ONLINE WRITTEN EMOTIONAL DISCLOSURE: EFFECTS ON PSYCHOLOGICAL WELL-BEING IN INDIVIDUALS WITH INFERTILITY

Katie Jane Cutts

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Abstract

The negative psychological impact of infertility and resultant stress inherent in the treatment of fertility problems is well documented in the research literature (Greil, 1997). Disclosing emotional reactions to stressful and traumatic experiences through writing has been shown to have beneficial effects on psychological well-being in healthy students and clinical populations (Frattaroli, 2006; Smyth, 1998). The principal aim of this thesis was to examine the efficacy of a written emotional disclosure intervention for individuals with infertility. However, initially the potential moderating effects of delivering the intervention via a computer and within the context of the home was examined. This showed that the adaptation of the traditional laboratory based, handwritten intervention developed by Pennebaker and Beall (1986) did not impact on the short-term or longer-term effects of written emotional disclosure. Subsequently, following a study which failed to recruit participants from an assisted conception unit, a written emotional disclosure intervention for individuals with infertility was examined using an internet-mediated delivery. Results showed that the effectiveness of writing about the experience of infertility and infertility treatment in producing changes in psychological well-being at 4-week follow-up was related to changes in the content of the disclosure narratives across the writing sessions. Analysis revealed that for those individuals in the disclosure group who showed an increase in their use of negative emotion words and cognitive words in their writing over the three disclosure sessions was associated with a reduction in symptoms of psychological distress. The findings of this study are discussed in relation to the heterogeneity of the sample and possible impact of the recruitment methods used. The contribution of this thesis has been to directly test the potential moderating effects of methodological variation in intervention delivery and examine the utility of a written emotional disclosure intervention for individuals with infertility, in doing so the findings of this thesis contribute to the expanding literature. Recommendations are made for more systematic examination of the utility of disclosure writing and investigation of the process by which positive changes occurs in individuals with infertility and other clinical populations.

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Abbreviations

ART – Assisted Reproductive Technologies

$DASS_{21}$ - Depression and Anxiety Stress Scale-21-Item

EEQ – Essay Evaluation Questionnaire

GSI – Global Severity Index

HCU - Health Care Utilisation

HFEA – Human Fertilization and Embryology Authority

ICSI - Intracytoplasmic Sperm Injection

IES – Impact of Event Scale

IUI - Intrauterine Insemination

IVF - In Vitro Fertilization

LIWC – Linguistic Inquiry and Word Count

M – Mean

NA – Negative Affect

OI - Ovulation Induction

PA – Positive Affect

PANAS – Positive and Negative Affectivity Scale

PSI – Physical Symptoms Inventory

SCL-90-R – Symptom Checklist -90-Revised

SD – Standard Deviation

Chapter 1

Introduction to the Thesis

1.1 Background to the Thesis

For most people having children is an essential part of adult life which is shaped by social, religious and cultural demands (Seibel, 1997). The negative impact that infertility and subsequent medical investigations and treatments can have on psychological functioning is well documented (Greil, 1997). Additionally, evidence suggests that there is a reciprocal relationship between stress and infertility, particularly that stress may influence the outcome of infertility treatment (e.g. Boivin & Schmidt, 2005). The literature on the psychological impact of infertility and infertility treatment clearly indicates a need for intervention in this population of individuals (Cousineau & Domar, 2007). Yet, the literature would also suggest hesitancy in couples to engage with the traditional face-to-face psychotherapeutic interventions that could help to alleviate their distress (e.g. Wischmann, 2008). The need for an intervention that is effective in reducing distress, yet is acceptable to this population of individuals is evident. A written emotional disclosure intervention is one such alternative that could be of potential benefit to individuals with infertility. Writing about stressful experiences in the context of written disclosure has been shown to provide psychological and physical health benefits in healthy individuals and patient populations (Frattaroli, 2006; Smyth, 1998). Moreover, such interventions are considered largely free from the stigma associated with traditional psychosocial therapies (Sexton & Pennebaker, 2004).

In order to examine the effectiveness of a written disclosure intervention in individuals with infertility a study was designed to implement and evaluate the effectiveness of such an intervention in individuals attending an assisted conception unit. Couples who were attending the unit for their first cycle of In Vitro Fertilization (IVF) were invited to take part in the study. Due to recruitment and attrition problems the continuation of this study became unfeasible (see Appendix A.2 for details of this study). Subsequently, an alternative method of recruitment and delivery was employed. Individuals with infertility

were recruited from online infertility support forums and the intervention protocol was adapted to be administered via the internet.

1.2 Structure of the Thesis

Chapter 2 (section 2.2) outlines the prevalence and causes of infertility and reviews the literature examining the psychological impact of infertility/infertility treatment and potential for intervention in this population. Section 2.3 provides a review of the psychological and physical health benefits of writing about traumatic and stressful experiences and the potential therapeutic value of a written disclosure intervention for individuals with infertility is proposed.

Chapter 3 provides a critical review of the methodological variation that is seen across written disclosure studies. To facilitate the implementation of the disclosure intervention in different populations and examine the limitations of written disclosure under various conditions it has been necessary to make modifications to the design features, procedure, instructional content and study setting of the original written disclosure protocol employed by Pennebaker and Beall (1986). In developing an intervention for individuals with infertility that can be administered within the home context, via a computer, this format deviates from the more traditional laboratory based, hand-written methodology that has been widely used in disclosure studies. The direct effects of deviating from the standard lab-based, hand-written methodology to a home-based, computer-mediated format are examined in two studies. Chapter 5 presents a study that directly examines the short-term and longer-term effects of writing using pen-and-paper versus typing on a computer. In a study examining the short-term effects of writing versus typing Brewin and Lennard (1999) found that participants who disclosed their thoughts and feelings using pen-and-paper reported a more negative mood immediately after the task than those who typed. A more recent examination of this effect by Sharp and Hargrove (2004) failed to support these earlier findings. No studies to date have examined the direct effect of modality on the longer-term benefits of disclosure, although studies utilising computer-mediated formats have reported positive intervention effects (Burton & King, 2008; Hemenover, 2003). A study examining the potential moderating effects of study context on outcome is presented in Chapter 6. Arguably, the main rationale for the adaptation of the laboratory based intervention to one that is delivered in the home setting has been to increase accessibility and flexibility of the intervention and maximize recruitment and retention of specific populations, in particular the chronically ill (e.g. Wetherell et al., 2005). The difficulty in evaluating the impact of context on disclosure from the available literature is that there

is a great deal of inconsistency in the findings of studies that have been conducted within the context of the home, which may in part be attributable to additional methodological differences and the diversity of populations across studies. Whilst some advocate the adaptation of the standard lab-based disclosure intervention for home application (van Middendorp et al., 2007) others have cautioned against the use of disclosure writing in the home (Sheffield, Duncan, Thomson & Johal, 2002). Therefore one of the aims of the thesis is to directly examine the effects of these methodological adaptations to the disclosure protocol prior to implementation of a home-based internet-mediated intervention for individuals with infertility.

Recruiting participants and conducting psychological studies via the internet presents a number of ethical and methodological issues. The implications of internet-mediated research and effectiveness of psychotherapeutic interventions delivered via the internet are reviewed in Chapter 7. Chapter 8 present the findings of an internet-mediated written disclosure intervention for individuals with infertility, recruited from online infertility support forums. One of the potential issues arising from conducting a writing intervention with individuals who are using internet forums is that they may already be disclosing their emotions in the context of the internet forum. In a study by Alpers et al. (2005) the content of the narratives taken from multiple disclosure studies were compared with the messages posted to a breast cancer support forum. The pattern (in terms of percentages) of emotional and cognitive words used by breast cancer forum members in their messages was similar to that of the pattern seen in multiple disclosure studies (Pennebaker, Francis & Booth, 2001). A study comparing the emotional content of the disclosure narratives written by intervention participants with infertility and the content of messages posted to an infertility support forum message board is presented in Chapter 9. Finally, Chapter 10 provides a summary of the main findings of the thesis and considers the implication of these findings within the broader context of the written disclosure literature. Future directions for research are discussed.

Chapter 2

Literature Review

2.1 Overview

Most men and women take for granted that they will have children when they so desire. Thus, infertility is for many an unanticipated life crisis (Menning, 1980). The broad aim of this thesis is to develop and implement a written disclosure intervention for individuals experiencing infertility. The purpose of this chapter is to provide a review and critical evaluation of the current literature relevant to the aims of the thesis. Section 2.2 describes the emotional reactions of individuals who are confronted with infertility and reviews the literature that has examined the reciprocal relationships between infertility, its associated treatments and psychological well-being. The need to develop and deliver effective psychosocial interventions is considered in light of research that suggests individuals dealing with infertility and infertility treatment perceive a number of constraints with face-to-face therapeutic interventions (e.g. McNaughton-Cassill, Bostwick, Arthur, Robinson & Neal, 2002). Section 2.3 describes a brief disclosure writing intervention (Pennebaker & Beall, 1986) that could be an effective alternative for individuals experiencing infertility. The short-term and longer-term effects of disclosure writing are described and the evidence for the effectiveness of writing as an intervention for reducing physical and psychological symptoms is reviewed.

2.2 Infertility

2.2.1 Definitions and Prevalence within the United Kingdom

Infertility affects one in seven couples in the United Kingdom (Human Fertilization and Embryology Authority; HFEA, 2006). The National Institute for Clinical Excellence (NICE) define infertility as the "failure to conceive after regular unprotected sexual intercourse for two years in the absence of known reproductive pathology" (NICE, 2004; p.10). Within this definition, the term infertility refers to an involuntary reduction in the ability to conceive children and not an absolute infertility (sterility) which is a total inability to conceive (Seibel, 1997). Infertility can be classified as primary, where pregnancy has never been achieved, or as secondary, where pregnancy has been

previously achieved, although the pregnancy may have not been successful (e.g. resulting in miscarriage or ectopic pregnancy; Taylor, 2004).

Within the medical and psychological literature there is some incongruity in the terminology used in reference to couples experiencing involuntary childlessness, with the terms sub-fertility and infertility often being used interchangeably. Couples who have a reduced chance of conception, because of one or more factors, are defined clinically as sub-fertile (Johnson & Everitt, 1995) which represents a relative condition. The term 'infertility' translates into 'not fertile', which is synonymous with sterility (Penzias, 2007). However, the term 'infertility' is used consistently within the medical and psychological literature as an identifier of the individual or population under examination irrespective of their diagnosis. Whilst it has been argued that the current terminology is misleading and ambiguous and should be abandoned (Habbema et al., 2004) others have suggested that this would lead to confusion and that the term 'infertility' should be accepted universally as an identifier of a problem (irrespective of the relative or absolute condition), with further qualifying details being presented as necessary (Jenkins et al., 2004). In this thesis, the term 'infertility' or 'infertile' will be used when describing the literature and population under investigation, with further categorization of the relative or absolute nature of the infertility problem when necessary.

2.2.2 Causes of Infertility

Impaired fertility has a wide range of causes with approximately 40 per cent of cases being due to female factor infertility, including ovulatory dysfunction, tubal damage, endometriosis and fibroids, and 30 per cent due to male factors such as reduced sperm motility and/or low sperm numbers (HFEA, 2004). The remaining 30 per cent of cases are either due to both partners or are unexplained (idiopathic) (HFEA, 2004). The single most important factor influencing a couples chances of conception is maternal age (Bayer, 2007; Skull, 2004). In general, female fertility is in decline from the age of 24 and accelerates in decline after the age of 37 (Bayer, 2007). Although semen parameters are known to change as the male ages (i.e. decreases in semen volume and motility) the impact on male fertility is often subtle or insignificant (Bayer, 2007). Particular lifestyle choices and behavioural factors are also associated with reduced chances of conception. For example, extremes of body weight are associated with ovarian dysfunction (Bayer, 2007) and smoking is associated with decreased fertility in both males and females (Seibel, 1997). Excessive alcohol consumption and

recreational drug use can also negatively impact fertility (Skull, 2004; Taylor, 2004). There is evidence that male fertility, particularly in relation to semen quality, can be adversely affected by certain occupational exposures including heat, radiation, chemical exposure and exposure to certain metals (Jensen, Bonde & Joffe, 2006). The possibility that stress may also play a causal role in male and female infertility has been considered (e.g. Wasser, Sewall & Soules, 1993).

2.2.2.1 Psychological stress as a cause of infertility

A number of studies have suggested that psychological factors such as interpersonal stress may be of significance in the aetiology of infertility (e.g. Wasser et al., 1993). While there is little evidence to support a 'psychogenic' hypothesis of infertility, which rests on the assumptions that unconscious conflicts and/or psychological disturbances in the couple are the root cause of idiopathic infertility (Greil, 1997; Wischmann, 2003), there is growing evidence that stress may play, at least a contributory, role in reproductive difficulties in both men (Clarke, Klock, Geoghegan & Travassos, 1999) and women (Csemiczky, Landgren & Collins, 2000).

Wasser and Isenberg (1986) describe the Reproductive Suppression Model as an explanation for reproductive failure in women. According to this model the human reproductive system has evolved sensitive physiological and behavioural mechanisms that suppress reproduction at times when environmental conditions are unfavourable. Psychosocial stress is one such factor that activates these physiological mechanisms (Wasser & Isenberg, 1986). Wasser et al. (1993) tested this hypothesis by examining the distress levels of infertile women with functional abnormalities of the hypothalamic-pituitary-ovarian axis (e.g. anovulation) in comparison to women with anatomical abnormalities (e.g. tubal damage) and a control group of women with functional abnormalities who were not trying to become pregnant. If psychosocial stress causes infertility (rather than infertility causing stress), it would be expected that both groups of women with functional abnormalities would report higher levels of stress than women with anatomical abnormalities. Consistent with this hypothesis both groups of women with functional abnormalities reported higher levels of distress and less social support than the women with anatomical infertility.

The link between stress and reproduction is a complex relationship (Campagne, 2006). Stress affects multiple sites, initiating cardiovascular, metabolic and endocrine responses (Ferin, 1999). A review by Ferin (1999) of the relationship between stress and women's reproductive cycles indicated a number of potential links between the

neuroendocrine stress response and inhibition of the hypothalamic-pituitary-gonadal (HPG) axis. Activation of the hypothalamic-pituitary-adrenal (HPA) axis during stress has the potential to inhibit the HPG axis and the secretion of hypothalamic gonadotropin-releasing factor (GnRH) (Ferin, 1999). During stress the HPA axis secretes corticotrophic-releasing hormone (CRH) from the hypothalamus, adrenocorticotrophic hormone (ACTH) from the pituitary and cortisol from the adrenal cortex (Bartlett, 1998). Glucocorticoids such as cortisol inhibit the HPG axis (Rivest & Rivier, 1995). Additionally, the immunosuppressant effects of cortisol may affect implantation of the fertilised ovum into the uterus lining (Smeenk et al., 2005). Cortisol levels have been shown to be higher among infertile women compared to fertile women (Csemiczky et al. 2000). Demyttenaere, Nijs, Evers-Kiebooms and Koninckx (1992) found that anticipatory cortisol (measured in the minutes before oocyte retrieval and embryo transfer) predicted pregnancy rates in women undergoing assisted reproduction. Studies that have indirectly examined the impact of stress on male reproduction have indicated a decline in semen quality in the male partners of women undergoing fertility treatment (Clarke et al., 1999; Harrison, Callan & Hennessey, 1987).

2.2.3 The Treatment of Infertility

Approximately 50 per cent of couples who have experienced an unexpected delay in conception will conceive naturally or with minimal medical intervention (Taylor, 2004). For those who experience a more persistent problem[1] there are a number of treatment options available.

2.2.3.1 Drug therapies and surgical procedures

Ovulatory dysfunction accounts for approximately 30 per cent of female factor diagnoses (Hamilton-Fairley & Taylor, 2004). The medical treatment of ovulatory problems with ovulation induction (OI) can be achieved with drug therapies (i.e. clomiphene citrate, metformin, gonadotropins) or surgically using laparoscopic ovarian diathermy[2] (LOD). Unfortunately, OI drugs can produce a number of side effects including nausea, vomiting, headaches and emotional irritability (Oskowitz, 2007), and a less common but more serious complication of OI drug treatments is ovarian hyperstimulation syndrome (OHSS) which develops in 1-2 per cent of women,

[1] The National Institute for Clinical Excellence (NICE, 2004) recommend that clinical investigations should be offered when couples have been trying to conceive, without success, for a period of no less than 12 months.

[2] Also known as 'drilling' this procedure involves making punctures in the ovary to encourage ovulation (Hamilton-Fairly & Taylor, 2004).

symptoms include abdominal pain and distension, shortness of breath and vomiting (Bayer, 2007). The success rates of drug versus surgical OI are similar (approximately 50 per cent live birth rate; Farquhar et al., 2007), yet drug therapy carries a much greater risk of multiple pregnancy (Hamilton-Fairley & Taylor, 2004). Procedures such as hysterosalpingogram[3] (HSG) and laparoscopy[4] are used in both the diagnosis and management of tubal infertility (Bayer & Alper, 2007).

In the case of male infertility, drug therapies are rarely used, though gonadotropin therapy is used in the treatment of the rare condition hypogonadotropic hypogonadism, which is caused by pituitary or hypothalamic defects (Hirsh, 2004). Surgical procedures are used in cases where there is an obstruction of the testicle as in some cases of obstructive azoospermia (no sperm in the semen) or in the case of vasectomy reversal (Hirsh, 2004). In cases where sperm is being produced and there is an obstruction sperm production is impaired, surgical sperm retrieval techniques such as percutaneous epididymal sperm aspiration (PESA) and testicular sperm extraction (TESE) can be performed (Bayer, 2007). The retrieved sperm can then be used in the process of assisted reproduction.

2.2.3.2 Assisted reproductive technologies (ART)

ART procedures include any technique in which the oocytes and/or sperm are handled or manipulated outside of the body (McLachlan, 1997). ART procedures are generally the last treatment option for those couples for whom other less invasive treatments have been unsuccessful. The three main types of assisted reproduction are Intrauterine Insemination (IUI), In Vitro Fertilization (IVF) and Intracytoplasmic Sperm Injection (ICSI). IUI is a minimally invasive form of assisted reproduction that is available to couples where the female is ovulating regularly and is often the first step in treating couples with unexplained infertility (Rowell & Braude, 2004), mild male factor fertility problems or minimal to mild endometriosis (NICE, 2004).

The most commonly performed and recognized ART procedure for treating infertility is IVF (Laufer, Simon, Hurwitz & Glatstein, 1997). IVF is a procedure in which fertilization occurs outside of the woman's body. The resulting embryo is then transferred to the woman's uterus. The average IVF cycle lasts 4-6 weeks from start to the pregnancy test and comprises of five stages; ovarian hyper-stimulation, egg retrieval, fertilization,

[3] An out-patient x-ray procedure that involves introducing an iodine-containing solution into the uterine cavity and fallopian tubes (Bayer, 2007).
[4] A day surgery procedure that requires anaesthesia (Khalaf, 2004).

embryo culture, and embryo transfer (Centre for Reproductive Medicine and Fertility, 2002). IVF is used to treat both female and male factor infertility, and the minimum requirements for IVF are that the patient has a normal uterine cavity, can produce sufficient oocytes (although IVF is also used with oocyte donation) and that there is enough sperm to achieve fertilization (Laufer et al., 1997).

In cases of severe oligozoospermia[5], ICSI is used at the fertilization stage of the IVF process, whereby a single sperm is injected directly into the oocyte (van Steirteghem, Liebaers & Devroey, 1997). ICSI represents 44 per cent of all IVF treatments in the United Kingdom (HFEA, 2006). Current figures suggest that for women under the age of 35 years the success rate for IVF/ICSI is 28.2 per cent. The success rate of IVF gradually reduces for women as they become older, with a decline to 23.6 per cent for women aged 35-37, 18.3 per cent for women aged 38-39 and 10.6 per cent for women aged 40-42 (HFEA, 2006).

2.2.4 Emotional Impact of Infertility

For most people having children is an essential part of adult life which is shaped by social, religious and cultural demands (Seibel, 1997). According to Menning (1980) infertility is for many an unanticipated life crisis that carries the potential for maladjustment but also positive growth. In a study of couples entering treatment, Freeman, Boxer, Rickels, Tureck and Mastroianni (1985) reported that 49 per cent of women and 15 per cent of men considered infertility to be the most upsetting experience of their life. Indeed, the emotional response to infertility is well documented (Cousineau & Domar, 2007; Greil, 1997). Dunkel-Schetter and Lobel (1991) identify five reactions that are dominant within the literature (1) grief and depression, (2) anger, (3) guilt, (4) shock and denial and (5) anxiety. In fact infertile women report comparable levels of depression and anxiety to women with cancer, myocardial infarction and Human Immunodeficiency Virus (HIV) (Domar, 1993).

Lazarus and Folkman's (1984) transactional model of stress and coping has provided a theoretical framework for understanding the emotional impact of infertility (Stanton, 1991; Stanton, Tennen, Affleck & Mendola, 1991). From this perspective stress occurs

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[5] Severe oligozoospermia is a defined as a sperm count <5 x 10^6/ml, normal semen parameters are defined as a sperm count >20 x 10^6/ml, progressive motility >50% and normal morphology >30% (WHO, 1999).

when an event is "appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p.19). According to Lazarus and Folkman (1984) it is the evaluation of an event as relevant and negative that constitutes a stressful appraisal. Primary appraisals of stressors that may lead to the perception of stress can be defined as those that constitute harm/loss (i.e. damage that the person has already sustained), threat (i.e. anticipated harm or loss) and challenge (i.e. events that hold the potential for gain or growth). For individuals who consider parenthood as an important life goal, infertility may well constitute a stressful event. Indeed, Stanton et al. (1991) found that couples can appraise their infertility as both harmful and challenging. Women who perceived their infertility to be more threatening and less challenging reported higher levels of distress and this was particularly so in women who perceived they had less control over their fertility.

Feelings of loss of control among couples experiencing infertility have been commonly reported in the literature (Dunkel-Schetter & Lobel, 1991; Mahlstedt, 1985; Matthews & Matthews, 1986). According to Dunkel-Schetter and Lobel (1991) infertile couples experience two types of loss of control; the loss of control over current events (i.e. daily activities, sexual relationships, bodily functions); and future events (i.e. the ability to plan for the future, the ability to meet life goals). The evidence indicates that this loss of control may be particularly stressful (Benyamini, Gozlan & Kokia, 2005; Campbell, Dunkell-Schetter & Peplau, 1991). Campbell et al. (1991) found that the relationship between control in infertility and psychological adjustment was differentiated by specific domains of control in women undergoing IVF. Campbell et al. (1991) distinguished between general (i.e. work, interpersonal relationships) versus situation specific control (i.e. pregnancy, infertility treatment), and their findings indicated that general control and infertility specific control were largely unrelated, both predicting different aspects of psychological adjustment. While higher levels of general control were predictive of life satisfaction lower levels of infertility specific control predicted depression. Women felt less in control of becoming pregnant but more in control of their medical treatment.

For some, infertility can have a positive impact on marital relationships by increasing communication, bringing couples closer together and strengthening the relationship (Schmidt, Holstein, Christensen & Boivin, 2005). Yet, the social stigma associated with infertility means that infertile couples often experience feelings of social isolation in relation to other interpersonal relationships (Abbey, Andrews & Halman, 1991; Atwood & Dobkin, 1992). Whilst social relationships can be supportive for individuals experiencing fertility problems they can simultaneously be a source of stress (Wilson &

Kopitzke, 2002). Mindes, Ingram, Kliewer and James (2003) considered the role of unsupportive social interactions, and the impact these have on psychological adjustment among women with fertility problems. Such unsupportive responses include behavioural and emotional disengagement, intrusiveness, minimizing the problem and blaming. Results indicated that infertility-specific unsupportive interactions were associated with increased depressive symptoms, overall distress and low self-esteem. This relationship appeared to be partially mediated by avoidance coping, that is, for women in this sample the experience of negative social interactions activated a coping process that proved to have negative psychological consequences.

2.2.4.1 Coping with infertility and infertility treatments

According to Lazarus and Folkman (1984) coping efforts can be categorised into two main types, problem-focused and emotion-focused. Problem-focused coping consists of efforts aimed at solving or changing the situation. In the context of infertility it can be argued that this could include seeking out information and medical opinion, seeking treatment and acting upon the information and options available. Emotion-focused coping is aimed at reducing the emotional distress associated with the situation and includes such strategies as escape/avoidance and denial. Stanton (1991) suggests that both emotion-focused and problem-focused strategies might be useful in the context of infertility. More specifically Stanton (1991) suggested that problem-focused strategies may be of use in the context of diagnostic and treatment procedures whilst emotion-focused strategies may be helpful in attenuating the resultant emotional distress and lack of control in these situations. Couples do indeed use multiple coping strategies in their effort to cope with their infertility (Stanton, Tennen, Affleck & Mendola, 1992). When comparing the coping efforts of the men and women in the study Stanton et al. (1992) found that women were more likely to use social support and avoidance, whereas men were more likely to use distancing, self-control and problem-solving.

Studies that have examined the effect of coping strategies in reducing distress have consistently shown that avoidance coping is associated with higher levels of psychological distress in both men and women (Berghuis & Stanton, 2002; Cook, Parsons, Mason & Golombok, 1989; Peterson, Newton, Rosen & Skaggs, 2006; Stanton et al., 1992). Conversely, seeking social support, planful problem solving and reappraisal have been shown to be more adaptive coping strategies (Berghuis & Standton, 2002; Peterson et al., 2006; Stanton et al., 1992).

In a meta-analysis of gender differences in coping, Jordan and Revenson (1999) reviewed eight studies that examined both men and women's coping responses to the stress of infertility. The results indicated that there were more similarities than differences between the sexes. Men and women only differed significantly on three of the eight coping strategies examined in the analysis. Specifically, women used the strategies of seeking social support, escape/avoidance and positive reappraisal more than men.

Taking the view that the couple should be studied as the unit of analysis within the context of infertility, some studies have examined the impact of dyadic coping and its relationship with psychological adjustment to infertility (Berghuis & Stanton, 2002; Levin, Sher & Theodos, 1997; Peterson, Newton & Rosen, 2003; Stanton et al., 1992). For example, Berghuis and Stanton (2002) found that both the individual's own coping efforts and their partner's coping influenced distress. For women, when they or their partners made more use of problem-focused coping, depression levels were found to be lower. For men, depressive symptoms were lower when they or their partner also used less avoidant coping. Levin et al. (1997) demonstrated the effects of the concordance of coping efforts within infertile couples using the Coping Inventory for Stressful Situations – Situation Specific Coping (CISS-SSC; Endler & Parker, 1994). Couples who were concordant in high task-oriented coping reported higher levels of marital satisfaction, which was lower amongst couples who were concordant in their low use of task-oriented coping. In relation to emotion-oriented coping the findings indicated that the lowest levels of marital satisfaction were reported when coping was discordant, specifically where men used high amounts of emotion-oriented coping and their partners used low amounts.

Studies that have looked specifically at coping with ART indicate that problem-focused coping strategies are more adaptive in this context (Demyttenaere et al., 1998; Edelmann, Connolly & Bartlett, 1994). Whereas seeking support is often adaptive for women experiencing infertility (Slade, Raval, Buck & Lieberman, 1992). A study by Hynes, Callan, Terry and Gallois (1992) found that in women, seeking social support after a failed IVF attempt was associated with increased levels of depression. The authors suggest that in this situation women may seek social support for emotional rather than instructional reasons (Hynes et al., 1992).

Therefore, variability in emotional reactions to infertility and its associated treatments may in part be determined not only by the adaptive value of the coping strategies used

by the individual in dealing with the problem but also by the reciprocal coping strategies used by their partner. There are however a number of other factors that are associated with the variability in emotional reactions to infertility.

2.2.4.2 Variability in the emotional reactions to infertility

The distress of infertility may be different for men and women as women tend to report higher levels than their male partners (Daniluk, 1997; Wright et al., 1991). There are thought to be a number of reasons for this difference. Even though women now have more career options available to them compared with past generations of women, motherhood is still considered to be the primary goal for women (Ullrich, 2000). Additionally, regardless of the location of diagnosis of the aetiology of the infertility, the majority of invasive tests and treatments are borne by the female. Indeed, women in couples where the fertility problem lies with the male report similar levels of distress to women who are themselves infertile (Natchtigall, Becker & Wozny, 1992). One factor that is associated with a more negative response in men is a male factor diagnosis (Connolly et al., 1992; Natchigall et al., 1992; Throsby & Gill, 2004). Male infertility is thought to threaten the male role, as virility is an important component of masculinity (Connolly, Edelmann & Cook, 1987).

The depression associated with infertility has been shown to increase with age in women, and this is thought to be a consequence of both the biological limits on reproductive lifespan and age limits on alternative parenting options, such as adoption (Berg & Wilson, 1991). However, others have noted a reduction in depressive symptoms among women as the number of treatments and duration of infertility increases (Demyttenaere et al., 1998). Infertility is not a discrete event but an unfolding process (Dunkel-Schetter & Lobel, 1991), and as such, psychological functioning across stages of diagnosis and treatment fluctuates. An acute stress reaction to the initial diagnosis and treatment phase shifts into a more chronic stress reaction to ongoing treatment and uncertainty (Berg & Wilson 1991). This chronic stage, which Berg and Wilson (1991) suggest is more pervasive around the third year following diagnosis and beyond, is related to the stage in the treatment process at which ART are often attempted. Studies that report the emotional impact of infertility most often draw their samples from fertility clinics, and these patients are often at various stages of their infertility course. This may therefore significantly impact on the emotional reactions reported. It is prudent therefore to consider the emotional impact of infertility treatment at different stages within the treatment cycle.

2.2.5 Emotional Reactions Before, During and After Assisted Reproduction

To quantify accurately the stress involved in ART is difficult (Hammarberg, Astbury & Baker, 2001), primarily because couples who arrive at this juncture will undoubtedly have been experiencing fertility problems for a number of years. The following section will consider the emotional reactions at different stages of the treatment process. The majority of research has been conducted with IVF patients.

2.2.5.1 Before

The possibility of failure of the IVF process is often given little consideration by those undergoing IVF for the first time. Couples are often overly optimistic and have unrealistic expectations of the treatment being successful (Collins, Freeman, Boxer & Tureck, 1992; Slade, Emery & Lieberman, 1997; Visser, Haan, Zalmstra & Wouters, 1994). Although couples entering IVF treatment are in general well adjusted (Edelmann et al., 1994; Holter, Anderheim, Bergh & Möller, 2006; Verhaak et al., 2001) some studies show that women have higher levels of depression (Merari, Chetrit & Modan, 2002) and anxiety (Slade et al., 1997; Theiring, Beaurepaire, Jones, Saunders & Tennant, 1993; Visser et al., 1994) prior to starting treatment than population norms. Women also tend to report higher levels of depression and anxiety than their male partners when embarking on the IVF process (Holter et al., 2006; Leiblum, Kemmann & Lane, 1987; Slade et al., 1997) and also anticipate that the treatment process will be more stressful (Collins et al., 1992).

In a longitudinal study of 144 couples embarking on their first cycle of IVF treatment Slade et al. (1997) found that women scored higher than their male partners on a measure of state and trait anxiety and that women's scores were higher than population norms, whereas men scored below population norms. This gender difference in the reporting of anxiety is not surprising considering that it is the female partner who is the primary focus of this invasive treatment process. Similarly, depression scores were also significantly higher for the female partners, but were not significantly different to population norms (Slade et al., 1997). This finding is consistent with other studies that have found relatively normal levels of depression in women embarking on an IVF programme for the first time (Edelmann et al., 1994; Verhaak et al., 2001; Visser et al., 1994). However, women undergoing repeat cycles are at greater risk of developing clinically relevant levels of depression (Beaurepaire, Jones, Thiering, Saunders & Tennant, 1994: Thiering et al., 1993). According to Thiering et al.

(1993) elevated depression levels in repeat cycle patients may reflect a more stable response to their ongoing failure to conceive. Depression is associated with loss, and for repeat cycle patients the loss of possible success and parenthood is more pertinent than it is for first time patients who have high expectations of the treatment being successful (Beaurepaire et al., 1994).

2.2.5.2 During

Responses to different stages of the IVF process have been examined both retrospectively (Baram, Tourtelot, Muechler & Huang, 1988; Hammarberg et al., 2001; Leiblum et al., 1987) and prospectively (Boivin & Takefman, 1995; Merari, Feldberg, Elizur, Goldman & Modan, 1992; Reading, Chang & Kerin, 1989). A prospective longitudinal study by Boivin and Takefman (1995) examined fluctuations in stress levels over a complete IVF cycle using a daily stress measure. The study found that women reported higher levels of stress at the stimulation, oocyte retrieval and embryo transfer stages of the process, with lower levels of stress at the luteal phase (waiting period before pregnancy test). These results are consistent with the findings of an earlier prospective study by Merari et al. (1992). Yet, when Boivin and Takefman (1995) asked women to retrospectively recall how they felt at the luteal phase, they remembered this period to be the most stressful irrespective of treatment outcome. According to Boivin and Takefman (1995) the discrepancy between retrospective and momentary assessment may be due to women downplaying their negative reactions at the time as a means of coping. Retrospectively women are more able to freely express how they were feeling. Consistent with this explanation, Hammarberg et al. (2001) found that when women were asked to identify the stress associated with IVF up to three years after treatment, the participants rated oocyte retrieval and the luteal phase as the most stressful.

Few studies have examined how the male partner reacts to the IVF process. However one study found that while women experienced more overall distress and fatigue throughout the cycle, the reaction pattern relating to treatment stage was similar for men and women (Boivin et al., 1998). Increases in levels of distress at oocyte retrieval, fertilization, embryo transfer and pregnancy test day were evident, and more marked increases in distress were associated with the oocyte retrieval and embryo transfer stages in both men and women. In a retrospective study of couples after unsuccessful treatment, women reported higher stress levels at every stage of the IVF process compared to men, but both men and women ranked the luteal phase and discovering

that the IVF treatment had been unsuccessful as the most stressful aspects of the process (Baram et al., 1988).

2.2.5.3 After

The single most important determinant in emotional response following IVF is whether pregnancy has been achieved (Holter et al., 2006). In a systematic review of the literature on the psychological impact of IVF, Verhaak, Smeenk, Evers et al. (2007) found that when IVF treatment results in pregnancy the negative emotions invoked by the treatment process immediately disappear. For those who do not achieve a pregnancy, treatment failure is highly distressing in the short-term (Slade et al., 1997; Verhaak, Smeenk, van Minnen, Kremer & Kraaimaat, 2005) yet there are few indications of a protracted negative reaction, and couples tend to adjust well in the long-term (Freeman et al., 1987; Verhaak, Smeenk, Evers et al., 2007; Weaver, Clifford, Hay & Robinson, 1997). The most commonly reported reactions to unsuccessful treatment are frustration, sadness, anger and depression (Baram et al., 1988; Holt et al., 2006; Leiblum et al., 1987). Whilst life satisfaction is often lower in women who do not conceive as a result of IVF (Hammaberg et al., 2001; Weaver et al., 1997), treatment failure does not appear to have a negative impact on marital relationships (Freeman et al., 1987; Hammarberg et al., 2001: Leiblum et al. 1987) and has in some studies been shown to have a positive effect, strengthening relationships and improving communication (Baram et al., 1988; Holter et al., 2006: Leiblum et al., 1987).

In order to determine the long-term impact of unsuccessful treatment, Verhaak, Smeenk, Nahuis et al. (2007) conducted a prospective study of 298 women entering their first IVF (or ICSI) treatment cycle. Participants were followed over a five year period. The results indicated that women who did not achieve a pregnancy had higher levels of anxiety and depression just after treatment than they did pre-treatment, but by the three and five year follow-up period depression and anxiety had returned to pre-treatment levels. Depression and anxiety levels were higher in women at follow-up who were still pursuing the desire for a biological child compared to women who had chosen to pursue adoption or had chosen to pursue other life goals (e.g. career). One study that has examined the longer-term consequences of unsuccessful treatment in couples who had made the decision to cease treatment found that poorer adjustment to infertility was associated with a lack of social support, less marital and sexual satisfaction and low self esteem. Gender, age, or the location of the diagnosis, were

not associated with adjustment (Daniluk & Tench, 2007). Couples who adopted (50% of the sample) demonstrated better adjustment overall.

2.2.6 The Impact of Psychological Stress on the Outcome of Assisted Reproduction

Accumulating evidence suggests that there is a reciprocal relationship between stress and infertility (see section 2.2.2.1), particularly that stress may influence the outcome of infertility treatment. A number of studies investigating the relationship between psychological factors and ART treatment report an association between negative psychological symptoms in female patients and treatment success rates. In particular, higher levels of depression (e.g. Thiering et al., 1993), state anxiety (e.g. Demyttenaere et al., 1988; Sanders & Bruce, 1997; Smeenk et al., 2001) and infertility specific stress (Boivin & Schmidt, 2005) have been shown to be associated with lower pregnancy rates.

In a multi-centre study, Smeenk et al. (2001) found that higher baseline levels of depression and state anxiety (measured in the period just before down-regulation[6]) predicted lower pregnancy rates in female IVF (and ICSI) patients, but did not predict the response to stimulation or fertilization. Similarly, Klonoff-Cohen, Chu, Natarajan and Sieber (2001) found that women who reported experiencing higher levels of stress at baseline (first clinic visit) had lower pregnancy rates and live births, however in this study baseline stress was also associated with a decrease in the number of oocytes retrieved and embryos transferred. Procedural stress (assessed by immediate ratings of affect prior to oocyte retrieval) was associated with success of oocyte retrieval, fertilization and embryo transfer but not treatment outcome. Boivin and Schmit (2005) looked specifically at the effects of infertility related stress on treatment outcome in both men and women. They found that higher levels of infertility stress in both partners was associated with poorer outcome after controlling for age and duration of infertility. More specifically, infertility related personal and marital stress showed stronger effects, and the number of cycles needed to become pregnant was associated with marital stress in women. Additionally, biological indicators of stress such as cardiovascular reactivity (Facchinetti, Matteo, Artini, Volpe & Genazzani, 1997), cortisol (Demyttenaere et al. 1992) and immunological changes (Gallinelli et al., 2001) show an association with treatment outcome.

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[6] Down-regulation of the pituitary using Gonadotropin Releasing Hormone (GnRH) agonist is the first stage of treatment required to prevent a Luteal Hormone (LH) surge prior to ovulation induction (Alper, 2007).

In contrast, some studies have found no influence of psychological factors on treatment outcome (Anderheim, Holter, Bergh & Möller, 2005; Merari et al., 2002; Merari et al., 1992; Slade et al., 1997). According to Merari et al. (2002) these differences in reported findings may be due to variations in the timing of assessment, or the use of different self-report measures and demographic differences in study participants (e.g. location of diagnosis, duration of fertility). In fact, the participants recruited by Slade et al. (1997) and Anderheim et al. (2005) were new referral patients, and as discussed in section 2.2.5.1 those who are experiencing treatment for the first time tend to be overly optimistic about their chance of success and do not exhibit the same emotional responses as repeat cycle patients.

The emotional stress associated with the IVF process has been shown to be one of the most influential factors in a couple's decision to discontinue treatment (Olivius, Friden, Borg & Bergh, 2004; Smeenk, Verhaak, Stolwijk, Kremer & Braat, 2004). Accordingly, there is a general consensus that patients undergoing ART treatment should receive counselling and support in order to reduce the stress levels prior to and during the treatment process (Domar, 2004; Slade et al., 1997). Indeed, psychosocial interventions have been shown to be effective in reducing negative affect in both men and women experiencing infertility (Boivin, 2003; Wischman, 2008).

2.2.7. Psychosocial Interventions

A number of different approaches have been used in the delivery of psychosocial interventions for infertile couples including cognitive behavioural treatment (CBT; e.g. Facchinetti, Tarabusi & Volpe, 2004), counselling (e.g. Connolly et al., 1993), stress management and coping training (e.g. McQueeny, Stanton & Sigmon, 1997) and group based interventions (e.g. McNaughton-Cassill et al., 2002). In a review of 25 studies, Boivin (2003) concluded that there was "moderate support for beneficial effects of psychosocial interventions on the well-being of infertile people" (p.2333). Overall, the majority of interventions showed some positive effects on at least one outcome measure. Positive effects on measures of anxiety (61.5% of studies) were more frequently reported than on measures of depression (38.4% of studies). Positive intervention effects were reported in all studies using infertility specific stress measures (e.g. McQueeny et al., 1997) but interventions generally failed to have an impact on interpersonal measures (i.e. marital and sexual satisfaction).

In a study by Domar et al. (2000) the effectiveness of a CBT based group intervention and a support group intervention were examined against a control group in women who

had been trying to conceive for between one and two years. Results indicated that both the treatment groups received positive benefits compared to controls at six and 12 month follow-up, with the CBT group reporting significant improvements over the support group. However, this study reported high attrition rates with control group participants citing distress as the main reason for discontinuation with the study. Attrition rates were also high in the intervention groups. Participants cited a number of reasons for drop-out, which included dissatisfaction with group assignment, a wish to seek other psychological treatment and an unwillingness to participate in a group based intervention (Domar et al., 2000). The majority of education-focused interventions included in the review by Boivin (2003) were group-based (70%), yet infertility patients are often reluctant to participate in support groups (Schmidt et al., 2003). Indeed, a study by McNaughton-Cassill et al. (2002) similarly found that participants were often unwilling to participate in scheduled group sessions due to time constraints, travel problems and work commitments. Therefore, McNaughton-Cassill et al. suggest that alternative approaches to the delivery of psychosocial interventions should be considered for infertile individuals who experience these constraints.

A few studies also report a positive effect of intervention on pregnancy rates. Boivin (2003) identified three studies (Domar et al., 2000; Sarrel & de Cherney, 1985; Tuschen-Caffier, Florin, Krause & Pook, 1999) that had shown an effect on pregnancy rates, out of eight studies that had used pregnancy as an outcome. Boivin (2003) reports an average cumulative pregnancy rate of 48.3 per cent in studies that found positive effects on other outcome measures compared to 24.7 per cent in studies that reported no effect. In a more recent randomized controlled trial Hosaka, Matsubayashi, Sugiyama, Izumi and Makino (2002) implemented a five session group intervention (including relaxation training, psychological support and guided imagery) in female infertility patients. Compared to a non-treatment group of controls, women in the intervention group reported a significant reduction in distress. A significant reduction in natural killer[7] cell activity was also found in the intervention group in addition to an increased pregnancy rate, indicating a potential immunological pathway through which psychosocial interventions can impact upon biological outcomes. Further research is needed to determine why some interventions might be effective in improving pregnancy rates.

[7] Natural killer cells are non-specific lymphocytes that provide immunological defence against cells which are infected or cancerous (Herbert & Cohen, 1993).

2.2.8 Conclusion

In consideration of the stressful nature of infertility and its associated treatments, the HFEA (2004) specifies that all patients seeking IVF/ICSI or donor insemination should be offered psychosocial counselling. Yet, patients often do not perceive the need for counselling (Cousineau & Domar, 2007). In a survey of fertility clinics across the UK, 71 per cent of patients said they would use counselling services if they were free of charge, however, the level of uptake is low with studies reporting as little as eight to 12 per cent of patients actually seeking counselling (Boivin, Scanlan & Walker, 1999; Kerr, Brown & Balen, 1999). This discrepancy is thought to be caused by numerous factors including time constraints, fear of being labelled as having a psychological problem, and fear of stigmatization (Boivin et al., 1999; Wischmann, 2008).

The literature on the psychological impact of infertility and infertility treatment clearly indicates a need for intervention in this population of individuals (Cousineau & Domar, 2007). Yet, the literature would also suggest hesitancy in couples to engage with psychological interventions that could help to alleviate their distress. One possible approach that has been suggested as an alternative for individuals experiencing infertility is a brief writing intervention (McNaughton-Cassill et al., 2002). Research examining coping with stressful events has shown that writing about stressful experiences can be beneficial for both psychological (Greenberg, Wortman & Stone, 1996; Páez, Velasco & Gonzalez, 1999) and physical well-being (Greenberg & Stone, 1992; Pennebaker & Beall, 1986), and that such interventions are considered largely free from the stigma associated with traditional psychosocial therapies (Sexton & Pennebaker, 2004).

2.3 The Writing Cure: Disclosure Writing

2.3.1 Emotional Expression

Kennedy-Moore and Watson (2001) define emotional expression as "observable verbal and non-verbal behaviours that communicate or symbolise emotional experience" (p.187). Emotional expression can take a number of forms, for example, laughing can demonstrate an expression of happiness, whilst crying can demonstrate an expression of sadness. One particular form of emotional expression is that of emotional self-disclosure. Verbal self-disclosure is at the heart of psychotherapy and within this context the expression of private thoughts and feelings can be beneficial (Stiles, 1995). The expression of emotion can be a means of alleviating distress (Stanton, Danoff-Burg, Cameron & Ellis, 1994). It would appear that the benefits of self-disclosure are

not limited to verbal expression as research has shown that there are psychological and physical health benefits to be gained through written self-disclosure (see Smyth 1998).

2.3.2 Written Emotional Disclosure

The laboratory based technique developed by Pennebaker and Beall (1986) involves healthy participants being assigned randomly to one of two or more conditions and being asked to write about either traumatic or stressful experiences (experimental group) or superficial topics (control group). Participants are typically instructed to write about their assigned topic for 3-5 consecutive days, for 15-20 minutes each day (Pennebaker & Seagal, 1999). Pennebaker and Beall (1986) utilised a trauma-emotion group, who were asked to write only about their feelings relating to an upsetting experience; a trauma-facts group, who wrote about only the facts of a personal experience, devoid of any emotionality; a trauma-combination group, who wrote about the factual aspects of a personal experience along with their feelings about the experience and a control group who wrote about different 'trivial' topics on the four occasions (e.g. describe your living room). All participants wrote for a period of 20 minutes on four consecutive days in the privacy of a laboratory cubicle. Participants in the trauma conditions disclosed a wide range of personal topics such as the death of a close family member or friend, the breakdown of relationships, health problems, sexual and physical abuse and leaving home to attend college. The personal nature of some of these topics indicated that individuals were able and willing to disclose details about intensely personal experiences through this medium. Furthermore the majority of participants chose to write about topics that they had not previously discussed with other people (Pennebaker & Beall, 1986). Pennebaker and Beall (1986) demonstrated that writing about the emotions surrounding personally relevant topics was associated in the short-term with an increase in blood pressure and negative mood, yet in the long-term participants reported a reduction in physical health problems.(i.e. colds or flu, headaches).

2.3.3 Short-term Effects

2.3.3.1 Subjective distress

In the short-term, writing about emotionally salient events can and often does result in transitory distress (Pennebaker & Seagal, 1999). The traditional writing instructions that typically ask participants to focus on their deepest thoughts and feelings about a stressful or traumatic event will inherently evoke negative emotions. For an event to be

appraised as stressful or traumatic it will pose some form of challenge, threat or harm to the individual and their goals (Lazarus & Folkman, 1984). Topics that individuals disclose in their writing, though considerably varied, are often powerful recounts of events such as bereavement, divorce, or physical and sexual abuse. Immediately after disclosure participants report feeling more nervous and guilty (Francis & Pennebaker, 1992), more sad and depressed (Batten, Follette, Hall, & Palm, 2002), have reported significantly higher levels of anxiety (Kloss & Lisman, 2002) and experience more physical symptoms such as a racing heart, stomach-ache, and headache (Greenberg & Stone, 1992; Páez et al., 1999; Pennebaker, Kiecolt-Glaser & Glaser, 1988) than controls who write about non-emotional topics. The initial distress that participants experience after their disclosure does not appear to have a negative impact on their overall subjective experience of participation in the studies. Participants typically report that they find the whole experience to be valuable and meaningful (Pennebaker et al., 1988), and the majority agree that they would participate in the study again (Pennebaker, 1989).

In a meta-analysis of 13 disclosure studies Smyth (1998) concluded that there was no relationship between the level of post-writing distress and subsequent changes in health outcomes. There does however appear to be an association between the level of physiological reactivity in response to writing and longer-term outcomes in disclosure participants (Epstein, Sloan & Marx; 2005; Sloan & Marx, 2004b; Sloan, Marx & Epstein, 2005).

2.3.3.2 Physiological arousal

Physiological arousal is regulated by the autonomic nervous system (ANS), which is subdivided into two anatomically separate structures. These are called the sympathetic nervous system (SNS), which has excitatory effects and controls functions associated with arousal (e.g. increased pulse and heart rate), and the parasympathetic nervous system (PNS), which has inhibitory effects and controls functions associated with states of relaxation, with an associated reduction in heart rate (Carlson, 2007). When faced with physical or psychological stress the SNS becomes dominant and increases in cardiovascular reactivity occur in response to the threat or challenge encountered (Applehans & Luecken, 2006). It follows therefore that changes in arousal initiated by emotional disclosure will be associated with cardiovascular reactivity. Increases in diastolic blood pressure (DBP), systolic blood pressure (SBP) and heart rate have been shown to be associated with such disclosure. Participants who talked into a voice recorder for six minutes about traumatic and upsetting experiences demonstrated such

reactivity (Pennebaker, Hughes & O'Heeron, 1987). In the period after talking there was a significant drop in SBP levels to below that at baseline for those rated as high discloser's (based on judges rating of how personal and stressful the disclosed trauma had been).

Whilst writing and talking about traumatic events may differ in that one modality requires the vocalisation of expression and the other does not, the pattern of cardiovascular reactivity to written emotional disclosure appears to reflect that produced by talking. Pennebaker and Beall (1986) found that participants in the disclosure group evidenced a significant short-term increase in SBP after the first writing session with a moderate decrease in SBP after writing in subsequent sessions. Similarly, Epstein et al. (2005) found a significant increase in heart rate at first writing session for participants in the disclosure group when compared to controls. There were no group differences in cardiovascular reactivity at subsequent sessions. Interestingly, greater heart rate reactivity was found to be associated with reductions in depressive symptoms and physical health complaints at one month follow-up (Epstein et al., 2005).

As a measure of emotional reactivity to the writing task, Sloan and Marx (2004b) used salivary cortisol[8] before and after writing sessions. Results indicated a significant initial increase in salivary cortisol at the first writing session for disclosure participants compared to controls, however, disclosure and control participants did not differ in physiological reactivity at subsequent sessions. Sloan and Marx (2004b) point out that salivary cortisol is sensitive to novelty and as such the findings of the study could be indicative of a physiological response to the novelty of the writing task at the first writing session. The fact that other studies have shown a consistent pattern of findings across writing session in the disclosure participants using other physiological indicators of emotional reactivity such as cardiovascular activity (Epstein et al., 2005; Pennebaker & Beall, 1986) would suggest that the changes in salivary cortisol found by Sloan and Marx (2004b) are more likely to be a mechanism of emotional disclosure rather than a response to the novelty of the writing task. Furthermore, initial increases in salivary cortisol at the first writing session have been shown to be associated with longer-term improvements in post traumatic stress disorder (PTSD) symptom severity (Sloan et al., 2005; Sloan & Marx, 2004b) and depressive symptom severity (Sloan & Marx, 2004b).

[8] Salivary cortisol is free cortisol that enters the saliva glands by passive diffusion, the sampling of salivary cortisol via salivettes (cotton swabs) in the mouth is a non-invasive and stress free technique of measuring cortisol frequently used in behavioural research (Levine, Zagoory-Sharon, Feldman, Lewis & Weller, 2007).

These correlational findings point to a potential pathway between disclosure and the longer-term physical and psychological health benefits that have been reported.

2.3.4 Longer-term Effects

In the longer-term (see Chapter 3 section 3.4.4 for a discussion on variation in length of outcome assessment) the written emotional disclosure task has been shown to have salutary effects. Studies have examined the effects of emotional disclosure on a number of health parameters including psychological well-being (e.g. Epstein et al., 2005), physical health (e.g. Pennebaker & Beall, 1986) and immune functioning (e.g. Pennebaker et al., 1988), as well as behavioural markers (e.g. Cameron & Nicholls, 1998).

2.3.4.1 Psychological well-being

Psychological effects have not been consistently reported as a result of disclosure. Whilst a number of studies have reported positive psychological changes, including improved mood (Páez et al., 1999; Pennebaker et al., 1988), a reduction in symptoms of depression and/or anxiety (Epstein et al., 2005; Hemenover, 2003; Schoutrop, Lange, Hanewald, Davidovich & Salomon, 2002), a reduction in trauma-related avoidance and intrusion (Klein & Boals, 2001a; Lutgendorf & Antoni, 1999; Schoutrop et al., 2002) and PTSD symptom severity (Sloan et al., 2005), others have found disclosure writing to have no effect on psychological well-being (Greenberg & Stone, 1992; Kloss & Lisman, 2002) and some studies have suggested that disclosure writing could have detrimental psychological effects (Greenberg et al.,1996). It is possible that these diverse findings could be due to the methodological variations used across studies. Note that variations in methodology are reviewed in detail in Chapter 3 of this thesis, but as an example, Kloss and Lisman (2002) did not find any changes in anxiety levels as a function of disclosure writing, which could be due to their use of the trait anxiety subscale of the State-Trait Anxiety Scale (Spielberger, 1983). This measure asks respondents to rate how they *generally* feel, and asking about general anxiety differs to the more common approach in the disclosure literature whereby evidence for reductions in anxiety symptoms have normally been demonstrated using state measures that assess the respondents' experiences of anxiety related symptoms specifically over the preceding week. For example, Hemenover (2003) found a significant reduction in anxiety related symptoms in the disclosure group at three month follow-up compared to controls as assessed by the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1977). Schoutrop et al. (2002) reported similar reductions in symptoms using the Dutch version of the SCL-90-R, and Epstein et al. (2005) found

disclosure writing to be equally effective on anxiety symptoms as measured by the Depression and Anxiety Stress Scale-21-Item ($DASS_{21}$; Lovibond & Lovibond, 1995). It can be seen therefore, that disentangling methodological differences and findings in relation to the impact of the writing task on psychological well-being is difficult.

Greenberg et al. (1996) reported detrimental effects of writing about a traumatic event, with participants reporting an increase in avoidance of thoughts relating to the trauma they had disclosed and an increase in fatigued mood as measured by the Naval Health Research Centre Mood Scale (Vickers & Kusulas, 1989). However, this study utilised a single 30 minute writing session as opposed to the three or four writing sessions that are commonly employed in disclosure studies (see section 3.4.1 for a more detailed discussion). Consequently, this single intervention writing task may have exposed participants to the emotions surrounding the events they wrote about, without providing adequate opportunity for participants to work through their related thoughts and feelings. Consistent with a model of stress response syndromes (see section 2.3.6.2 this chapter for a discussion of the exposure hypothesis of disclosure) an increase in trauma related avoidance would be indicative of attempts to protect the individual from being overwhelmed by the emotions and thoughts relating to the event (Foa & Kozak, 1986; Horowitz, 1986). Despite inconsistencies in the literature, two meta-analyses of written disclosure studies (Frattaroli, 2006; Smyth, 1998) concluded that in general writing about traumatic or stressful events is associated with a reduction in distress (see section 2.3.4.4).

2.3.4.2 Physical well-being: subjective and objective measures

The physical effects of disclosure writing have been evaluated through a variety of subjective and objective measures. Studies have used a number of self-report measures to assess the effects of written disclosure on physical health including symptom specific measures (e.g. Pennebaker Inventory of Limbic Languidness; PILL, Pennebaker, 1982) and self-reported number of days off university due to illness, as well as more objective measure such as health care utilisation (HCU), and immune functioning.

2.3.4.2.1 Self-reported symptoms and health care utilisation

Studies have reported beneficial health effects of writing for disclosure group participants compared to controls based on significant differences at follow-up assessments in self-reported physical symptoms (Epstein et al., 2005; Greenberg et al., 1996; Pennebaker & Beall, 1986; Sheeses, Brown & Graziano, 2004; Sloan &

Marx, 2004b; Sloan et al., 2005), self-reported sick days (Pennebaker & Beall, 1986; Sloan & Marx, 2004b; Sloan et al., 2005; Sheese et al., 2004) and recorded HCU (Greenberg et al., 1996; Pennebaker & Beall, 1986; Pennebaker & Francis, 1996; Pennebaker, Colder & Sharp, 1990; Pennebaker et al., 1988). For instance, Sloan and Marx (2004a) report a study with university students who completed the PILL (Pennebaker, 1982) and self-reported the number of days they had been sick since the beginning of the semester at baseline, and then again four weeks after the writing intervention. Relative to control group participants, those in the disclosure group evidenced a significant reduction in physical symptoms and sickness days.

The highly significant effects of writing on self-reported health in a study by Greenberg et al. (1996) appeared to be due to increasing upper respiratory symptoms in the control group and decreasing upper respiratory symptoms in the disclosure group over a four week period. Greenberg et al. (1996) also reported a significant reduction in HCU at follow-up for disclosure participants compared to controls. The results indicated that whilst the proportion of visits to the health centres in the disclosure groups[9] had decreased (real-trauma group 12 to 9%; imaginary-trauma group 15 to 12%) there had been a sharp increase in the proportion of visits made by control group participants from 13 to 26 per cent. Although these findings could be interpreted to suggest that it is the control manipulation that has detrimental effects as opposed to disclosing emotions as being beneficial, examination of health centre data for the whole university suggested an overall increase in HCU for the period of the study. This is similar to other studies that have found increases in HCU in control group participants which often reflect normal season changes in illness rates (Pennebaker & Beall, 1986; Pennebaker et al., 1990; Pennebaker et al., 1988) and suggests that disclosure writing could attenuate this effect.

Self-report and HCU measures of physical illness do not always show consistent change when used together. Greenberg and Stone (1992) found no differences between groups on HCU but they did find a reduction in self-reported illness symptoms at follow-up for disclosure group participants who had rated the trauma they disclosed as severe. A possible explanation for the failure to find any effects on HCU compared to self-report symptoms is that the more frequently experienced illnesses (i.e. common cold) and symptoms (i.e. headache) do not often require the attention of a doctor and so go unreported (see section 3.5.1 for a detailed discussion of the problems

[9] Greenberg et al. (1996) included an imaginary trauma group to examine the inhibition theory of disclosure.

associated with self-report measures of physical health and more objective measure of HCU). Findings using self-report physical health measures have not been consistently encouraging however, with a few studies having failed to produce health benefits via the disclosure writing task (Kloss & Lisman, 2002; Marlo & Wagner, 1999; Murray, Lamnin & Carver, 1989), and in one instance participants in the disclosure group actually reported significantly more physical symptoms and days taken off sick at a three week follow-up compared to controls, though at later periods of follow-up (seven weeks and 30 weeks) the groups did not differ on physical well-being measures (Sheffield, Duncan, Thomson & Johal, 2002).

Stronger evidence for a link between the disclosure writing and physical health improvements come from studies that have examined longer-term changes in immune functioning.

2.3.4.2.2 Immune functioning

Interactions between psychosocial and immunological factors are thought to be mediated primarily by the HPA and sympathetic adrenal medullary (SAM) axes, which are both responsive to stress, and it is through these pathways that psychosocial interventions are thought to modulate the chronic effects of stress and normalize endocrine and immune function (Lutgendorf & Costanzo, 2003). Pennebaker et al. (1988) were the first to demonstrate the effects of written emotional disclosure on immune functioning. Changes in the proliferation of T-lymphocytes (white blood cells) to stimulation by two types of mitogen[10], phytohemagglutinin (PHA) and concanavalin (ConA), were assessed at baseline, on the fourth day of writing (final day of four, 30 minute writing sessions) and at six week follow-up. A significantly higher response to PHA stimulation (indicative of an enhanced immunological response) at follow-up was found in disclosure participants compared to controls who wrote descriptively about their day, the ConA data was only available from the baseline and post writing assessments, the direction of change between groups paralleled that of the PHA data but failed to reach statistical significance. Subsequently, a number of studies have provided further evidence of positive immunological effects via disclosure. Esterling, Antoni, Fletcher, Margulies and Schneiderman (1994) found that individuals who either wrote or spoke (into a tape recorder) about a stressful event showed significantly decreased Epstein-Barr virus (EBV) antibody titres compared to controls; an indication of better immune control over the latent virus. Natural killer cell activity was found to be

[10] A mitogen is an agent that stimulates lymphocyte proliferation, of which phytohemagglutinin (PHA) and concanavalin (ConA) are types.

higher in verbal disclosure participants compared to controls; an effect that was moderated by level of hostility. Disclosure participants high in hostility evidenced greater natural killer cell activity than disclosure and control participants low in hostility (Esterling et al., 1994). However, Booth and Petrie (2002) point out that the measurement of lymphocytes as an immunological variable from blood samples (the method of measurement in the aforementioned studies) does not necessarily indicate changes in the immune system as a whole. The limitation of this method of measurement is that the concentration of lymphocyte components in the blood is only approximately 10 per cent of the total body content and not necessarily representative of activity in the lymphatic organs (Booth & Petrie, 2002).

Several studies have now demonstrated that the effects of disclosure on immunological markers appear related to health consequences. For example, Petrie, Booth, Pennebaker, Davison and Thomas (1995) examined the influence of a written disclosure intervention on the immune response to a hepatitis B (a serious viral infection) vaccination programme. Consistent with the findings of previous disclosure studies positive immunological changes were seen in the disclosure group. Compared to controls, disclosure participants developed a significantly higher level of antibodies against the hepatitis B virus, suggesting that emotional disclosure may influence an individual's immunity to infection (Petrie et al., 1995). More recently written disclosure has also been shown to be associated with faster wound healing 14 and 21 days after a punch biopsy (Weinman, Ebrecht, Scott, Walburn & Dyson, 2008). Extending these findings beyond healthy student populations, Petrie, Fontanilla, Thomas, Booth and Pennebaker (2004) demonstrated that disclosure writing can produce important immunological changes in HIV patients, by increasing $CD4^+$ lymphocyte counts (declines in $CD4^+$ lymphocytes are associated with progression to acquired immune deficiency syndrome: AIDS). The findings that emotional disclosure interventions can impact upon immune parameters have been consistently positive. Taken together these findings indicate that the reported health benefits of disclosure may be to some extent mediated by the effects on immune function.

2.3.4.3 General functioning

In addition to the health implications already detailed, positive effects related to disclosure writing have been shown in other domains of functioning. For example, studies that have utilised a disclosure writing task with new entry college students have found that writing about the transition to college not only reduces subsequent visits to physicians compared to controls (Cameron & Nicholls, 1998) but has also been

associated with either an improvement in academic performance as assessed by average semester grades referred to as grade point average (GPA; Cameron & Nicholls, 1998; Lumley & Provenzano, 2003) or a trend towards maintaining GPA in disclosure groups relative to controls (Pennebaker et al.,1990; Pennebaker & Francis, 1996). How disclosure writing might improve academic performance is unclear. One possible explanation is that as a consequence of writing about the stressors of moving to college, students ruminate (go over in the mind) less about these stressors and are subsequently better able to focus on their academic studies (Pennebaker & Francis, 1996). This explanation is plausible given the more recent finding that working memory capacity in first year university students was improved following an emotional disclosure task; an improvement that was associated with academic performance and mediated by a decrease in intrusive and avoidant thinking (Klein & Boals, 2001a).

In attempts to extend the generalisability of findings beyond students the disclosure paradigm has also been evaluated with career professionals. For example, Alford, Malouff and Osland (2005) found a reduction in distress and increase in job satisfaction in a sample of child protection services officers who were asked to write about their "recent stresses, emotions, and related thoughts and plans" (p.181) compared with a control group. Although the results of this study are promising, the period between pre-test and post-test assessment was only two weeks. While this could be indicative of the potency of disclosure writing, it is not possible to establish if the intervention effects were maintained beyond the immediate outcome of the intervention period. Additionally, in a study by Spera, Buhrfeind and Pennebaker (1994), a group of job-seeking unemployed engineers who wrote about the thoughts and emotions surrounding their job loss, were found to be more likely to gain full-time employment than control group job seekers (both writing controls and non-writing controls). Unexpectedly, the writing task was not associated with any physiological or self-reported health changes and the increased re-employment rate in disclosure group participants did not appear to be mediated by either motivational factors, anxiety levels or in quantitative efforts to get a job (i.e. increased phone calls, job applications, making more contacts). Therefore, Spera et al. (1994) could only speculate that having the opportunity to address their emotions and reassess their current situations led to a qualitative difference in their re-employment efforts. The only behavioural difference to emerge between the groups of job-seekers at follow-up was the level of alcohol consumption, with the disclosure group consuming less alcohol six weeks following the study compared to controls. It is not possible though to establish if this reduction in

alcohol consumption is an intervention effect or a consequence of improved employment status of the intervention group.

In general, disclosure writing has not been shown to have any impact on health related behaviours such as consumption of prescribed drugs, alcohol and tobacco or engagement with exercise (Pennebaker & Beall, 1986; Pennebaker et al., 1990; Pennebaker et al., 1988; Petrie et al., 1995). Nevertheless, Ames et al. (2007) found disclosure writing used as an augmentation within a brief office based smoking cessation programme, which used a motivational interviewing approach and nicotine replacement therapy alongside the disclosure itself, showed some promising effects. Participants in the Ames et al. (2007) study wrote on three consecutive days prior to their quit date and on the subsequent two days after they quit. Those who expressed their emotions about stopping smoking had significantly higher biochemically confirmed abstinence rates than control participants at eight week follow-up. At six months and one year follow-up this treatment effect had diminished.

2.3.4.4 Overall effect

In order to bring together the divergent findings of these studies and establish if disclosure writing is effective in improving well-being, a number of meta-analyses have been conducted (Frattaroli, 2006; Harris, 2006; Frisina, Borod & Lepore, 2004; Smyth, 1998). In the first published meta-analysis of disclosure writing, Smyth (1998) evaluated 13 controlled studies that had included non-clinical samples (i.e. students). An overall effect size of d = 0.47, indicated a 23 per cent improvement in long-term health in participants asked to write about stressors over the control group (Smyth, 1998). Effect sizes differed across outcome types, physiological functioning outcomes (i.e. immune functioning; d = 0.68) and psychological functioning outcomes (i.e. anxiety; d = 0.66) showed the highest effect sizes. Physical health outcomes as assessed by self-reports and health centre records (d = 0.42) and general functioning outcomes (i.e. GPA; d = 0.33) showed lower effect sizes but all were statistically significant at $p<.001$. The effect size for health behaviours (i.e. alcohol use) was not significant (d = 0.03). Psychological and physiological functioning outcomes had significantly higher effect sizes than general functioning outcomes.

Frisina et al. (2004) included nine studies in their meta-analysis of trials utilizing participants from clinical populations (e.g. breast cancer patients, severely depressed or suicidal individuals). Overall, emotional disclosure was found to be more effective for alleviating physical symptoms (d = 0.21, p = 0.01) than psychological symptoms (d =

0.07, p = 0.17). Analysis of outcomes differentiating between participants from medical (e.g. cancer patients, asthma sufferers) or psychiatric populations (e.g. psychiatric prison inmates, PTSD sufferers) indicated that disclosure writing in psychiatric populations was largely ineffective, whereas for people dealing with physical illness writing has the potential to be of clinical significance (Frisina et al., 2004).

A meta-analysis by Harris (2006) concentrated on studies that measured HCU, including those that used self-reported HCU and data collected from health centre records. Harris (2006) concluded that disclosure writing was effective in significantly reducing HCU in healthy people, although the reported overall effect size was small (Hedge's[11] g = 0.16, 95% CI = 0.02 to 0.31). Disclosure writing did not appear to reduce HCU in people suffering from pre-existing medical conditions (Hedge's g = 0.21, 95% CI = -0.03 to 0.43) or those who had been selected based on their current psychological state (e.g. pre-screened for psychological or somatic disorder), or had experienced a specific stressful experience (e.g. bereavement; Hedge's g = 0.06, 95% CI = -0.12 to 0.24). As discussed in section 2.5.1, HCU as an outcome measure is problematic. When interpreting these findings, and making comparisons between samples the differing health care needs of these groups should be considered. It is unclear if a reduction in HCU in people with pre-existing medical conditions and psychological disorders can be considered beneficial or if we would expect to see changes in HCU in these populations irrespective of the writing intervention (e.g. due to continuing/differential treatment regimens).

A more recent meta-analysis by Frattaroli (2006) included 146 disclosure studies and reported an overall effect of r = 0.075. Frattaroli (2006) further calculated effect sizes for a range of outcome categories, indicating fairly modest effects for psychological health (r = 0.056), physiological functioning (r = 0.060), reported health (r = 0.072), subjective impact (r = 0.0159) and general functioning (r = 0.046), all were statistically significant. The only outcome type found not to improve as a result of disclosure were health behaviours (r = 0.007), which is consistent with the earlier findings of Smyth (1998) (also see section 1.4.3.3). Noting the difference in overall effect size of Smyth's (1998) earlier study and the authors own more recent one Frattaroli (2006) argues that this difference may be due to the large number of unpublished studies (48%), that tend to have smaller effect sizes, included in her analysis (compared with 23 per cent in Smyth's analysis). Despite the smaller effect size reported in this recent meta-analysis

[11] Hedge's g gives an effect size that is not biased by small sample sizes and is an adjustment of Cohen's d (Cohen, 1977) (Hedge's g = [1-(3/4N-9)] x Cohen's d) (Hedges & Olkin, 1985).

the evidence suggests that disclosure writing is a useful intervention, even if improvements appear to be modest (Smyth, Nazarian & Arigo, 2008).

2.3.5 Comparisons with Other Therapies

Smyth (1998) reported an effect size of d = 0.66, r = 0.31 in a meta-analysis for psychological functioning following disclosure writing, which is comparable to the effect size reported by Haby, Donnely, Corry and Vos (2005) in a meta-analysis of the effects of CBT (d = 0.68) and that reported by Smith and Glass (1977) in a review of psychotherapy studies (r = 0.32). A number of studies have attempted to establish directly if the effects of disclosure writing are comparable to other forms of therapeutic interventions. While disclosure writing has been shown to be superior to drawing therapy in alleviating psychological distress (Chan & Horneffer, 2006) the results of studies comparing disclosure writing with face-to-face therapies are equivocal.

Murray et al. (1989) compared two 30 minute psychotherapy sessions with two 30 minute writing sessions in undergraduate students. A distinct pre-post intervention effect upon affective arousal was found between the writing and psychotherapy groups with those writing about a traumatic event reporting a significant increase in negative mood following the first writing session compared to the psychotherapy session participants. Content analysis of the recordings and writings from the sessions showed that writing group participants used more negative emotion in their narratives than the psychotherapy participants. Greater cognitive change, self-esteem and adaptive change was noted in the psychotherapy session narratives compared with the writing sessions. There were no significant group effects in self-reported sick days at six month follow-up, but a strong trend was noted in the number of self-reported days of restricted activity (writing 1.5 days; psychotherapy 3.9 days; control 7 days). These findings led Murray et al. (1989) to be pessimistic about the use of writing over more traditional psychotherapy treatments. The authors suggested that within the psychotherapy group, the expression of stressful emotions relating to trauma was attenuated by the presence of the therapist, whereby the resolution of these emotions is brought about by discussion with the therapist, resulting in a reappraisal of the event. These adaptive changes were not present in the written disclosure group. In a subsequent replication of Murray et al.'s (1989) study Donnelly and Murray (1991) reported comparable changes between written expression and psychotherapy when the number of session was increased to four. Donnelly and Murray (1991) found that whilst the two treatment groups did not differ significantly from each other in terms of narrative content, both treatment groups did differ significantly from the control group in

that those in the treatment groups showed a gradual shift from negative to positive content and increases in cognition and self-esteem as assessed by experimenter ratings. Consistent with the findings of Murray et al. (1989), participants in the writing group reported an increase in negative mood immediately following the writing session that was not seen in the psychotherapy group. Rather than being interpreted as an unfavourable outcome of written disclosure, Donnelly and Murray (1991) argue that whilst the presence of a therapist may serve to ameliorate the negative emotions aroused within the sessions, the positive therapeutic progress achieved at the conclusion of the four sessions is the same. It is not possible however to generalize the findings of these two studies to psychotherapy populations as the participants in these studies were convenience samples drawn from student populations and not from a clinical population seeking psychotherapy. Furthermore, the psychotherapy sessions were fewer in number and length than would be commonly seen in clinical practice and there was no assessment of long-term psychological outcome. These studies do however provide tentative evidence that writing has benefits akin to psychotherapy, but only for individuals who do not have serious mental health problems.

Two studies have examined the longer-term effects of written disclosure in participants selected for elevated anxiety (Muris, Meesters & Gobel, 2002) and depressive symptoms (Stice, Burton, Bearman & Rohde, 2006) in direct comparison to other therapeutic techniques. Muris et al. (2002) found a written emotional disclosure intervention to have comparable effects to a cognitive coping intervention in highly anxious children. Significant decreases in self-reported symptoms of anxiety and worry were seen in both intervention groups from pre-treatment to post-treatment although larger effect sizes were observed in the cognitive coping group which focussed primarily on the cognitive component of a CBT programme. However, the lack of a significant group by assessment (pre - post treatment) interaction for anxiety symptoms suggests that this difference in effectiveness between the interventions was not substantial. Furthermore, the results indicated that both the cognitive coping intervention and the emotional disclosure intervention yielded clinically significant improvements in anxiety disorder and symptoms of worry (54.5% and 38.5% respectively) the level of which was not significantly different between groups.

Overall, in terms of comparisons with other therapies, writing can be seen as an alternative way for individuals to disclose their emotions relating to personal issues outside of the therapeutic process, while receiving similar benefits to disclosing in

therapy, suggesting that this therapeutic approach may be useful for hard to reach groups (Smyth & Helm, 2003).

2.3.6 Mechanisms of Change

While the evidence that disclosure writing has a number of psychological and physical benefits is now well established in the literature, the mechanisms through which this phenomenon exerts its effects are less understood. The hypotheses put forward include an inhibition-confrontation model (e.g. Pennebaker, 1989), an exposure based model (Sloan & Marx 2004a), a cognitive processing model (Pennebaker et al., 1997), a model of narrative development (Campell & Pennebaker, 2003) and a model of social integration (Pennebaker & Graybeal, 2001). Each one of these models and the evidence to support it will be considered in turn.

2.3.6.1 Emotional inhibition/confrontation

Pennebaker (1989) proposed an inhibition model of disclosure writing based on the theoretical rationale that emotional inhibition, a conscious attempt to inhibit strong emotions and associated thoughts and behaviours, can act as a physiological stressor and that individuals who experience traumatic episodes in their lives, but do not confide in others about these traumas, are more likely to report health problems (Pennebaker & Susman, 1988). According to inhibition theory the failure to confront traumatic or stressful events requires a great deal of psychological work that results in chronic autonomic arousal (Francis & Pennebaker, 1992). Over time, the work of active inhibition acts as a low level cumulative stressor (Traue, Lee & Kessler, 1997). McEwen (1998) documented the adverse health effects of cumulative stressors and the failure of the body to adapt the stress response to them. Activation of the HPA is an adaptive response to acute stress, which is defined as a stress reaction provoked by a major or minor event that is appraised as threatening or harmful at that particular moment in time but is present only for a brief period (Lazarus, 1999). Over time, in response to cumulative stress, the HPA axis is dysregulated so that it is to some extent "on" all the time, this in turn leads to immunological alterations that have consequences for the development of physical disease (Kiecolt-Glaser, McGuire, Robles & Glaser, 2002). The idea of disinhibition is similar to that of catharsis originally proposed by Breuer and Freud (1895/1966) that the venting of repressed emotions could cure people of their symptoms. However, Pennebaker (1989) points out that although there are similarities in these methods, the inhibition approach differs in its emphasis on conscious thought.

In order to examine the effect of disclosure on health and immune functioning Pennebaker et al. (1988) randomly assigned healthy participants to write about either a traumatic experience (ideally one that had not been discussed with others) or a trivial event. Overall findings supported the utility of disclosure writing with experimental participants evidencing a decrease in HCU compared to controls as well as a significant increase in immune response to the mitogen PHA (see section 2.3.4.2.2 for a more complete discussion of these findings). To test directly the emotional inhibition model Pennebaker et al. (1988) examined the influence of active inhibition on immune functioning. Participants were asked to rate to what degree they had actively held back from discussing with others the event they had written about, and from this the participants were split into groups of high disclosers (n = 11) and low disclosers (n = 14). High disclosers exhibited a marginally higher response to PHA stimulation than low disclosers, however this did not reach significance (p = .06). A significant interaction revealed that from baseline to the last day of writing, the high disclosers exhibited an enhanced response to the mitogen ConA compared to the low disclosers. Although the findings of Pennebaker et al. (1988) support the view that disclosure writing allows individuals to confront actively previously inhibited emotions relating to traumatic experiences, the evidence is far from conclusive that the dis-inhibition of emotions is in itself responsible for the health benefits that are seen. Instructions did not explicitly direct participants to write about events that they had actively inhibited, rather just ones they had not previously discussed. Although participants wrote about events that where highly personal and subjectively traumatic, they included events that were ongoing such as relationship problems which they would arguably have had less time to inhibit.

Evidence to support the emotion inhibition/confrontation model of disclosure remains equivocal with contrary evidence suggesting that whether a participant writes about previously disclosed or non-disclosed traumatic or stressful events are as likely to produce positive health changes (Greenberg & Stone, 1992; Smyth, 1998). Additionally, Greenberg et al. (1996) found that event-specific emotional disinhibition is not necessary for generating positive health effects following written emotional expression. Greenberg et al. (1996) were surprised to find that individuals who read a description of an imaginary traumatic event, which they were then asked to imagine experiencing and write about, made fewer illness visits to a health centre compared to controls. The inhibition hypothesis cannot account for the changes seen in the imaginary trauma group, however the authors postulate that within this group the health effects could be mediated by enhancing affective regulation. The health benefits seen

in this group were related to perceiving the imaginary event as more traumatic, higher levels of negative mood post-writing and lower levels of negative mood at longer-term follow-up suggesting that participants who benefited most from the imaginary trauma writing were those who immersed themselves in the imaginary trauma but were better able to regulate these negative emotions over the following weeks.

2.3.6.2 Exposure and habituation

Some have suggested that the process of written disclosure may provide a context in which negative emotional associations can be habituated via repetition and exposure (Bootzin, 1997; Sloan & Marx, 2004a; Sloan & Marx, 2004b). Foa and Kozak's (1986) emotional processing theory proposes repeated exposure to aversive stimuli can ultimately lead to extinction of the negative emotional associations and pathological fear related to the stimuli. For exposure based therapies to be successful individuals should initially experience high levels of emotional activation (emotional engagement) when confronted with the aversive stimuli followed by a gradual reduction in this emotional activation (habituation) over repeated sessions (Foa & Kozak, 1986). Though initially developed to treat anxiety disorders, exposure therapy has been effective in ameliorating the symptoms associated with PTSD. In this context the repeated reliving of the trauma ameliorates anxiety by contradicting the individual's expectation that the resultant symptoms (e.g. fear, anxiety) are dangerous (Jaycox, Foa & Morral, 1998). It is suggested that repeatedly confronting the images and emotions associated with a traumatic event through writing could lead to a reduction in the negative emotions associated with the event (Sloan & Marx, 2004a). Findings of studies that have tested the exposure hypothesis have been mixed.

Sloan and Marx (2004b) examined the physiological (salivary cortisol) and self-reported emotional response to a disclosure task in individuals who had moderate levels of post traumatic stress symptoms. The findings indicated that consistent with exposure theory individuals who wrote about traumatic events showed significantly greater emotional reactivity at their first session compared to controls, followed by a significant reduction in reactivity at following sessions. Although improvements were seen in both physical and psychological symptoms at four week follow-up in disclosure group participants compared to controls, emotional reactivity was only associated with improvements in psychological symptoms. However, one aspect of this study that differs from that of exposure based therapies is that participants were free to write about different events at each session, indeed only half of the disclosure group participants wrote about the same event at each session. Whereas exposure based therapies assume that

exposure to the same event or memories is required for habituation, Sloan & Marx (2004b) suggest their findings may indicate that repeated exposure to *any* stimulus (in this case any emotional memories) that elicits a negative emotional response may be sufficient for the extinction/reduction of negative affect. To test this hypothesis Sloan et al. (2005) instructed participants to write about the same event and compared them to a group who had been instructed to switch topics. While repeat disclosers showed increased physiological activation to the first writing session, followed by a gradual decrease, in the topic switching group a significant increase in physiological activity at the first session was still evident at the second session. The authors suggest that this merely indicated faster habituation in the repeat disclosure group. However the longer-term psychological and physical changes seen in the repeat disclosure group were not evident in the topic switching group providing little support for Sloan and Marx's (2004b) assertion that habituation may not require repeat disclosure.

Studies that have used self-report measures of emotional arousal (i.e. negative affect, anxiety) have shown little support for an exposure/habituation theory of disclosure (see Smyth 1998). For example, Kloss and Lisman (2002) found that although participants showed a significant increase in anxiety at the initial disclosure session followed by a reduction over sessions, no changes were found in longer-term well-being. Furthermore, the number and length of writing sessions in disclosure studies are not typical of the multiple exposure sessions, lasting approximately 45-90 minutes, which clients undergo in exposure therapy (Baike & Wilhelm, 2005; Sloan & Marx, 2004a). Consequently, Pennebaker and Chung (2007) argue that a purely habituation based explanation is unlikely to be sufficient in explaining the effects of disclosure.

2.3.6.3 Cognitive processing

The idea that disclosure writing may lead to cognitive changes has been considered by a number of authors (e.g. Esterling, L'Abate, Murray & Pennebaker, 1999; Niederhoffer & Pennebaker, 2005). It is thought that the act of converting emotions and images into words helps the individual to change and organise the way they think about their experience (Pennebaker & Seagal, 1999). The difficulty in measuring cognitive change has meant that this explanation has been difficult to test empirically. Donnelly and Murray (1991) and Murray et al. (1989) measured cognitive change through judges' evaluations of the narrative content based on ratings on a scale of one to seven of the content exhibiting a deeper understanding of the problem or reviewing the problem in a more adaptive way (Murray et al., 1989). Disclosure participants showed greater cognitive change across the four sessions than controls. Additionally, Klein and Boals

(2001a, 2001b) have shown that disclosure writing can increase working memory capacity which could promote improvements in cognitive processing.

Park and Blumberg (2002) identified changes in the cognitive appraisal of events using the Stress Appraisal Measure (Peacock & Wong, 1990). A reduction in both threat and uncontrollability appraisal were noted from session one to session four of writing, in addition to a reduction in the stressfulness rating of the event. Increases in judges' ratings of understanding, resolution/acceptance and congruency within the narratives were related to lower levels of reported stressfulness at session four, whereas an increase in understanding across the four days was related to lower appraisals of uncontrollability. Although disclosure group participants exhibited a number of cognitive changes across the writing sessions the only change variable associated with improvements in psychological well-being at follow-up was stress appraisal.

This cognitive change account of disclosure writing has typically been examined by looking at language use across the writing study. Using a computerized text analysis programme called Linguistic Inquiry and Word Count (LIWC; from Francis & Pennebaker, 1992), Pennebaker and Francis (1996) found that participants were more likely to benefit from expressive writing if they used a high number of positive emotion words compared to a moderate number of negative emotion words. More important however was an increase in the use of cognitive words that represent causation (i.e. because) and insight (i.e. realize). Further support for this was found by Pennebaker et al. (1997) who analysed the narrative data from six previous studies and found that participants' physical health and adaptive behaviours improved with an increased use of cognitive words. The findings also suggested that greater expression of negative emotions compared to the expression of positive emotions, in terms of frequency, was related to poorer health outcomes. A greater use of cognitive words has also been shown to be associated with improvements in immune functioning (Petrie et al., 1998; Rivkin, Gustafson, Weingarten, & Chin, 2006).

2.3.6.4 Narrative development

According to Ramírez-Esparza and Pennebaker (2006), "constructing a story is more powerful than having a story" (p.215). Further examination of the pattern of cognitive language use in disclosure narratives revealed an interesting difference between those writers who experienced benefits and those who did not. The evaluation of the narratives by judges indicated that those stories which judges perceived as constructing a story were associated with an increase in cognitive word use

(Pennebaker, 1997). This suggests that developing a narrative may be an important factor in the beneficial effects of disclosure writing. In the only study to empirically examine this hypothesis Smyth, True and Souto (2001) randomly assigned participants either to write about their most traumatic event in a fragmented format, by listing details of the event and their thoughts and feelings about the event, or to construct a narrative. Although the fragmented group produced comparable amounts of emotion only the narrative condition reported health benefits at follow-up.

Using a different analysis strategy Campbell and Pennebaker (2003) considered the importance of linguistic style in effective disclosure. Using the technique of Latent Semantic Analysis (LSA; Landauer, Folt & Laham, 1998) the authors identified a relationship between pronoun use and health improvements; such that the more people alternated their use of first person singular pronouns (i.e. I, me, my) and other personal pronouns (i.e. she, you, them) the more their health improved. This pattern of pronoun use is thought to reflect a change in perspective from one writing day to the next, the key element being flexibility in perspective switching across sessions and not directional change (Campbell & Pennebaker, 2003). However, a note of caution is raised by a number of authors in interpreting the correlational findings as causal in studies that have examined language use and health outcomes (Bootzin, 2001; Campbell & Pennebaker, 2003; Pennebaker & Chung, 2007). For example Bootzin (1997) argues that linguistic changes observed in writing narratives may be a consequence of, rather than a cause of, emotional and cognitive changes within the person. Notwithstanding this, the findings of Campbell and Pennebaker (2003) suggest the importance of discussing the self and social relationships in written disclosure.

2.3.6.5 Social integration

More recently researchers have started examining the social effects of disclosure writing and whether writing might facilitate social integration. This has been measured using a digital recording device, the Electronically Activated Recorder (EAR; Mehl, Pennebaker, Crow, Dabbs & Price, 2001), which is an event sampling device that is designed for the assessment of natural socially interactive behaviour (verbal communication). The EAR is typically worn by participants for two days and records 30 seconds of every 12-13 minutes (Pennebaker & Graybeal, 2001). Transcription of the data is followed up with coding by judges of the behavioural variables of interest (e.g. talking with one person, talking with more than one person, being alone). In a pilot study of the social effects of disclosure writing, participants wore the EAR for two days two weeks prior to writing, and again two weeks later (Pennebaker & Graybeal, 2001).

Those in the disclosure group talked more with their friends, laughed more and used more positive emotion words in their conversations at follow-up than they did prior to writing. In a more recent examination of this phenomenon with bilingual students, Kim (2008) also noted increased social interaction in disclosure group participants compared to controls. It is not clear how or why disclosure writing might improve social integration or how this might ultimately affect well-being. One suggestion is that writing could help individuals to personally understand their trauma, leading to a willingness to discuss it with others and thus become more socially integrated (Niederhoffer & Pennebaker, 2005).

2.3.6.6. Summary

A number of potential mechanisms of change have been proposed to explain how disclosure through writing can enhance well-being. The search for one general mechanism of action has not been successful, but it is noteworthy that not all the theories have been adequately tested and the findings for each are equivocal. The fact that none of the theories alone provide a sufficient explanation for the improvements in well-being reported so far in empirical studies may indicate a need to consider a complex combination of the previously proposed mechanisms (Sloan & Marx, 2004b; Smyth et al., 2008). Alternatively, it may be that the mechanisms through which disclosure writing exerts its effects are determined by a combination of event, context and participant characteristics.

2.3.7 Who Benefits From Writing?

While much of the empirical evidence for the effectiveness of writing comes from studies using healthy individuals (primarily university students), there has been a recent move toward examining the therapeutic benefit of writing in other populations. Writing has been shown to reduce asthma symptoms in adolescents aged between 12-17 years (Warner et al., 2006) and anxiety in school children aged between 8-12 years (Muris et al., 2002). Prison inmates who had been convicted of sex crimes experienced a reduction in illness visits to the infirmary after writing compared to controls (Richards, Beal, Seagal & Pennebaker, 2000) and Bernard, Jackson and Jones (2006) found that first-episode psychosis patients who wrote about their illness reported a reduction in the overall severity and avoidance of psychosis related stimuli. The preceding review has largely included studies that have used university student samples, and while there are no studies to date that have directly examined if there are any differential effects of disclosure writing between university students and the general population, the results of a recent meta-analysis concluded that participants with higher stress or poorer

physical health were more likely to benefit from disclosure writing (Frattaroli, 2006). Thus, the following section provides a review of studies that have examined the effects of disclosure in three specific populations; the traumatized, the bereaved and the chronically ill.

2.3.7.1 Traumatized samples: specific trauma symptoms & post traumatic stress disorder

The type and severity of events disclosed by participants in disclosure studies is diverse (e.g. sexual abuse, death of a pet, argument with a lover). This diversity within studies has been suggested to be a possible explanation for the inconsistencies in efforts to replicate findings (Brown & Heimberg, 2001). A number of studies have utilised a trauma-focused intervention for populations that have experienced specific types of events, with mixed findings. The events studied include domestic violence (Koopman et al., 2005), childhood sexual abuse (Batten et al., 2002), rape (Brown & Heimberg, 2001), a natural disaster (Smyth, Anderson, Hockemeyer & Stone, 2002) and the diagnosis of cancer in a child (Duncan et al., 2007). For example, two studies that focussed on the female victims of sexual assault, examined the effects of disclosing emotions about the experience of rape (Brown & Heimberg, 2001) and childhood sexual abuse (Batten et al., 2002) and found no psychological or physical benefits of disclosure for these groups. Batten et al. (2002) suggested that the influence of self-selection bias may have influenced their findings, given the relatively mild levels of distress in the sample at baseline; this group of sexual abuse survivors may have already developed resilience to the effects of their trauma. This explanation is consistent with the findings of a study with women who had experienced intimate partner violence (Koopman et al., 2005). Written disclosure was found only to be effective in reducing depressive symptoms in female victims of domestic violence who had high levels of depression at baseline. Similarly, disclosure was shown to reduce posttraumatic stress symptoms in highly distressed parents of children recently diagnosed with cancer (Duncan et al., 2007).

Written disclosure as a therapeutic intervention for individual's exhibiting posttraumatic stress symptoms appears to be beneficial for those with mild to moderate symptoms (Sloan & Marx, 2004b; Sloan & Marx, 2006) but has been shown to have an unfavourable outcome in those with a clinical diagnosis of PTSD. Gidron, Peri, Connolly and Shalev (1996) implemented a written disclosure intervention in trauma survivors recruited from a psychiatric trauma clinic. At five week follow-up disclosure group participants who had written about their most traumatic experience for 20

minutes on three consecutive days, reported an increase in avoidance symptoms and HCU relative to controls. Content analysis of the narratives produced by disclosure participants indicated a positive relationship between the use of emotion words and increases in symptoms and health care visits. The authors suggested that the length and number of writing sessions utilized in this study may not be enough for effective habituation in PTSD patients. However, in a more recent study by Smyth, Hockemeyer and Tulloch (2008) disclosure writing was found to provide some, if limited, benefits for PTSD patients. Writing about trauma was associated with reductions in anger and tension and a trend towards less depression at three month follow-up. The inconsistency in findings between these two studies may in part be due to methodological variations. Smyth et al. (2008) utilized a more structured writing protocol in which participants were guided to write in a manner that would enhance insight and followed the general principles of psychotherapeutic treatments for PTSD. Participants conducted the three, 20 minute writing sessions in a small private room on one single day (with 15 minute intervals between sessions). Whereas Gidron et al. (1996) had participants write at home on three consecutive days, following a more unstructured writing format that has been typically used in disclosure studies (e.g. Pennebaker at al., 1988). Furthermore, a five week follow-up period may not be of sufficient duration to capture the psychological benefits of disclosure as it has been found that improvements may not emerge for many months (Gortner, Rude & Pennebaker, 2006).

2.3.7.2 Bereaved individuals

Individuals choose to write about a multitude of topics in disclosure studies, but one theme that is prominent across studies is bereavement (Pennebaker et al., 1997; Pennebaker et al., 1988; Pennebaker & Beall, 1986). However, studies that have asked participants to write exclusively about the death of a loved one have not been able to replicate the physical health effects of general disclosure studies (Range, Kovac & Marion, 2000; Stroebe, Stroebe, Schut, Zech & van den Bout, 2002). In addition, writing about grief and loss does not appear to facilitate recovery in recently widowed females (Stroebe et al., 2002) or for individuals who have experienced a sudden (non-suicide) death (Range et al., 2000).

Kovac and Range (2000) did find that writing about the intentional death (suicide) of a loved one reduced the unique grief characteristics of suicidal bereavement. Thirty undergraduate students, who had been pre-selected based on their experience of losing a loved one to suicide within the previous two years, completed the Grief

Recovery Questionnaire (GRQ: Lehman, Ellard & Wortman, 1986), the Grief Experience Questionnaire (GEQ: Barrett & Scott, 1989) and the Impact of Event Scale (IES: Horowitz, Wilner & Alvarez, 1979) at pre-test, post-test and follow-up. Participants in the experimental condition were asked to write about their thoughts and feelings surrounding the death of their loved one, whilst those assigned to a control condition were instructed to describe their bedroom. A reduction in the unique aspects of suicidal grief as measured by the GEQ were seen from post-test to follow-up in experimental group participants compared to controls. There were no changes in avoidance, intrusion (IES) or general grief (GRQ) as a function of disclosure writing in this population.

The lack of support for the effectiveness of written emotional disclosure in bereaved individuals appears to parallel the findings of other bereavement interventions (Stroebe, Schut & Stroebe, 2005). Grief counselling or therapy has proven only to be effective for bereaved individuals who were experiencing complicated grief (Schut, Stroebe, van den Bout & Terheggen, 2001). The term complicated grief is used to refer to a grief reaction that shows a marked deviation from the normal pattern and is maladaptive. Amongst the risk factors for a poor bereavement outcome are previous psychiatric problems, concurrent other stresses and the nature of the bereavement. Sudden traumatic death which includes suicide, murder and fatal accidents can contribute to complicated grief (Stroebe et al., 2005). The fact that the only written disclosure study to facilitate any change in grief reaction was with individuals who had been bereaved through suicide (Kovac & Range, 2000), a form of bereavement that is associated with complicated grief, is consistent with the general pattern of findings in the bereavement literature.

Although a number of studies which have shown positive benefits for disclosure group participants have included individuals who have written about the death of a loved one (e.g. Pennebaker & Beall, 1986) the fundamental difference is that in bereavement specific studies participants have been directed to write about their bereavement and grief (e.g. Range et al., 2000). In studies that have utilised the standard disclosure instructions participants self-select the topic of disclosure. In these cases it may be that individuals who choose to write about the death of a loved one are expressing a genuine need to disclose what they consider to be the most stressful or traumatic experience of their life. Although a person will undoubtedly experience sadness at the loss of a loved one, this loss may not be experienced as an enduring stressor (Bonanno & Kaltman, 1999). Some of the participants in the bereavement specific

studies had experienced their loss many years ago and may therefore, through a natural process of grief, already have come to terms with their loss.

2.3.7.3 Patients with physical illness

Written emotional disclosure has been shown to have the potential to improve symptoms in patients suffering from chronic illness such as rheumatoid arthritis (RA) (Danoff-Burg, Agee, Romanoff, Kremer & Strosberg, 2006; Smyth, Stone, Hurewitz & Kaell, 1999; Wetherell et al., 2005), asthma (Bray et al., 2003; Smyth et al., 1999), lupus (Danoff-Burg et al., 2006), fibromyalgia (Broderick, Junghaenel & Schwartz, 2005) and chronic pain (Graham, Lobel, Glass & Lokshina, 2008). Smyth et al. (1999) found clinically relevant improvements in physician rated disease activity in RA patients, and lung function as measured by spirometry[12] in asthma patients who wrote about traumatic events compared to controls at four month follow-up. Wetherell et al. (2005) found an emotional disclosure intervention to be effective in improving mood in RA patients but not disease activity. Although there was an indication of some benefit for the disclosure group compared to the control group, this appeared to be due to deterioration in disease activity (increases in symptoms) in the control group. It is possible that the follow-up period of ten-weeks was not sufficiently long enough to reveal any significant physical changes associated with emotional disclosure in RA patients. For example in the Smyth et al. (1999) study the improvements seen four months after the disclosure intervention were not manifest at a two month assessment.

Taking into consideration the apparent delay in the effect of emotional disclosure in RA and asthma patients Broderick et al. (2005) employed an extended follow-up period of ten months in their examination of disclosure writing in fibromyalgia patients. Self-reported assessments of pain, fatigue and psychological well-being were administered pre-treatment and post-treatment at four and ten months post intervention. Consistent with their predictions the disclosure group participants improved on measures of pain, fatigue and psychological well-being at four month assessment compared to controls. Post-treatment assessment scores did not differ from those at pre-treatment suggesting that onset of change does not occur in the immediate aftermath of disclosure. The scores had returned to baseline by ten months indicating that the effects of disclosure writing are not persistent.

[12] A spirometer measures the amount of air leaving the lungs and is measured in terms of forced expiratory volume in 1 second (FEV_1).

Tentative support for the value of disclosure writing in cancer patients has been shown in three studies that have recruited patients with different types of cancer (Rosenberg et al., 2002; Stanton et al., 2002; Zakowski, Ramati, Morton, Johnson & Flanigan, 2004). In a randomized controlled trial 60 early stage breast cancer patients were assigned to one of three groups. The first group wrote about their thoughts and feelings regarding their experience of breast cancer, the second wrote about only positive thoughts and feelings regarding their experience of breast cancer, and the third group was the control condition who wrote about the facts of their breast cancer and treatment. At three months the women who expressed their emotions (both the positive and standard disclosure group participants) relating to their experience of cancer reported significantly fewer negative physical symptoms and cancer related morbidities than the control group. A reduction in distress levels was only evident in women who were low in cancer related avoidance suggesting that it is ineffective to ask women who have made a concerted effort to avoid thinking about their experiences, to write about their cancer and treatment (Stanton et al., 2002). Rosenberg et al. (2002) found that disclosure writing had no effect on distress in prostate cancer patients, but intervention group patients reported experiencing significantly less prostrate pain at follow-up than control participants. Although there were no other significant effects there was a trend toward lower HCU and lower consumption of medicines in the intervention group.

These findings together would suggest that some cancer patients may receive physical health benefits from disclosure writing but are unlikely to experience any psychological benefits. However, baseline measures of distress for both patient samples revealed that the breast cancer sample reported lower levels of distress than other breast cancer patient samples (Stanton et al., 2002) and the prostate cancer patients had distress scores comparable to general population norms suggesting that there was little room for positive change (Rosenberg et al., 2002). The findings of a study by Zakowski et al. (2004) suggest that disclosure writing may be best targeted at cancer patients who are experiencing social constraints on expression either because of a perceived inadequacy of social support networks or social barriers to talking about their cancer experience.

2.3.8 Conclusion

Writing about stressful and traumatic events can result in transient distress. Nevertheless, the evidence suggests that, for some, in the longer-term, writing is associated with improvements in physical and psychological well-being. The mechanism by which disclosure writing exerts these positive changes is still unclear

and may involve more than one process. Comparisons between writing and traditional face-to-face therapies provide support for the utility of this brief intervention as an alternative approach. The feasibility of delivering a writing intervention in patient populations has been successfully demonstrated. Disclosure writing has been shown to provide some, if at times limited, benefits for individuals with elevated levels of distress and chronic medical conditions, this is especially so for those who experience constraints in self-disclosure relating to their condition.

2.4 Overall Summary

Research has shown that a writing intervention which promotes disclosure of thoughts and feelings can be effective in improving psychological and physical well-being in both healthy populations (e.g. Greenberg & Stone, 1992) and medical patients (e.g. Stanton et al., 2002). The implication of these findings is that a disclosure writing intervention may prove to be a valuable therapeutic tool that could be used to ameliorate distress in infertile individuals. The perceived associated costs of counselling and time constraints mean that uptake of counselling services is poor in this population (Boivin et al., 1999). Writing does not require a trained counsellor or expensive equipment to be administered; consequently writing is a low-cost, and time efficient means of self-disclosure that allows for the expression of thoughts and feelings that is relatively free from social constraints and value judgements. Disclosure writing has the potential to improve health and well-being in individuals experiencing both the chronic stress of infertility (Berg & Wilson, 1991) and the acute stress of ART (Boivin & Takefman, 1995).

The methods used by Pennebaker and Beall (1986) have been subject to much modification in subsequent studies. The methodological differences between studies are an important factor when considering the inconsistency in findings. In order to develop a disclosure protocol that is feasible and effective for infertile individuals it is necessary firstly to consider how methodological variation can impact on the outcome measures used. Chapter 3 provides a critical review of the various methods used in written disclosure studies, the findings of which will inform the development of an intervention to be administered in this population.

Chapter 3

Methodological Review: Disclosure Writing

3.1 Overview

Chapter 2 identified a number of psychological, physical and behavioural benefits that can be achieved through emotional disclosure. The disclosure of personal experiences can work for some but has limited benefit for others (see 2.3.7.1 – 2.3.7.3). Since the publication of the first written disclosure study by Pennebaker and Beall (1986) more than 150 studies examining the effects of disclosure in a variety of populations have been published. Interpreting the relative effectiveness of disclosure in the many studies published is confounded by the diversity of methods employed in these studies. Over the last 20 years, numerous modifications have been made to the standard disclosure protocol (Pennebaker, 1994; Pennebaker & Beall, 1986), often without consideration for the consequence that these changes may have on the efficacy of the disclosure interventions (e.g. Sheese, Brown, & Graziano, 2004; Ullrich & Lutgendorf, 2002). However, modifications to design features, procedures, instructional content and study setting have been arguably necessary to accommodate the application of the intervention into different populations and also to examine the limitations of disclosure under various conditions. The purpose of this chapter is to review the methodological variations that have been employed within disclosure studies and in doing so to identify the likely boundary conditions of the disclosure intervention. Using the terms *'written disclosure'*, *'written emotional disclosure'*, *'emotional disclosure'*, and *'disclosure writing'* a search of the databases, PsychINFO, ScienceDirect and Web of Science was conducted in the autumn of 2004 and regularly updated to identify studies relevant to this thesis. In addition to using these search strategies, published studies were located using the reference lists of relevant papers and books. Table 3.1 presented at the end of this chapter provides a methodological overview of the disclosure studies that have been reviewed in the preparation of this chapter.

3.2 Topic of Disclosure

3.2.1 Type and Severity

Very few disclosure studies select participant samples based on their history of trauma (Greenberg, Wortman & Stone, 1996; Schoutrop, Lange, Hanewald, Davidovich & Salomon, 2002; Sloan, Marx, Epstein & Lexington, 2007). Indeed, the majority of studies have been conducted with healthy young adult students (see Frattaroli, 2006). Arguably, as a consequence of their young age a proportion of these individuals will not have experienced a significant trauma in their life. In studies that have administered a variation of the standard disclosure instructions in which participants freely choose a traumatic or stressful topic about which they disclose their thoughts and emotions, the events described have varied in the magnitude of severity. For example, common topics include the death of a loved one, family violence and abuse, serious illness, actual or threatened physical and sexual attacks, family and romantic relationship problems, moving away from home and difficulties associated with university or employment. Although disclosure has been argued to be broadly beneficial (Kacewicz, Slatcher & Pennebaker, 2007; Pennebaker, 1997) some studies have found the health benefits of disclosure to be restricted to those individuals who describe subjectively more severe traumas (Greenberg & Stone, 1992; Lutgendorf, Antoni, Kumar & Schneiderman, 1994). For example, Greenberg and Stone (1992) found that participants who rated the traumas they had disclosed as more severe reported a reduction in physical symptoms at two month follow-up compared to non-severe trauma participants and controls.

Studies that have selected participants based on trauma history have produced equivocal findings. For example, Batten, Follette, Rasmussen Hall and Palm (2002) reported no beneficial psychological or physical effects of disclosure writing in female participants, recruited due to their history of childhood sexual abuse, who were asked specifically to describe these events. Similarly, rape victims who wrote about the event did not experience any improvements in psychological well-being or symptoms of PTSD (Brown & Heimberg, 2001). In addition, individuals selected based on their experience of bereavement do not appear to gain any benefits from disclosing their thoughts and feelings about the death of a loved one (Kovac & Range, 2000; Range, Kovac & Marion, 2000; Stroebe, Stroebe, Schut, Zech & van den Bout, 2002; see section 2.3.7.2). Arguably, the inconsistency in findings relating to the effect of trauma severity on outcome could be due to the willingness of participants to describe their ordeals. In the studies of Greenberg and Stone (1992) and Lutgendorf et al. (1994)

participants were free to choose events about which they wrote, whilst in the studies that recruited participants based on a specific trauma history (e.g. rape) participants have been instructed to concentrate on that specific trauma. It is argued that constraining individuals by asking them to focus on a specific topic may render the disclosure task to be less effective because the individual may focus more on the act of writing and less on their emotional involvement with the event (Kacewicz et al., 2007)

Evidence does suggest that the choice of topic can in some cases selectively affect the outcome (Pennebaker & Chung, 2007). For example, writing about the experience of coming to college has been shown to improve academic functioning as measured by semester grade point average (GPA) in students (Cameron & Nicholls, 1998; Pennebaker, Colder & Sharp, 1990; Pennebaker & Francis, 1996), and writing about losing a job has been found to be associated with higher re-employment rates (Spera, Buhrfeind & Pennebaker, 1994). Additionally, studies that have asked individuals to focus on writing about their experience of life threatening illnesses have reported improvements in illness specific outcomes in these patients. For instance, Stanton et al. (2002) found that patients with breast cancer, who were asked to write about their experience of the illness, reported a reduction in medical visits for cancer related morbidities. Petrie, Fontanilla, Thomas, Booth, and Pennebaker (2004) found that individuals with HIV reported a significant increase in $CD4^+$ lymphocyte counts after writing about emotional aspects of their life including their HIV status. These findings appear to contradict the suggestion of Kacewicz et al. (2007) that constraining the choice of writing topic is not beneficial. However, the main difference between these studies is the distinction between writing about past events, for example specific trauma history (e.g. Batten et al., 2002) and writing about events which are current and ongoing, for example, going to college (e.g. Pennebaker et al., 1990) or life threatening illness (e.g. Stanton et al., 2002).

3.2.2 Past or Current Events

One variation in the instructions given to participants relates to that of the time frame between the incident and disclosure. Assigning participants to write about topics such as their illness status (e.g. Rosenberg et al., 2002) or going to university (e.g. Pennebaker & Francis, 1996) inherently requires them to focus on an ongoing event. Conversely, studies that ask participants to describe an event of their own choosing do not control for the recency of the event. Some studies do specify the time frame of the event that participants write about, asking them to focus on events that are in the past

(e.g. Schoutrop et al., 2002), ongoing (e.g. Gortner, Rude & Pennebaker, 2006) or either past or ongoing (e.g. Francis & Pennebaker, 1992). However, no study to date has examined if time since the event to intervention has a direct impact on the effectiveness of disclosure. The results from two meta-analyses (Frattaroli, 2006; Smyth, 1998) suggest that time frame is an important factor in disclosure studies. In the most recent and extensive meta-analysis published, Frattaroli (2006) found that the time since occurrence of the described event significantly moderated both the psychological and reported health effect size. In 86 per cent of the 146 studies participants were assigned to write about a negative event, the average time from the incident to disclosure was 16 months in these studies. The results suggested that writing about a more recent event was associated with larger effect sizes.

Frattaroli (2006) also examined the impact of time reference in the disclosure instructions, looking at the effects of asking participants to write about either past events or giving them the choice to describe current or past events. Surprisingly, Frattaroli (2006) did not find that this reference to time frame moderated the effect of disclosure. This is in direct contrast to the findings of Smyth (1998) who found that participants who were asked to address ongoing traumas in their writing showed greater improvements in psychological well-being compared to those who were instructed to write about either past or current traumas. Frattaroli (2006) does note however that in the meta-analysis data set, there was no significant difference in time since occurrence of the described event between studies that asked participants to disclose a current event compared with those that gave participants the choice of describing either a past or current event, suggesting that participants often choose to describe more recent events when given the option.

3.2.3 Previous Disclosure

As discussed in section 2.3.6.1, the health benefits seen from confronting traumatic experiences through writing were initially believed to be achieved by reducing the stress associated with the conscious inhibition of thoughts and feelings relating to the events that individuals disclosed (Pennebaker, 1989). Yet, in the first published study of disclosure writing, in which health benefits of disclosure were reported (Pennebaker & Beall, 1986), participants were not instructed to write about events which they had held back from discussing with others. The subsequent guidelines produced by Pennebaker (1994) for running disclosure studies include instructions to participants to write about events that they "have not discussed in great detail with others" (p.3). A

number of studies have adhered to this format and found positive benefits of writing about undisclosed or minimally disclosed events (e.g. Francis & Pennebaker, 1992). Equally, the majority of studies have not instructed participants to consider previous disclosure when selecting the events they write about and the outcome for some of these studies has been similarly positive (e.g. Epstein, Sloan, & Marx, 2005). Other methodological differences between these studies mean that it is impossible to fully determine the impact of previous disclosure on outcome but two studies that have directly tested disclosure status have found physical (Greenberg & Stone, 1992) and psychological improvements (Páez, Velasco & González, 1999) after writing regardless of previous disclosure. Corresponding with these findings Frattaroli (1996) found that previous disclosure did not moderate the physical health effects of writing and the moderating effect on psychological outcomes was only marginally significant (p= .06).

3.2.4 Writing about the Same or Different Events

It is suggested that the writing instructions given to participants should not restrict them in their choice of writing topic (Kacewicz et al., 2007). In particular, participants should be given the option to write about the same or different events at subsequent writing sessions (Pennebaker, 1994). In fact the majority of studies explicitly instruct participants in this way (e.g. Booth, Petrie & Pennebaker, 1997). There are very few studies that restrict participants to disclosing their thoughts and feelings about the same event over the course of the study (exceptions include: Klein & Boals, 2001a; Sheese et al., 2004; Radcliffe, Lumley, Kendall, Stevenson & Beltran, 2007; Kraft, Lumley D'Souza & Dooley, 2008; Sloan et al., 2007) unless the event is the specific focus of intervention, for example in studies with cancer patients that ask them to write about their experience of cancer (e.g. Low, Stanton & Danoff-Burg, 2006). Although not entirely consistent with the views of Kacewicz et al. (2007), the findings from Frattaroli's (2006) meta-analysis of disclosure studies suggest that whether participants write about the same or different topics is of little importance with regards to producing effects of disclosure. However, in a direct test of the effect of topic switching Sloan, Marx and Epstein (2005) found that only participants who were instructed to write repeatedly about the same topic over three days reported improvements in psychological and physical functioning. Furthermore, physiological activation in response to writing as assessed by salivary cortisol indicated that participants who switched topics showed increased physiological reactivity to the first and second writing session, whilst those who wrote about the same topic only showed reactivity to the first session. These findings are consistent with an exposure based theory of disclosure

writing (see section 2.3.6.2) and suggest that habituation may have occurred at a faster rate in those who wrote about the same event (Sloan et al., 2005). It is notable that a large proportion of the sample in the study of Sloan et al. (2005) had, in the past, been in psychotherapy (42%) and had used psychotropic medication (37%) and the majority reported that their response to treatment had been poor to moderate. It is possible therefore that the past treatment characteristics of this sample represent a special group in which writing repeatedly about the same topic is more beneficial. More importantly the instructions given to the different topic group which required them to change topics at each session could be considered, for some, more restrictive than being asked to stay on topic. For example, some participants may not have found one writing session to be sufficient to express all their thoughts and feelings about that particular topic before having to move onto another. The fact that these participants were *not* given the option to choose how to write may be more important in determining the effects found in this study than what they actually wrote about.

3.3 Writing Instructions

3.3.1 Orientation of the Topic: The Negatives, the Positives or the Benefits

The focus of most disclosure studies has been to examine the effect of writing about negative experiences on well-being. Studies have asked participants to write about negatively valenced events using a number of approaches such as asking them to write about the most traumatic and upsetting experience of their lives (e.g. Greenberg & Stone, 1992), the most stressful experience (e.g. Esterling, Antoni, Fletcher, Marguiles, & Schneiderman, 1994), important emotional issues (e.g. Greybeal, Sexton & Pennebaker, 2002) and difficult or emotionally disturbing events (Gortner et al., 2006; the range of writing instructions employed are listed by study in Table 3.1).

More recently studies have shown that writing about positive life events and experiences can also produce physical and psychological health benefits. For example, Burton and King (2004) found that instructing individuals to write about "the most wonderful experiences....happiest moments, ecstatic moments, moments of rapture" (p.155) resulted in a more positive mood than writing about plans for the day or describing inanimate objects (control). Longer-term effects on health centre visits were found, such that positive writing had a buffering effect, with control participants having more illnesses post writing than those who wrote about positive experiences. Similarly, writing (and talking) about a best possible self in the context of accomplishing life goals was also effective in reducing HCU and increasing positive mood compared to writing

(or talking) about their schedule for the following day (Harrist, Carlozzi, McGovern & Harrist, 2007).

Studies that have compared writing about negative experiences versus writing about positive experiences have produced mixed findings. King (2001) found that writing about a best possible self, a traumatic event, or a combination of the two produced comparable reductions in HCU compared to controls at five month follow-up. Similarly, Burton and King (2008) found that writing about positive or negative experiences produced comparable improvements in self-reported health at 4-6 week follow-up compared to controls. Whereas a study by Klein and Boals (2001a) looking at the effects of writing about either a negative or positive experience on working memory only found improvements in individuals who wrote about negative life events. Marlo and Wagner (1999) found positive writing to be superior to negative writing for improving psychological health. Whereas Harris, Carl, Thoresen, Humphreys and Faul (2005) found neither set of instructions to be effective in improving pulmonary function in asthmatics.

More consistent health effects have been found in studies that have asked participants to write about the benefits or positive aspects of a stressful or traumatic event that they have experienced versus writing about the negative emotional aspects. King and Miner (2000) found that writing about the positive aspects of a trauma produced a comparable reduction in health centre visits at three month follow-up to writing about the more negative aspects of trauma. Writing from both perspectives also produced comparable reductions in illness visits compared to controls. Writing about either the benefits or negative emotional aspects of having cancer resulted in reduced doctor visits for cancer related morbidities (Stanton et al., 2002) and reduced fatigue in patients with lupus and rheumatoid arthritis (Danoff-Burg, Agee, Romanoff, Kremer & Strosberg, 2006).

Arguably, the difficulty in drawing any clear conclusions about the utility and comparability of differently valenced writing instructions is confounded by the variation in assessed outcomes, methodological and procedural differences and sample characteristics. For example, Stanton et al. (2002) found that writing about the positive benefits of cancer only produced beneficial psychological effects for women who were high in cancer-related avoidance, whereas writing about the negative emotional aspects of cancer was more effective in producing psychological change in women low in cancer-related avoidance. Similarly, Austenfeld and Stanton (2008) found differential

effects on reductions in hostility as a function of self-reported emotional expressiveness for those who wrote about a trauma relative to those who wrote about a best possible self. It would be prudent therefore to consider further under what conditions positive writing or the standard trauma protocol may be more suitable. For instance asking students to write about the positive aspects of a past trauma may seem innocuous in comparison to asking them to write about the negative aspects, however forcing cancer patients or those experiencing a chronic debilitating illness to focus on the benefits of their experience may seem insensitive to their situation.

Considering the multifaceted explanations that have been proposed as possible mechanisms for the effects of writing about negative events (see section 2.3.6.1 – 2.3.6.5), the mechanisms through which positive writing might exert its effects have yet to be examined. It has been suggested that writing about positive events or the positive aspects of negative events may enhance self-regulation of emotions (King & Miner, 2000), whereas writing about life goals may provide an opportunity for individuals to more effectively pursue these life goals (King, 2001). Alternative explanations for why writing about the positive aspects of negative events are to be found within the positive psychology literature, for example Frederickson and Joiner (2002) argue that finding positive meaning in the face of adversity triggers positive emotion and this in turn creates an upward spiral to emotional well-being. More research is needed to identify not only the conditions under which positive writing is more effective, but also the mediators of these effects.

3.3.2 Wording of Instructions

The original and widely used instructional set recommended by Pennebaker (1994) is relatively unstructured. The writing instructions provide such prompts as "explore your deepest emotions and thoughts" (p.3) and suggest that the writer relates their specific experience to "people you love, who you are, or who you want to be" (p.4). On the final day of writing participants are directed to consider how their experience/s may be related to "your current life and your future" (p.4). Some studies have provided directed questions in order to assist participants in what specific information about the event they should discuss (Barry & Singer, 2001) or to help them choose a topic about which to write (Lutgendorf et al., 1994). Based on findings that both emotional and cognitive processes are mediators of the positive physical and psychological health effects seen in disclosure writing (Lepore, Greenberg, Bruno & Smyth, 2002) others have emphasized the importance of emotional expression and cognitive assimilation in their

instructions (Broderick, Junghaenel & Schwartz, 2005; van Middendorp, Sorbi, van Doornen, Bijlsma & Geenen, 2007; Smyth, Hockemeyer & Tulloch, 2008). For example, the instructions given to disclosure participants in a study by Broderick et al. (2005) direct participants at the second writing session to write in a story format (i.e. the narrative should have a beginning, a middle, and an end) and to think about the effects the trauma had had on their beliefs and life view. At the third session participants were encouraged to reflect on any insights they may have gained from the previous writing sessions and any changes in how they felt about the trauma. Others have gone further still and have developed a guided disclosure protocol (GDP) which provides very specific instructions on how to write, integrating self-reflection and self-regulation strategies (Gidron, et al.,2002).

Overall, it is unclear as to what the effect of modifying the writing instructions has on the outcome of disclosure writing. Frattaroli (2006) reported that the presence of directed questions in the instructional set was associated with a significantly larger effect size for psychological health but not physical health. However, Frattaroli's (2006) meta-analysis does not differentiate between the nature of the directed questions, or whether examples were included in the instructions, so the effects of each are not clear. Two studies that have directly examined instructional content have found conflicting results (Ullrich & Lutgendorf, 2002; Sloan et al., 2007). Ullrich and Lutgendorf (2002) compared instructional sets that emphasized only emotional expression versus the combination of emotional expression and cognitive assimilation. They found that participants who wrote about both the emotional and cognitive aspects of a traumatic event reported an increase in positive growth that was not evidenced in those who focused only on their emotions. More importantly, focusing on the emotional aspects of a trauma resulted in an increase in self-reported illness symptoms. Conversely, Sloan et al. (2007) found that focusing on the emotional aspects of a trauma was associated with improvements in both psychological and physical health at one month follow-up, whereas focusing on the cognitive aspects alone did not produce these effects. Although both these studies selected their student samples based on a trauma history, it is difficult to make direct comparisons between the studies because of different setting and procedural variations. Participants in Ullrich and Lutgendorf's (2002) study wrote at home for ten minutes, on eight separate occasions over a one month period, whereas Sloan et al. (2007) had participants write in a laboratory for 15 minutes on three consecutive days. Furthermore, the time frame for follow-up utilised by Ullrich and Lutgendorf (2002) may have impacted on the findings. Although self-reports of physical and psychological well-being were completed with an interval of one

month, participants completed the writing phase of the study only a few days before the follow-up assessment. It is not unusual for participants to experience an increase in physical symptoms in the immediate days after writing (Greenberg & Stone, 1992). Consequently it is difficult to distinguish between the effect of the unique instructional set and the procedural variations on the outcome of these two studies.

3.3.4 Control Groups: Writing and Non-writing

In order to establish that the positive health effects reported by experimental group participants are a function of the writing instructions and not a consequence of just writing per se, disclosure studies have typically included a control group for comparison that are asked to write about trivial or neutral topics. As can be seen in Table 3.1, the instructions that have been utilised in control conditions have varied, for example control group participants have been asked to write about the day's activities (e.g. Kloss & Lisman, 2002), recent social events (e.g. Páez et al., 1999), or to describe their surroundings (e.g. Greenberg et al., 1992) or pictures (e.g. Kelley, Lumley & Leisen, 1997). Another approach is to utilise instructions that are representative of a time management type task, asking participants to write about their plans for the following day, week, month (e.g. Petrie, Booth, Pennebaker, Davison, & Thomas, 1995) or coming years (Lumley & Provenzano, 2003). Some studies employ a combination of the two approaches (e.g. Bernard, Jackson, & Jones, 2006). However, a number of studies that have employed time management type instructions have reported health improvements in the control groups (Batten et al., 2002; Frayne & Wade, 2006; Gillis, Lumley, Mosely-Williams, Leisen, & Roehrs, 2006). For example, Mackenzie, Wiprzycka, Hasher and Goldstein (2007) found that stressed caregivers who wrote about how they used their time as a caregiver reported improvements in physical and psychological well-being, compared to those who wrote about the stressful aspects of being a caregiver or about significant world events. Due to this potential for writing about time management to have beneficial outcomes, some studies have also included a non-writing control group in their design (e.g. Broderick et al., 2005).

The writing instructions given to control group participants are often selected as a function of the population under investigation. In patient populations it is arguably inappropriate to ask control participants who, for example, may be undergoing cancer treatment, to write about their shoes or the contents of their closet. In such instances control instructions often direct participants to write factually about their illness (e.g. Stanton et al., 2002), relevant health behaviours such as diet and exercise (de Moor et

al., 2002) or have used a multiple baseline design[13] (Bray et al., 2003; Duncan et al., 2007) or non-writing control group (e.g. Solano, Donati, Pecci, Persichetti, & Colaci, 2003). Indeed, Wetherell et al. (2005) found that rheumatoid arthritis (RA) patients who were asked to write about their daily activities reported an increase in disease activity (i.e. swollen and tender joints, inflammation) at ten week follow-up. In a follow-up study looking at participants' views on disclosure writing, control participants reported that they found writing about their day to day activities emotive, which is not surprising given the day to day struggles they faced because of RA. Therefore control participants were writing about day to day struggles without being able to resolve or express openly their feelings about their experience (Byrne-Davis et al., 2006). Given these findings it would appear prudent to tailor the control writing instructions to the population under investigation to prevent evoking emotions that cannot be sufficiently resolved or equally, confounding the outcome of the study by inadvertently introducing another treatment variable to the design. The inclusion of a non-writing control, along with an appropriate writing control group, which is seen in some studies (e.g. Broderick et al., 2005), would appear to be a sensible addition in order to provide adequate experimental control.

3.4 Procedural Variations

3.4.1 Length and Number of Disclosure Sessions

The length and number of writing sessions or 'dose' utilised in disclosure studies varies widely (see Table 3.1). The length of writing per single session ranges between 3-50 minutes with the majority of studies using a 20 minute cut off (e.g. Pennebaker et al., 1990). The number of writings sessions administered also varies greatly ranging from 1-10 sessions with most studies asking participants to write on at least three separate occasions (e.g. Smyth et al., 2008). Pennebaker (1994) suggests that multiple sessions are most effective and this is supported by Frattaroli (2006) who found that writing on three or more occasions is associated with larger physical and psychological health effects than writing on fewer than three occasions. Similarly, writing for 15 minutes or more was also found to be associated with larger physical health effect sizes but not psychological effects (Frattaroli, 2006). Nonetheless, studies have found brief sessions of writing to have some benefits, in fact as little as one 10-15 minute session has been shown to reduce the negative emotions relating to the collective

[13] The multiple baseline design or AAB design involves administering assessment measures twice pre-intervention (AA) followed by the assessment measure post intervention (B). This design controls for time effects and potential demand effects of assessment and is used in the absence of a control group (Cotton, 1998).

trauma of a terrorist attack in Spanish students at two month follow-up (Fernández & Páez, 2008). Similarly, Burton and King (2008) reported a reduction in self-reported physical symptoms 4-6 weeks after writing about either negative or positive experiences for only two minutes on two separate occasions compared to controls. Furthermore, the size of the physical health effect was comparable to that reported in the meta-analysis of Smyth (1998). Consequently, these findings would suggest that in situations where either time and/or resources are limited or lengthy repeated disclosure would not be acceptable to the population under investigation there is scope to tailor the dosage of disclosure to the practical demands of the study or sample.

3.4.2 Time between Writing Sessions

Typically, participants are asked to complete their writing over consecutive days. In fact Pennebaker (1994) advises this timeframe for writing, suggesting that participants report finding larger intervals between sessions unfavourable for re-entering the 'mind set' for writing. However, the spacing of sessions over consecutive days is not always practical. Some studies have had participants write at weekly intervals to coincide with scheduled classroom sessions (Chan & Horneffer, 2006; Horneffer & Jamison, 2002; Pantchenko, Lawson & Joyce, 2003). Others have spaced sessions at the participants' convenience allowing them to conduct sessions over a week (Radcliffe, Lumley, Kendall, Stevenson & Beltran, 2007) or three week period (Stanton et al., 2002: see Table 3.1 for study variations in spacing of session). Based on the findings of Smyth (1998) that spacing writing sessions over longer periods of time may be beneficial to the writer, others have incorporated larger time intervals in an attempt to achieve stronger intervention effects (Langens & Schüler, 2005; van Middendorp et al., 2007; Mackenzie et al., 2007; Ullrich & Lutgendorf, 2002).

In a recent study by Smyth et al. (2008) the feasibility of an intense one day intervention that involved three 20 minute writing sessions with a 15 minute rest interval between each session was tested in patients with a diagnosis of post traumatic stress disorder (PTSD). Whilst the majority of participants found this intense protocol acceptable (one participant withdrew after the first writing session due to distress) at three month follow-up there was no effect on PTSD symptom severity. A reduction in tension and anger in the trauma writing group compared to controls and a trend towards a reduction in depression would suggest that the writing intervention has the potential to be effective in this population but may need to be administered over a longer period (section 2.3.7.1 for a discussion of the efficacy of writing in this

population). The only study to test directly the differential effects of long versus short interval writing (weekly versus daily) found no systematic differences between the two time frames (Sheese et al., 2004) which is consistent with the findings of Frattaroli (2006) that time between writing (analysis of daily versus weekly) does not moderate the health effects of disclosure writing. The implications of this being, researchers can reasonably administer the writing sessions to fit with the demands of either the study or the participants.

3.4.3 Modality: Writing, Typing, Talking and Drawing

Originally conceptualized as a writing intervention (Pennebaker & Beall, 1986), disclosure studies have been conducted employing a number of modalities (see Table 3.1). Whilst the majority of studies adhere to the more traditional modality of disclosing their experiences in handwriting (e.g. Sloan & Epstein, 2005) others have asked participants to type their narratives using a computer (e.g. Hemenover, 2003), disclose verbally into a tape recorder (e.g. Kelley, Lumley & Leisen, 1997), disclose verbally to a researcher (e.g. Schilte et al., 2001) or disclose their emotions about a stressful events through drawing (Chan & Horneffer, 2006; Pantchenko et al., 2003). Studies have often departed from the traditional handwritten protocol in favour of a modality that is better suited to the functional ability of their participants, as in the case of Wetherell et al. (2005) who gave participants with RA the option of handwriting their narratives or verbally disclosing them into a tape recorder. Similarly, others have chosen to provide participants with personal computers on which to type their narratives (Booth et al., 1997; Burton & King, 2008; Graybeal, Sexton & Pennebaker, 2002; Hemenover, 2003; Petrie et al., 2004) or for practical reasons have asked participants to submit their narratives via e-mail (Sheese et al., 2004) or conduct the study online (Gortner et al., 2006; Slatcher & Pennebaker, 2006).

Studies that have directly compared verbal and written disclosure would suggest that the health effects are comparable (Donnelly & Murray, 1991; Harrist et al., 2007; Murray, Lamnin & Carver, 1989) though participants who talked in these studies did so in the presence of another individual, a factor that has been shown to influence the parameters of disclosure (Donnelly & Murray, 1991; Murray et al., 1989; Pennebaker, Hughes & O'Heeron, 1987). One study that has compared the effect of different modalities on the modulation of the immune response to exposure to the Epstein-Barr virus, found that verbal disclosure was superior to written disclosure, and both modalities produced a significantly better immune response compared to controls

(Esterling et al., 1994). Drawing as a means of disclosure was not found to produce the same psychological benefits as disclosure writing (Chan & Horneffer, 2006; Pantchenko et al., 2003), possibly due to the fact that many of the drawing participants reported feeling uncomfortable expressing themselves through this particular modality.

Frattaroli (2006) reported that typing does not have any differential impact on the outcome of disclosure. However, to date there are only two published studies that have compared the effect of writing modality on disclosure. In the first of these studies, Brewin and Lennard (1999) found that participants who wrote longhand reported a more negative mood immediately after the task than those who typed. Further analysis showed that participants who wrote longhand reported that they revealed significantly more about the event and found it more beneficial than those who typed. Conversely a more recent study by Sharp and Hargrove (2004) found that post writing affective arousal was not differentiated by modality, and that participants who wrote longhand or typed about an emotional topic reported similar levels of disclosure. The only difference between the two modalities was that typing participants produced significantly more words than their longhand counterparts. Whilst Brewin and Lennard (1999) speculated that their findings could suggest that the effects of disclosure might be in part dependent on the modality of expression, the longer-term effects of typed disclosure were not assessed. Before any clear conclusions can be made about the comparability of typed and written disclosure, research needs to determine if the longer-term psychological and physical health effects of disclosure are moderated by these modalities.

3.4.4 Timing of Follow-up Assessment

As can be seen in Table 3.1, the time between disclosure and post-test assessment has varied considerably from study to study, with some administering outcome measures immediately after the final disclosure session (e.g. Deters & Range, 2003), at weekly intervals (Cepeda et al., 2008; Sheese et al., 2004) or even up to two years post intervention (Schilte et al., 2001), with the average time to follow-up being three months (see Frattaroli, 2006). Despite the large number of disclosure studies that have now been conducted and the variation in post-test assessment times that have been employed it is still unclear what the optimal time of post-test assessment should be. Frattaroli (2006) found that studies that assessed participants less than a month post intervention had larger psychological but not physical health effect sizes, than those that assessed participants for at least one month. In fact, studies have reported

improvements in psychological functioning in disclosure participants a matter of days post intervention (Alford, Malouff & Osland, 2005; Chan & Horneffer, 2006; Ullrich & Lutgendorf, 2002). However, a notable methodological similarity in the aforementioned studies is that the writing sessions were not conducted on consecutive days, but over a number of weeks, consequently, the time between first disclosure and follow-up ranges from two to eight weeks. Considering that psychological improvements have been found after one session of disclosure (Fernández & Páez, 2008) it is possible that the mechanisms through which psychological changes occur may have become activated prior to the final disclosure session. Others have found that psychological improvements do not emerge until many months following disclosure. For example, Gortner et al. (2006) found a reduction in symptoms of depression at six months post intervention that were not evident at five weeks. Similarly, Sheffield, Duncan, Thomson and Johal (2002) found that reported improvements in anxiety and insomnia at 30 week assessment were not evident at three and seven week follow-up.

In terms of physical health the findings regarding the timing of the follow-up assessment are similarly mixed. Studies that have examined immunological changes after writing indicate that positive changes can be seen relatively quickly. Esterling et al. (1994) found an enhanced response to the latent Epstein-Barr virus one week after disclosure. In addition Petrie et al. (2004) found a systematic continued increase in the $CD4^+$ lymphocyte count in patients with HIV at two weeks, three and six months post intervention. Improvements in self-reported physical symptoms have also been found at one month post-intervention (Epstein et al. 2005; Sloan et al., 2005). However, Greenberg et al. (1996) failed to find an effect within this one month time frame and suggested that the high levels of negative mood aroused by disclosure writing may have an immunosuppressive effect in the initial few weeks following disclosure, the effects of which may take time to subside. Studies that have examined the health effects of disclosure writing in patient samples show some support for this premise. For example, Smyth, Stone, Hurewitz and Kaell (1999) found that physician rated disease activity did not differ between disclosure and control groups in RA patients at two week or two month follow-up. However, at four month follow-up disclosure group participants had improved disease activity ratings. Similarly, Stanton et al. (2002) found that self-reported somatic symptoms and recorded medical appointments for cancer related morbidities in breast cancer patients reduced at three month follow-up a as function of disclosure, although these health benefits were not evident one month post-intervention.

In addition it is also not clear for how long benefits can be maintained. Broderick et al. (2005) found that the improvements in pain, psychological well-being and fatigue seen in disclosure participants with fibromyalgia four months post intervention were no longer evident at ten months. However, Gidron et al. (2002) found that clinic attendance for individuals in the disclosure group previously classified as frequent clinic attendees[14] was significantly reduced compared to controls at three month follow-up; and that this group difference was maintained at 15 months. Arguably, the difficulty in interpreting the findings presented with regards to the timing of follow-up assessments is that the variability in results will likely be a consequence of a complex combination of the characteristics of the samples under investigation, variations in methodology and in particular how the dependent variables of well-being are assessed.

Considering the uncertainty about the optimum time at which disclosure effects emerge and for how long they persist, the use of multiple post-test assessment periods and outcome types, within the practical limits of the study, should be employed.

3.5 Outcome Type

Considering the large number of disclosure studies that have been conducted it is not surprising that a wide variety of physical and psychological well-being, behavioural, physiological and immunological measures have been used to evaluate the disclosure paradigm.

3.5.1 Objective Versus Subjective Assessment of Physical Health

An assortment of self-report physical health measures have been used in disclosure studies including Pennebaker's Inventory of Limbic Languidness (PILL; Pennebaker 1982), the Short Form Health Survey (SF-36; Ware & Sherbourne, 1992) and the 12-item Pennebaker Symptom Scale (Pennebaker, 1982). Studies have also judged physical well-being based on self reported health care utilization (HCU; e.g. Cameron & Nicholls, 1998). Studies in patient populations have utilised self-report measures that represent the physical limitations or characteristics of the disorder, for example the Multidimensional Pain Inventory (MPI; Kerns, Turk & Rudy, 1985) has been used in studies with fibromyalgia patients (Broderick et al., 2005), migraine sufferers (Kraft et al., 2008) and women with pelvic pain (Norman, Lumley, Dooley, & Diamond, 2004).

[14] Based on the inclusion criteria of having visited the clinic at least twice during the past 3 months, no known mental illness or major cognitive difficulties and no known chronic illness (Gidron et al., 2002).

Because self-reports can be subject to demand characteristics, some studies have assessed objective health measures such as HCU (e.g. Pennebaker et al., 1990) or in the case of chronic illness patients, physician rated disease activity (e.g. Kelley et al., 1997). However, Frattaroli (2006) found that whilst disclosure did not appear to affect objective measures of disease activity, self reported measures did improve. As discussed in detail in section 2.3.4.4, a meta-analysis by Harris (2006) including only studies that measured HCU (both self-report and objectively assessed) concluded that disclosure writing was effective in significantly reducing HCU in healthy people. HCU as an outcome measure is problematic. First self-reported HCU can be subject to multiple demand characteristics. Second, even the more objective measures of HCU (e.g. health centre recorded visits) are still an indirect measure of health status. For example, an increase or decrease in visits to the doctor may not be indicative of an actual change in health but of a change in the individual's threshold for reporting illness (Cohen & Williamson, 1991). Equally, the more frequently experienced illnesses such as the common cold and gastrointestinal viruses and symptoms such as headaches and sore throats do not often require the attention or diagnosis of a doctor and so go unreported. It is unclear if a reduction in HCU in people with pre-existing medical conditions and psychological disorders can be considered beneficial or if we would expect to see changes in HCU in these populations irrespective of the writing intervention (e.g. due to continuing/differential treatment regimens).

3.5.2 Physiological and Immunological Measures

A number of longer-term immune and physiological parameters have been examined in the disclosure literature, including the body's response to the Epstein-Barr virus (Esterling et al., 1994) and hepatitis B vaccinations (Petrie et al., 1995), wound healing after a punch biopsy (Weinman, Ebrecht, Scott, Walburn & Dyson, 2008), HIV viral load and $CD4^+$ lymphocyte counts (Petrie et al., 2004) and blood pressure (O'Connor & Ashley, 2008). The immediate post-writing effects on blood pressure, heart rate, skin conductance levels (Pennebaker et al., 1987) and salivary cortisol (Sloan & Marx, 2004a) have also been examined. The findings of studies that have examined the longer-term immunological effects and short-term physiological effects of disclosure are discussed in sections 2.3.4.2.2 and 2.3.3.2 respectively, however in the meta-analysis of Smyth (1998) the effect size for immune functioning was one of the largest (d = 0.68). Ideally studies should utilise these more objective markers of physical functioning in order to establish the wider benefits of disclosure (Pennebaker, 1994),

however the use of immunological and physiological markers is expensive and is therefore dependent on the financial limitations of the study.

3.5.3 Psychological Well-being

The measurement of the psychological effects of disclosure is necessarily dependent on self-report. The exact nature of psychological functioning that has been assessed in disclosure has varied considerably as have the measures used to assess the different categories of psychological functioning. For example, the most common measures of mood have been the Positive and Negative Affectivity Scale (PANAS: Watson, Clark & Tellegan, 1988) and the Profile of Mood States Short Form Scale (POMS: Shacham, 1983). Symptoms of depression and anxiety have been measured using well validated measures such as the Beck Depression Inventory (BDI: Beck, Ward & Mendelson, 1961), the Symptom Checklist- 90-Revised (SCL-90-R: Derogatis, 1992) and the Depression Anxiety and Stress Scale-21-item ($DASS_{21}$; Lovibond, & Lovibond, 1995). The impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979) has been widely used to assess the frequency of event related intrusive and avoidant thoughts and as a measure of PTSD symptomology. Frattaroli (2006) reported that the only categories of psychological well-being to improve as a result of disclosure over the 146 studies analysed were those of depression, anxiety, distress, subjective well-being and anger. Irrespective of the variation in measures used, the effect size for psychological outcomes has been found to be comparable to that of the physiological effects on disclosure, with students experiencing better psychological outcomes (Smyth, 1998). This finding is supported by Frisina, Borod and Lepore (2004) who found disclosure writing to be more effective in alleviating physical symptoms than psychological symptoms in populations with physical illness.

3.6 Study Setting

3.6.1 Context: Laboratory, Home or Medical Setting

The laboratory based procedure developed by Pennebaker and Beall (1986) has been the blueprint for numerous studies examining the effects of written emotional disclosure (e.g. Pennebaker & Francis, 1996). Subsequently, researchers have taken the writing intervention out of the laboratory and into other settings such as the hospital room (Schwartz & Drotal, 2004), out-patient clinic (de Moor et al., 2002; Duncan et al., 2007), home (e.g. Langens & Schüler, 2005) and prison (Richards, Beal, Seagal, & Pennebaker, 2000: see Table 3.1 for the contexts in which studies have been conducted). Arguably, the main rationale for taking the writing intervention out of the

controlled setting of the research laboratory has been to maximize the recruitment and retention of specific populations, in particular the chronically ill (e.g. Wetherell et al., 2005). Whilst this adaptation of the standard protocol may help to widen the application of disclosure writing some have questioned if this adaptation to the protocol may limit its effectiveness (Schwartz & Drotar, 2004; Sheffield et al., 2002; Smyth & Catley, 2002). For example, Schwartz and Drotar (2004) examined the effectiveness of writing about traumatic events in a sample of caregivers of children and adolescents with cancer or sickle cell disease. Although participants were given the option to complete the disclosure sessions in a private room at the hospital, the majority chose to remain in the child's hospital room. At four month follow-up disclosure participants did not report any changes in mood, anxious or depressive symptoms or caregiver appraisal of stress compared to controls, in fact controls reported more vitality than disclosure participants over time. This finding led Schwartz and Drotar (2004) to caution against the implementation of disclosure writing in the inpatient setting of a hospital and recommend that writing should take place in a setting separate from that of the hospital room. Whilst it is reasonable to assume that the stressors and distractions of a child's hospital room may interfere with the disclosure process, it is notable that in this study participants were asked to write about any traumatic event and not specifically about the stressors they encountered caring for a sick child. Given the evidence that the topic of disclosure can selectively affect the outcome, particularly in relation to ongoing stressors (see section 3.2.2) the lack of improvements reported in caregiver appraisals of stress may not have been a result of the study setting, Solano et al. (2003) found, for example, that writing about being in hospital (whilst in hospital) did have positive effects on post-operative course in male urology patients.

Although clinic and hospital settings may have consequences for research participants, they still maintain the 'legitimate authority' that is inherent in the traditional laboratory environment (Smyth & Catley, 2002), that is they maintain a level of control that is not possible within a home setting. Sheffield at al. (2002) attempted to replicate the lab based protocol used in previous disclosure studies (e.g. Pennebaker & Beall, 1986) in a home-based context with a student sample. At three weeks follow-up disclosure participants reported experiencing more physical symptoms and higher rates of absence from college due to illness than controls. This led the authors to caution against the use of disclosure writing in the home. However, previous studies conducted in the traditional laboratory setting have also reported short-term increases in physical symptoms in trauma group participants (Greenberg & Stone, 1992; Kloss & Lisman, 2002; Park & Blumberg, 2002) suggesting that the reporting of increased physical

symptoms, in the short-term, is not unique to the home setting. Indeed, in Sheffield et al.'s (2002) study, at 30 week follow-up, disclosure group participants reported lower levels of anxiety and insomnia than control groups, suggesting that the home-based intervention was effective to some extent.

The evidence for the effectiveness of home-based disclosure interventions with chronic illness populations is somewhat equivocal. For example, studies that have implemented home-based disclosure interventions with cancer sufferers have found only limited support for the effectiveness of the intervention in this population (Cepeda et al., 2008; Rosenberg et al., 2002; Zakowski, Ramati, Morton, Johnson & Flanigan, 2004). Equally, studies that have been conducted in lab-based settings with cancer sufferers have also found limited support for the effectiveness of disclosure writing (see section 2.3.7.3) suggesting that this type of intervention may have limited utility in this population irrespective of the context in which it is conducted. Conversely, Frattaroli (2006) found that effect sizes tended to be larger for psychological outcomes in studies where participants disclosed at home. The methodological, sample and procedural variability in studies that have been conducted in different settings makes it difficult to draw any clear conclusions about the impact of different settings without a direct examination of the moderating effect of study context on disclosure.

3.6.2 Audience Effects

There are three differential audience effects that can arise in the course of disclosure studies: verbally disclosing to another, the sharing of written disclosure with the researcher and disclosing in a public room. Studies which consider the differential effects of verbal disclosure often involve directly disclosing to another individual (e.g. Harrist, et al., 2007). Differences have been noted for the immediate effects on post disclosure mood, such that talking in the presence of another arouses less negative affect than writing alone (Donnelly & Murray, 1991; Harrist et al., 2007; Murray et al., 1989). Consistent with this finding, Pennebaker et al. (1987) found that participants who talked in the presence of another were less likely to cry or have a wavering voice, this inhibition of affect was also reflected in skin conductance level's (see section 2.3.3.2 for a discussion of the short-term physiological effects of disclosure). As mentioned in section 3.4.3, the longer-term outcome of verbal disclosure is comparable to that of written disclosure (Harrist et al., 2007; Donnelly & Murray, 1994), though individual differences in emotional processing may moderate the effect of these different modalities (Cohen, Sander, Slavin & Lumley, 2008).

Most disclosure studies ask participants to submit their writing upon completion (e.g. Epstein et al., 2005). In this instance the writing is no longer private as an audience becomes privy to the content. Considering that the submission of writing is commonplace in disclosure studies, in order that the content can be subject to analysis, there has been little consideration of the consequences of sharing the content of written disclosure with others. Very few studies have allowed participants complete privacy of disclosure, either by allowing them to keep their writing (Broderick, Stone, Smyth, & Kaell, 2004; Horneffer & Jamison, 2002) or by guaranteeing that their writing will not be read by anyone (Schoutrop, Lange, Hanewald, Duurland, & Bermond, 1997; Schoutrop et al., 2002; Stice, Burton, Bearman & Rohde, 2006). Some studies report that participants are told they can keep their writing if they wish, although few are reported to choose this option (Klein & Boals, 2001a; Pennebaker & Beall, 1986; Weinman et al., 2008). Frattaroli (2006) reported that in studies where participants did not submit their writing to the researcher the psychological effect sizes were significantly larger than in studies where participants did submit. However, in a direct test of this effect, Radcliffe, Lumley, Kendall, Stevenson and Beltran (2007) found the opposite. In their study, participants who did not share their writing with the researcher reported lower levels of intrusion at three month follow-up than those who did. Both groups had lower levels of trauma related avoidance at follow-up compared to controls. Furthermore, participants who shared their writing reported significantly less depression at follow-up than those who kept their writing private. Shared disclosers had significantly lower levels of interpersonal sensitivity at follow-up compared to controls, whereas private disclosers did not differ from controls. One possible explanation for this is that shared disclosers may have put more effort into their writing knowing that it would be in some way evaluated by the researcher, whilst private disclosers may have felt less obliged to adhere to the writing protocol and thus did not engage with task sufficiently leading to reduced benefits (Radcliffe et al., 2007).

The privacy of the setting in which participants conduct the disclosure session may also be important. Pennebaker (1994) advocates the use of a unique and solitary environment for disclosure. Due to practical constraints, such as time and resources, and also to maximise recruitment, studies that are conducted within the academic environment, with student samples, are occasionally conducted in group settings. This can be in the laboratory (e.g. Chung & Pennebaker, 2008) or in the classroom (e.g. Chan & Horneffer, 2006). The presence of an audience in this context, namely other participants, has been found to moderate the psychological effects of disclosure (Frattaroli, 2006) such that disclosure in the solitary conditions of a private room,

produce larger psychological effect sizes than disclosure in group conditions where other participants are present.

Interpersonal disclosure, whether it be through talking to another or sharing writing about a traumatic or stressful experience, appears not to affect the longer-term outcome of disclosure studies. However, there are possible implications for conducting disclosure sessions where others are present (i.e. in a classroom with other students). Arguably, the presence and involvement of a researcher differs from that of conducting disclosure in the presence of others, be they peers or strangers, in that the researcher may be considered within the role of therapist.

3.6.3 Administration of Instructions

The writing instructions given to participants are commonly delivered in two ways, either in writing or verbally. Whilst the setting of some studies (e.g. at home or in a classroom) necessitates that written instructions are provided (e.g. Cepeda et al., 2008) those conducted in the more controlled setting of the laboratory are able to administer instructions verbally (e.g. Francis & Pennebaker, 1992). In fact some studies administer instructions verbally and in writing in order to emphasize adherence to the protocol (e.g. Greenberg et al., 1996). Some home based studies have provided telephone prompts to participants in addition to providing written instructions in an attempt to increase adherence (Beckwith McGuire, Greenberg, & Gevirtz, 2005; Bruera, Willey, Cohen & Palmer, 2008; Gill, Lumley, Mosley-Williams, Leisen & Roehers, 2006). In a unique study by Broderick et al. (2004) the effectiveness of a home-based writing intervention for RA patients delivered via videotaped instructions was examined. Although the delivery of instructions via videotape appeared to be feasible the study failed to find any disclosure effects. Whilst it is unclear what the cause of these null findings were the way in which instructions are administered is not generally thought to have any effect on the outcome of disclosure (Frattaroli, 2006).

3.7 Summary

The methods used in disclosure studies have varied considerably. The protocol described by Pennebaker and Beall (1986) has been subject to numerous modifications and adaptations to such an extent that the 'standard protocol' no longer exists (if indeed it ever did). While Pennebaker (1994) has argued to maintain some of the original methodological features of the protocol, such as the instructional set and solitary laboratory context of disclosure, it is evident that in order to broaden the

accessibility, and examine the feasibility, of the disclosure intervention as a therapeutic tool, it is necessary to move beyond the constraints of the original protocol. In doing so it is necessary first of all to directly examine the differential effects of methodological adaptations to the original protocol. Whilst the findings of meta-analyses of disclosure studies can guide us in the development of future adaptations, the independent moderating effects of a number of the methodological variations that exist in the literature are yet to be directly tested.

This thesis aims to develop and implement a written disclosure intervention for individuals with infertility. The reluctance of individuals experiencing infertility and undergoing treatment to engage in face-to-face therapies (see section 2.2.7) suggests that the method by which an intervention is delivered in this population is important, if such an intervention is to be feasible. In order to overcome some of the barriers to participation that individuals with infertility may encounter (e.g. time constraints, accessibility), the intervention will be implemented within the home using a computer. The consequence, of adapting the written disclosure protocol to be delivered within the home context and using a computer to complete the writing task is a departure from the more traditional laboratory based, hand-written methodology that has been widely used in disclosure studies. It is not clear from the available evidence what the direct effects are of deviating from the standard lab-based, hand-written methodology to a home-based, computer-mediated protocol. Before this intervention can be developed and implemented in individuals with infertility it will be necessary to determine what impact these methodological changes might have on the efficacy of a disclosure intervention. Chapter 4 outlines the aims and objectives of this programme of research and the sequence of investigations that will be conducted.

Table 3.1 Methodological summary of published disclosure studies.

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Alford, Malouff, & Osland (2005)	Child protective service officers	Recent stressors	Non-writing control	3	15-20	Consecutive	Written	Home	Days after writing
Ames et al. (2007)	Young adults	About stopping smoking (in addition to motivational interviewing and nicotine replacement therapy)	Describe objects and events	5	20	Consecutive	Written	Home	8, 16, 24 & 52 weeks
Austenfeld, & Stanton (2008)	Students	Stressful current experience *or* best possible self	Activities of last 24 hours	3	20	Weekly	Written	Lab	4 weeks
Baikie (2008)	Students	Traumatic experience	Neutral (undefined)	4	20	Weekly	Unspecified	Unspecified	4 weeks
Barry & Singer (2001)	Mothers of NICU graduates	About NICU experience (included directed questions)	Non-writing control	4	30	Consecutive	Written	Home	4 weeks
Batten, Follette, Rasmussen Hall, & Palm (2002)	Sexual abuse survivors (female)	Traumatic experience (adapted)	Plans for the day	4	20	Consecutive	Written	Lab	Bi weekly for 12 weeks
Beckwith McGuire, Greenberg, & Gevirtz (2005)	Individuals with high blood pressure	Traumatic or stressful experience	Activities of the last 24hrs, that day and plans for next week	3	20	Consecutive	Written	Home	1 & 4 months

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Bernard, Jackson, & Jones (2006)	Psychosis patients	About illness and treatment	Plans for the day and describe objects	3	15	Over 10 days	Written	Lab	4-6 weeks
Booth, Petrie, & Pennebaker (1997)	Students	Traumatic and upsetting experience	Plans for the day, week and month	4	20	Consecutive	Typed	Lab	Weekly over 5 weeks
Bray et al. (2003)	Asthma sufferers (children & adults)	Stressful life experience	None (multiple baseline design to act as experimental control)	3	20	Weekly	Written	Lab	1 ½ weeks
Brewin & Lennard (1999)	Students	Traumatic or stressful experience	Events that day	1	Untimed	Single session	Typed *or* written	Classroom	Post disclosure only
Broderick, Junghaenel, & Schwartz (2005)	Fibromyalgia patients	Current or past traumatic event (adapted)	Activities of last week, last 24hrs and plans for the following week *or* non-writing control	3	20	Weekly	Written	Lab	Immediate post intervention, 4 & 10 months
Broderick, Stone, Smyth & Kaell (2004)	Rheumatoid arthritis (RA) patients	Stressful event *or* stressful event with instructions to enhance meaning	Activities of last week, last 24hrs and plans for the following week	3	20	Within 7-14 days	Written	Home	4-6 months
Brown & Heimberg (2001)	Rape victims	About the rape	Facts about the rape	1	Unspecified	Single session	Written *or* Verbal	Lab	1 month

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Bruera, Willey, Cohen & Palmer (2008)	Patients with advanced cancer	Traumatic and upsetting experience	Health behaviours, sleeping, diet, physical activity, substance use	4	20	Twice weekly	Written	Home	After last writing session (2 weeks)
Burshteyn, Lei, & Cea-Aravena (2005)	Students	Transition to college *or* Transition to college with biofeedback training	None	3	40	Weekly	Written	Lab	Post disclosure only
Burton & King (2004)	Students	Most wonderful experience	Plans for the day, describe surroundings	3	20	Consecutive	Written	Lab	3 months
Burton & King (2008)	Students	Most wonderful experience *or* traumatic event	Description of campus	2	2	Consecutive	Typed	Lab	4-6 weeks
Cameron & Nicholls (1998)	Students	About coming to college *or* problems with college and select self-regulation strategies	Today's activities today, plans for the day, describe a social event	3	15	Weekly	Written	Lab	6 weeks approx
Cepeda et al. (2008)	Cancer patients advanced	How cancer affected their life	Filled out questionnaires *or* non-writing control	3	20	Weekly	Written	Home	Weekly over 8 weeks
Chan & Horneffer (2006)	Students	Current or previous stressful event	Plans for the day	2	15	Weekly	Written *or* drawn	Classroom	1 week
Christensen et al. (1996)	Students	Stressful event	Read a hypothetical stressful scenario	1	10 minutes writing 60 seconds verbal disclosure	Single session	Written *and* verbal	Lab	Post disclosure only

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Chung & Pennebaker (2008)	Students	About life transition	Typical activity before transition, that day, and next month	3	15	Over 1 hour, over 3 hours, over 3 days	Written	Lab	1 & 9 months
Cohen, Sander, Slavin, & Lumley (2008)	Students (history of trauma)	Stressful experience	Plans for next 24 hours, next month, next year	1	30	Single session	Verbal *or* written	Lab	6 weeks
Corter & Petrie (2008)	Students	Traumatic experience	None	1	30	Single session	Written *or* typed	Lab (setting manipulated)	1 month
Danoff-Burg, Agee, Romanoff, Kremer, & Strosberg (2006)	Rheumatoid arthritis (RA) patients	Deepest thoughts and feelings about RA *or* positive thoughts about experience of RA	Facts about experience of RA	4	20	Over 3 weeks	Written	Lab	1 & 3 months
de Moor et al. (2002)	Renal cell carcinoma patients (enrolled in phase II clinical trial)	About cancer	Health behaviours, sleeping, diet, physical activity, substance use	4	15	Weekly	Written	Clinic	4, 6, 8 & 10 weeks
Deters & Range (2003)	Students (history of trauma)	Stressful and traumatic event	Details of last meal	3	15	Over 2 weeks	Written *and* typed	Lab	Immediate post intervention & 6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Donnelly & Murray (1991)	Students	Traumatic and upsetting	Describe closet, bedroom, classroom and wardrobe	4	30	Consecutive	Written *or* verbal	Lab	3 months
Duncan et al. (2007)	Parents of children with cancer	Trauma of child's cancer diagnosis - Guided Disclosure Protocol (GDP)	None (AAB design baseline taken twice at 1 month interval as own control)	1	30	Single session	Written	Outpatient clinic	1 month
Earnhardt, Martz, Ballard & Curtin (2002)	Female students with negative body image	About body image	Describe surroundings	4	Unspecified	Consecutive	Written	Lab	Immediate post intervention & 1 month
Epstein, Sloan, & Marx (2005)	Students	Most distressing experience	How they spend their time	3	20	Consecutive	Written	Lab	1 month
Esterling, Antoni, Fletcher, Margulies, & Schneiderman (1994)	Students	Stressful event	Describe surroundings and objects	3	20	Weekly	Written *or* verbal	Lab	1 week
Fernández & Páez (2008)	Community and students	About Madrid terrorist attack	Social activity	1	10-15	Single session	Unspecified	Unspecified	3 weeks & 2 months
Francis & Pennebaker (1992)	University employees	Trauma or personal upheaval (current or past)	Activities today, upcoming plans and describe surroundings	4	20	Weekly	Written	Lab	6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Frayne & Wade (2006)	Students	Traumatic experience	Plans for the day, week and month	3	20	Over 1 week	Written	Lab	10 weeks
Gallant & Lafreniere (2003)	Children of alcoholics	Personally stressful event	Description of a superficial event *or* non-writing control	3	25	Consecutive	Written	Alcohol recovery clinic	1 month
Gidron et al. (2002)	Clinic patients	Stressful or upsetting experience (GDP)	Activities today and describe job and house	3	15	Consecutive	Written	Home	3 months & between 10-20 month
Gidron, Peri, Connolly, & Shalev (1996)	PTSD Patients	Traumatic experience	Daily agenda and activities	3	20	Consecutive	Written *and* verbal	Home	5 weeks
Gillis, Lumley, Mosely-Williams, Leisen, & Roehrs (2006)	Fibromyalgia patients	Stressful experience and how this has affected their fibromyalgia	Activities of last week, last 24hrs, plan for next 24hrs and next week	4	15-20	Consecutive	Written	Home	1 & 3 months
Gortner, Rude, & Pennebaker (2006)	Students (elevated depressive symptoms)	Any difficult or emotionally disturbing events (current)	Activities of last 2 weeks, last 24hrs,and plans for next 2 weeks	3	20	Consecutive	Typed (online)	Lab *and* home	5 weeks & 6 months
Graham, Lobel, Glass & Lokshina (2008)	Chronic pain patients	Write a letter to a person or thing at which they are most angry	A letter to a person describing their plans for the day	2	20	2.5 weeks	Written	Clinic *or* home	Average of 4.3 weeks and 9.2 weeks
Graybeal, Sexton, & Pennebaker (2002)	Students	Emotionally significant experience	Activities of last 24hrs, plans for next 24hrs and next week	3	20	Consecutive	Typed	Home	During writing & 4½ weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Greenberg & Stone (1992)	Students	Traumatic and upsetting event previously disclosed *or* undisclosed event	Upcoming plans and describe objects	4	20	Consecutive	Written	Lab	1 & 2 months
Greenberg, Wortman, & Stone (1996)	Students (females with history of trauma)	Traumatic event *or* imaginary trauma (focused on visualization of the event)	Describe surroundings	1	30	Single session	Written	Lab (small groups)	1 & 4 weeks
Guastella & Dadds (2006)	Students	Upsetting experience (plus 2 other groups adapted for exposure or devaluation processes) *or* benefit-finding group	Visualise different environments	3	30	Weekly	Written	Lab	Post disclosure only
Hamilton-West & Quine (2007)	Patients with ankylosing spondylitis (AS)	Stressful experience over the last month can be related to AS	Plans for tomorrow	3	20	Consecutive	Written	Home	1 & 3 months
Harris, Thoresen, Humphreys, & Faul (2005)	Asthma patients	Stressful or traumatic experiences *or* positive events	Events of previous day	3	20	Weekly	Written	Lab *and* home	Immediate post intervention & 2 months
Harrist, Cariozzi, McGovern, & Harrist (2007)	Students	Best possible self	Plans for tomorrow	4	20	Consecutive	Written *or* verbal	Lab	3 months
Hemenover (2003)	Students	Traumatic life event	Plans for tomorrow	3	20	Over 2 weeks	Typed	Lab	3 months

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Horneffer & Jamison (2002)	Students	Current or previous stressful event	Plans for the day	2	15	Weekly	Written	Classroom	1 week
Hughes, Uhlmann, & Pennebaker (1994)	Students	Traumatic event	Plans for the day *and* copying written text	3	15	On same day	Typed	Lab	Post disclosure only
Hunt, Schloss, Moonat, Poulos & Wieland (2007)	Pet owners with terminally ill, injured or dying pets	Situation with the sick pet with cognitive restructuring *or* emotional processing *or* a combination of the two	None	3	20	Consecutive	Written	Home	1 month
Kelley, Lumley, & Leisen (1997)	Rheumatoid arthritis patients	Trauma or upheaval (current or past)	Descriptions of pictures	4	15	Consecutive	Verbal	Home	1-6 months (averaged 6 months)
Kim (2008)	Students	Traumatic event	Non-writing control	4	Unspecified	Consecutive	Written	Unspecified	1 month
King (2001)	Students	Traumatic event *or* best possible self *or* combination of two	Plans for the day	4	20	Consecutive	Written	Lab	3 weeks & 5 months
King & Miner (2000)	Students	traumatic event *or* trauma event & perceived benefits *or* perceived benefits only	Plans for tomorrow and describe your shoes	3	20	Consecutive	Written	Lab	3 & 5 months
Klapow et al. (2001)	Geriatric patients	Most distressing event	What they did to stay healthy	3	20	Over 2 weeks	Written	Clinic	1 month

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Klein & Boals (2001a) Study 1	Students	Coming to college	What they did in the day and how they might have done it better	3	20	Over 14 days	Written	Lab	1 week & 6 weeks
Klein & Boals (2001a) Study 2	Students	Positive event *or* negative event	Activities of last 24hrs,today and plans for next 24hrs	3	20	Over 14 days	Written	Lab	Immediate post intervention & 7-8 weeks
Kloss & Lisman (2002)	Students	Traumatic and upsetting experiences *or* happiest experiences	Today s activities	3	20	Consecutive	Written	Lab	2-3months
Koopman et al. (2005)	Female victims of domestic violence	Traumatic experience	How they used their time	4	20	Weekly	Written	Lab, café *and* other venue chosen by participant	4 months
Kovac & Range (2000)	Students	Suicide of loved one	Describe your room, what you have eaten, what you have done today or plan to do	4	15	Over 2 weeks	Written	Lab	6 weeks
Kraft, Lumley, D'Souza, & Dooley (2008)	Students with migraine	Stressful experience *or* relaxation training	Activities of last week, last 24 hrs and plans for next 24hrs, next week	4	20	Over 2 weeks	Written	Lab	1 & 3 months
Langens & Schüler (2007)	Students	Emotionally upsetting events *or* venting emotions	Describe apartment and route to school	4	20	Consecutive	Written	Home	6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Langens & Schüler (2005) Study 1	Students	Emotionally upsetting events	Describe apartment and route to school	4	20	Consecutive	Written	Home	6 weeks
Langens & Schüler (2005) Study 2	Students	Self defining memories	Non-writing control	8	20	Weekly	Written	Home	5 weeks
Lepore (1997)	Graduate entrants	Deepest thoughts about entrance exam	Activities of last 24 hrs	1	25	Single session	Written	Lab	1 week after exam.
Lepore & Greenberg (2002)	Students	About relationship and breakup	Impersonal relationship topics	3	20	Consecutive	Written	Home	2 &15 weeks
Lumley & Provenzano (2003)	Students	Traumatic and upsetting experience	Plans for the next 24 hrs, next week, next year, next 10 years	4	15-20	Consecutive	Written	Lab and home	Over two subsequent semesters
Lutgendorf, Antoni, Kumar, & Schneiderman (1994)	Students	Highly stressful or traumatic event (experiential exercise to increase level of involvement at 2nd session)	Non-writing control	3	20	Weekly	Verbal	Lab	5 weeks
Mackenzie, Wiprzycka, Hasher, & Goldstein (2007)	Family caregivers of elderly	Most stressful, upsetting and distressing aspect of being a caregiver	Activities as a caregiver *or* 20th Century History and World Events *or* non-writing control	4	20	Over 2 Weeks	Written	Lab	Immediate post intervention & 1 month
Mann (2001)	HIV infected women	Positive future	Non-writing control	8	10	Twice a week	Written	Clinic *and* home	3 days

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Marlo & Wagner (1999)	Students	Negative, traumatic event *or* positive event	Describing shoes surroundings and plans for the day and week	4	20	Over 2 weeks	Written	Classroom	Immediate post intervention & 1 month
McCullough, Root, & Cohen (2006)	Students	Benefit finding of personal transgression *or* traumatic features of personal transgression	Plans for tomorrow	1	20	Single session	Written	Lab	Immediate post intervention
Mosher & Danoff-Burg (2006)	Students	letter to some who helped you (positive) *or* letter to someone who hurt you (negative)	Letter to school official about college topic	1	25	Single session	Written	Lab (small group)	1 month
Muris, Meesters, & Gobel (2002)	Children (with elevated anxiety scores)	Cognitive coping applied to threatening situations *or* emotional disclosure about threatening idiosyncratic situation	None	6	50	Weekly	Written	Classroom	1 week
Murray, Lamnin & Carver (1989)	Students	Traumatic event	Describe room and closet	1	30	Single session	Written *or* verbal	Lab	6 months
Murray & Segal (1994)	Students	Traumatic and upsetting experience	Describe surroundings and objects	4	20	Consecutive	Written *or* verbal	Lab	3 months
Norman, Lumley, Dooley, & Diamond (2004)	Women with pelvic pain	Negative emotional experience associated with chronic pelvic pain	Positive aspects of life not related to pelvic pain	3	20	Consecutive	Written	Home	2 months

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
O'Connor, Allen, & Kaszniak (2005)	Bereaved community sample	About the death of a loved one and a letter to the deceased saying goodbye	Activities yesterday, today and plans after session has finished	3	0	1-2 weeks apart	Written	Lab	1 week & 1 month
O'Connor & Ashley (2008)	Students	Upsetting experiences	Activities of last 24 hrs and plans for next 24hrs	3	15	Consecutive	Written	Lab *or* home	2 weeks
O'Neill & Smyth (2001)	Students and staff who experienced Hurricane Floyd	About hurricane and flood	Effects of flood on plans for the coming week *or* non-writing control	1	20	Single session	Written	Lab	2-3 months
Páez, Velasco, & González (1999) Study 1	Students	Traumatic and upsetting experiences not previously disclosed *or* traumatic and upsetting experiences previously disclosed	Most recent social event	3	20	Consecutive	Written	Lab	2 months
Páez, Velasco, & González (1999) Study 2	Students	Traumatic and upsetting experiences not previously disclosed *or* traumatic and upsetting experiences previously disclosed	Most recent social event	1	3	Single session	Written	Lab	2 months
Pantchenko, Lawson, M, & Joyce (2003)	Students	Personally upsetting experience	Describe bookcase, tree, seashell	3	20	Weekly	Written *or* drawn or both	Classroom	10 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Park & Blumberg (2002)	Students	Traumatic or upsetting experience	Details of closet, outfit, things you do before class, setting of first class this week	4	20	Consecutive	Written	Lab (in small groups)	4 months
Pennebaker & Francis (1996)	Students	Coming to college	Activities that day, upcoming plans and a social event	3	20	Consecutive	Written	Lab	6 weeks - 2 months
Pennebaker & Beall (1986)	Students	Feelings about a personally upsetting experience *or* facts about a personally upsetting experience *or* combination	Description of living room, shoes, a tree, room	4	15	Consecutive	Written	Lab	4 months & 2 years
Pennebaker, Colder, & Sharp (1990)	Students	About coming to college	Activities that day, upcoming plans and a social event	3	20	Consecutive	Written	Classroom	4 months
Pennebaker, Hughes, & Heeron (1987)	Students	Highly stressful or traumatic event	Plans for this afternoon	1	6	3 minute intervals (Participants took part in both conditions)	Verbal	Lab	Post disclosure only
Pennebaker, Kiecolt-Glaser, & Glaser (1988)	Students	Traumatic and upsetting experience	Describe activities during day, a recent social event, shoes, and plans for the day	4	20	Consecutive	Written	Lab	6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Petrie, Booth, Pennebaker, Davison, & Thomas (1995)	Students	Traumatic and upsetting experience	Activities of last 24 hour and plans for next 24 hours, next week, next 12 months	4	20	Consecutive	Typed	Lab	1, 4, & 6 months
Petrie, Fontanilla, Thomas, Booth, & Pennebaker (2004)	HIV patients	Traumatic and emotional experiences	Activities of last 24 hour and plans for next 24 hours, next week, next 12 months	4	30	Consecutive	Typed	Clinic	2, 4, & 6 months
Radcliffe, Lumley, Kendall, Stevenson, & Beltran (2007)	Students (history of trauma)	Stressful event (instructed to try and resolve and find meaning)	Activities of last week, last 24hrs, next 24 hrs and next week *or* non-writing control	4	20	Over 1 week	Written	Lab *and* home	1 month & 3 Month
Range, Kovac, & Marion (2000)	Students who had experienced sudden death	Death of a loved one	Describe your room, what you have eaten, what you have done today or plan to do	4	15	Consecutive	Written	Lab	6 weeks
Reynolds, Brewin, & Saxton (2000)	Children 8-13	Things that you have found stressful or sad	How you spend your time *or* non-writing control	3	15-20	Consecutive	Written	Classroom	2 months
Richards, Beal, Seagal,& Pennebaker (2000)	Psychiatric prison inmates	Traumatic and upsetting experiences	Describe events or objects *or* non-writing control	3	20	Consecutive	Written	Prison	6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Rivkin, Gustafson, Weingarten, & Chin (2006)	HIV Patients	About being HIV positive	Activities of last 24 hrs	4	20	Weekly	Written	Home, university office *and* other community venue	2 & 6 months
Rogers, Wilson, Gohm & Merwin (2007)	Students	Traumatic event in presence of a *warm* experimenter *or* traumatic experience in presence of a *cold* experimenter	Contents of house in presence of a *warm* experimenter *or* contents of house in presence of a *cold* experimenter	3	20	Consecutive	Written	Lab	1 week, 4-8 weeks & 6 months
Rosenberg et al. (2002)	Prostate cancer patients	Experience of prostate cancer and treatment (may also write about other traumatic or upsetting experiences)	Non-writing control	4	20	Consecutive	Written	Home	3 & 6 months
Schilte et al. (2001)	Frequent clinic attendees	Emotionally important events	None	2	30 mins-2 hours	Weekly	Verbal	Home	6 months, 1 & 2 years
Schoutrop, Lange, Hanewald, Davidovich, & Salomon (2002)	Students (history of trauma)	Past negative experience that still disturbs you daily	Non-writing control	5	45	Over 2 weeks	Written	Lab *and* home	Immediate post intervention & 6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Schoutrop, Lange, Hanewald, Duurland, & Bermond (1997)	Students (history of trauma)	Past negative experience that still disturbs you daily	None	5	45	Over 2 weeks	Written	Lab *and* home	Immediate post intervention & 8 weeks
Schwartz & Drotar (2004)	Caregivers of hospitalized children	Traumatic and upsetting experience	What you did last summer	3	20	1 day apart	Written	Hospital room	4 months
Seih, Lin, Huang, Peng, & Huang (2008)	Students	Psychological displacement diary writing	None	10	Unspecified	Consecutive	Written	Unspecified	1 week
Sharp & Hargrove (2004)	Students	Extremely important emotional issue	Describe closet	1	15	Single session	Written *or* typed	Lab (large groups)	Post disclosure only
Sheese, Brown, & Graziano (2004)	Students	Traumatic experience	Activities of last 24hrs , today and describe a movie	3	20	Consecutive *or* weekly	Typed (e-mail)	Home	Weekly over 5 weeks
Sheffield, Duncan, Thomson, & Johal (2002)	Students	Traumatic or upsetting experience	Activities since waking, most recent social event, plans for the rest of the day or non-writing control	3	10	Consecutive	Written	Home	3, 7, & 30 weeks
Slatcher & Pennebaker (2006)	Students	About their current romantic relationship	Daily activities	3	20	Consecutive	Typed (online)	Home	3 months

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Sloan & Epstein (2005)	Students	Traumatic experience	How they spent their time	3	20	Consecutive	Written	Lab	1 month
Sloan & Marx (2004a)	Students (women with moderate PTSD symptoms)	Traumatic upsetting experience	Activities of last 24hrs, today and plans for next week	3	20	Consecutive	Written	Lab	4 weeks
Sloan & Marx (2006)	Student and community - females with moderate PTSD symptoms	Traumatic , upsetting experience	None	3	20	Consecutive	Written	Lab	2 months
Sloan, Marx, & Epstein (2005)	Students	Traumatic upsetting experience concentrating on same event or traumatic upsetting experience describing different events	Activities of last 24hrs, today and plans for next week	3	20	Consecutive	Written	Lab	4 & 8 weeks
Sloan, Marx, Epstein, & Lexington (2007)	Students (history of trauma)	Traumatic upsetting experience *or* traumatic upsetting experience with cognitive assimilation	Activities of last 24hrs, today and plans for next week	3	20	Consecutive	Written	Lab	1 month
Sloan, Marx, Epstein, Lexington, & Dobbs (2008)	Students	Traumatic or stressful experience	How they spent their time	3	20	Consecutive	Written	Lab	2, 4 & 6 months

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Smyth, Anderson, Hockemeyer & Stone (2002)	Students	About hurricane and floods	How you will manage your time over next week *or* non-writing control	1	20	Single session	Written	Lab	3 months
Smyth, Hockemeyer, & Tulloch (2008)	PTSD patients	Traumatic event (guided writing)	Daily plans	3	20	15 minute intervals	Written	Lab	3 months
Smyth, Stone, Hurewitz, & Kaell (1999)	Community sample with asthma or rheumatoid arthritis	Stressful experience	Plans for the day	3	20	Consecutive	Written	Lab	2 weeks , 2 & 4 months
Smyth, True, & Souto (2001)	Students	Traumatic or stressful event in a list format *or* traumatic or stressful event in a narrative format	Activities of last week	1	20	Single session	Written	Lab	Weekly over 5 weeks
Solana, Donati, Pecci, Persichetti, & Colaci (2003)	Urology patients - bladder surgery	About the operation	Non-writing control	3	20	Consecutive	Written	Hospital room	Day before discharge
Spera, Buhrfeind, & Pennebaker (1994)	Unemployed professionals	About being laid off and how this affected their lives	Plans for the day and job search *or* non-writing control	5	20	Consecutive	Written	Job centre	12 days

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Stanton et al. (2002)	Breast cancer patients	Deepest thoughts and feelings about cancer *or* positive thoughts and feelings breast cancer experience	Facts about breast cancer	4	20	Over 3 weeks	Written	Home, lab *and* clinic	1 & 3 months
Stetler, Chen, & Miller (2006)	Black students	Experiences with racism, prejudice or discrimination	Plans for the week	3	20	Weekly	Written	Lab	1 & 3 months
Stice, Burton, Bearman, & Rohde (2006)	Adolescents and adults (students with elevated depressive symptoms)	Extremely important emotional issue (compared to Cognitive behaviour therapy, supportive-expression, bibliotherapy and journaling)	Non-writing control	3	45	Weekly	Written	Lab	Immediate post intervention, 1 month & 6 month
Stone, Smyth, Kaell, & Hurewitz (2000)	Community sample with asthma or rheumatoid arthritis	Stressful experience	Plans for the day	3	20	Consecutive	Written	Lab	4 months
Stroebe, Stroebe, Schut, Zech, & van den Bout (2002)	Recently bereaved widows/ers	About death of partner *or* problems caused by death of partner *or* combination	Non-writing controls	7	10-30	Consecutive	Written	Home	1 week, 6 months
Suedfeld & Pennebaker (1997)	Students	Traumatic and upsetting experience	Describe surroundings, objects and plans for day	4	20	Consecutive	Written	Lab	6 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Swanbon, Boyce, & Greenberg (2008)	Gay men	About being gay	Non-emotional (unspecified)	3	20	Over 1 week	Written	Home	1 & 2 month
Taylor, Wallander, Anderson, Beasley, & Brown (2003)	Cystic fibrosis patients	Distressing experience	Non-writing control	3	20	Over 5 days	Written	Clinic *and* home	3 months
Ullrich & Lutgendorf (2002)	Students	Emotions only about a trauma, stressor *or* emotions and cognitions about a trauma, stressor (continuous source of stress)	Events from media involving loss and trauma	8	10	Twice weekly over a month	Written	Home	A few days
van Middendorp & Geenen (2008)	Rheumatoid arthritis patients	Traumatic or important event (adapted)	None	4	15	Weekly	Verbal	Home	1 week & 3 months
van Middendorp, Sorbi, van Doornen, Bijlsma, & Geenan (2007)	Rheumatoid arthritis patients	Traumatic or important event (adapted)	Activities of last 24hrs, why you performed these activities and next 24hrs	4	15	Weekly	Verbal	Home	Post disclosure only
Vedhara et al. (2007)	Psoriasis sufferers	Traumatic upsetting experience or major conflicts if not had a traumatic experience	Activities of last 24hrs and plans for that day	4	20	Consecutive	Written	Home	2, 8, 12 weeks

Study	Sample Type	Experimental Writing Type	Control Writing Type	Number Of Sessions	Length of Sessions (minutes)	Spacing of Sessions	Modality	Context	Follow-up
Walker, Nail & Croyle (1999)	Breast cancer patients	About breast cancer	None	1 *or* 3	30	Consecutive	Written	Clinic *and* home	1, 4-6, 16 & 28 weeks
Warner et al. (2006)	Adolescents with asthma	Trauma or problem experiencing right now or at some other time	Activities of last week, last 24hrs & plans for next 24hrs	3	15-20	Consecutive	Written	Home	2 months
Weinman, Ebrecht, Scott, Walburn, & Dyson (2008)	Students and Staff (male)	Traumatic and upsetting experience	Activities of last 24 hrs, that day and plans for next week	3	20	Consecutive	Written	Lab	7, 14, 21 days wound healing (14 days for self-report)
Wetherell et al. (2005)	Rheumatoid arthritis patients	Upsetting experience	Activities that day, plans for following day and following weekend	4	20	Consecutive	Written *and* verbal	Home	1 , 6 & 10 weeks
Wing, Schutte, & Byrne (2006)	Student & community	Most wonderful experiences *or* most wonderful experiences with emotional regulation cue	Plans for the day	3	20	Consecutive	Written	Home	Immediately post intervention & 2 weeks
Yogo & Fujihara (2008)	Japanese Students	Traumatic experience *or* best possible self	Activities that day, upcoming plans and a social event	3	20	Consecutive	Written	Unspecified	1 & 5 weeks
Zakowski et al. (2004)	Prostrate and gynaecological cancer patients	About cancer	Activities of last 24hrs	3	20	Consecutive	Written	Home	6 months

In studies which employ mixed methodologies identifiers are presented as '*or*' to represent that the differential methods are subject to analysis, whereas '*and*' is used to identify that methods are mixed but not subject to analysis.

Chapter 4

Aims and Objectives

4.1 Aims

The principal aim of this thesis is to examine the efficacy of a written emotional disclosure intervention for individuals with infertility. The negative psychological impact of infertility and resultant stress inherent in the treatment of fertility problems is well documented in the research literature (see section 2.2). It is acknowledged that individuals experiencing infertility would (and do) benefit from psychosocial interventions aimed at alleviating the distress associated with their infertility (Boivin, 2003). Yet, individuals with infertility perceive a number of constraints (i.e. time, travel problems and work commitments that are problematic for attending scheduled therapy sessions) with the traditional face-to-face therapeutic interventions that are available to them (McNaughton-Cassill, Bostwick, Arthur, Robinson & Neal, 2002). Disclosure writing, which has been shown to provide positive benefits for some patient populations and individuals with elevated levels of distress, and is largely free from the stigma associated with traditional psychosocial therapies (see section 2.3), has been suggested as an alternative approach for this population of individuals (McNaughton-Cassill et al., 2002). Additionally, the flexibility of the disclosure writing protocol means that it can be delivered within the home environment, making the intervention more accessible and reducing the time burden of attending scheduled intervention sessions.

Since the development of the original disclosure protocol by Pennebaker and Beall (1986) studies that have utilised the disclosure intervention have often adapted the standard protocol to meet the specific demands of the study or population under investigation without considering the consequences for intervention efficacy (see Chapter 3). For the purpose of this thesis the disclosure protocol will be adapted to be delivered using a home-based computer-mediated format. Whilst the delivery of disclosure writing interventions delivered within a home-based context (e.g. Sheffield, Duncan, Thomson, & Johal, 2002) or via a computer (Gortner, Rude & Pennebaker, 2006; Sheese, Brown & Graziano, 2004) is not new, it is not clear if a departure from

the standard hand-written, lab-based methodology of the disclosure protocol, to one that is computer-mediated and delivered outside of a controlled laboratory setting (i.e. in the home), has an impact on the efficacy of the intervention. In addition to attempting to replicate the findings of previous disclosure studies (e.g. Pennebaker et al., 1988; Pennebaker & Beall, 1986), a further aim of this thesis is to test methodologies and examine the potential moderating effects of disclosure modality (writing versus typing) and context (lab versus home) on study outcome.

The findings of a study examining the impact of modality on disclosure is presented in Chapter 5. Chapter 6 presents the findings of a study which examines the impact of the context in which the disclosure intervention is delivered on outcome. Chapter 8 presents the findings of a study examining the effects of an internet-mediated written emotional disclosure intervention for individuals with infertility recruited from internet based infertility support forums.

In addition to the aims set out above, this thesis also aims to examine the role of language in disclosure by analysing the linguistic content of essays written by participants and if changes in word use influence changes in psychological and physical well-being in each of the studies.

4.2 Objectives

The specific objectives of the thesis are as follows:

i. To replicate the findings of previous research that has found writing about stressful and traumatic events to be beneficial for improving physical and psychological well-being.

ii. To determine if writing about traumatic or stressful events using pen-and-paper (handwritten) versus writing about traumatic or stressful events using a computer (typed):

    a. Moderates the short-term effects of disclosure
    b. Moderates the longer-term effects of disclosure

iii. To determine if writing about traumatic or stressful events in a laboratory versus writing about traumatic or stressful events in the home:

a. Moderates the short-term effects of disclosure
b. Moderates the longer-term effects of disclosure

iv. To establish if disclosing thoughts and feelings about infertility has any beneficial effects for the physical and psychological well-being of individuals with infertility.

v. To assess the impact of changes in narrative content in disclosure essays on changes in psychological and physical well-being.

Chapter 5

Testing Methodologies 1: Paper-and-Pen Versus Computer.

5.1 Overview

Chapter 2 identified a growing body of research that has demonstrated the effectiveness of emotional disclosure writing on general well-being. There is, as discussed in Chapter 3, a great deal of variation in the methods utilised in the studies reviewed and a number of uncertainties remain about what effect variations in the structure of administering disclosure writing interventions have on outcome (Smyth & Pennebaker, 2008). One particular departure in methodology from the standard writing task developed by Pennebaker is the adaptation of the intervention to a computer based task. A number of studies have elected to have participants conduct the writing sessions on personal computers (PC's) in the laboratory (Burton & King, 2008; Hemenover, 2003) or at home (Gortner, Rude & Pennebaker, 2006; Sheese, Brown & Graziano, 2004). However, with the exception of Sheese et al. (2004), none of these studies have acknowledged that the effectiveness of the writing intervention may, in part, be moderated by the medium through which it is delivered or the context in which it is conducted.

5.2 Introduction

The use of computers in the home, schools and workplace is widespread and computer-mediated modes of communication (e-mail and instant messenger {IM} systems) are commonplace. Arguably, students are especially more accustomed to using e-mail and IM to communicate and the recent phenomenon of online journals (weblogs or blogs) would suggest that through this increased familiarity with computers people are becoming more comfortable expressing personal and emotional information via such technological means (Qian & Scott, 2007; Suler, 2004). Indeed, a meta-analysis examining self-disclosure on computer forms (interview and questionnaire) compared to traditional pen-and-paper forms found greater self-disclosure of sensitive information on computer forms (Weisband & Kieser, 1996; see section 7.4.3.1).

There are a number of advantages to using a computer-mediated intervention. Within the context of written emotional disclosure research, having participants type their stories allows the researcher to analyse participant narratives using computerized content analysis programmes (i.e. Linguistic Inquiry and Word Count; LIWC) without having to transcribe the hand written narratives, a process that can be time consuming. Additionally, the demands of writing intervention studies often mean that sample sizes are small (e.g. Duncan et al., 2007), a computer based writing intervention, which can be administered via the internet, is well placed to provide access to a much wider population including community samples, and potentially larger numbers of participants, thus increasing the statistical power of studies and widening the scope for investigating variables that moderate the effect of written disclosure (Sheese et al., 2004). Arguably, providing participants with the flexibility to choose the medium through which they would feel more comfortable expressing their emotions could be beneficial for recruiting and retaining participants in disclosure studies.

Whilst there are clear advantages to adapting the standard writing intervention to a computer-mediated format, there may be an impact on the effectiveness of the intervention. Whilst the standard writing task is conducted in a laboratory using a pen-and-paper (longhand writing), computer-mediated delivery of the writing task is often conducted within the home. Thus, delivery of the writing intervention differs from that of the standard delivery methods in both modality (pen-and-paper or typing) and context (laboratory or home).

Sheese et al. (2004) utilized e-mail for the submission of participants' writing in a study that used a home-based protocol. Participants completed pre-treatment and post-treatment assessments of physical health, mood and quality of social relations. Self-reports of physical health were completed on a weekly basis, and were also assessed through e-mail communications with the researcher, with writing instructions submitted and returned via e-mail. Participants in the control group reported more sick days and missed classes as a result of illness on average, over the five weeks following the writing intervention, than did the trauma writing group. The authors did not however control for pre-intervention absences or sick days, and even though analysis of post-intervention retrospective self-reported health indicated an improvement in the disclosure group relative to controls, this effect was no longer evident when pre-treatment self-reported health was controlled for. Equally, Gortner et al. (2006) found a web-based writing task that was conducted in both the lab and the home was only effective for reducing depressive symptoms in students identified as high suppressors

of emotional expression. It is not possible however to draw any conclusions about the impact of using a computer-based format on the outcome of these two studies as the findings may also be confounded by the contexts (home; Sheese et al., 2004; and home or laboratory; Gortner et al., 2006) in which they are implemented.

The broad aim of this thesis as outlined in section 4.1 is to examine the efficacy of a brief writing intervention for individuals with infertility. In order to achieve this aim, and considering the mixed findings of both Sheese et al. (2004) and Gortner et al. (2006) it is necessary to determine whether the modality and/or the context of disclosure moderate the effectiveness of the writing task. The current chapter will address the issue of modality, whilst Chapter 6 will address the question of context.

The standard method of disclosure employed in writing studies is via the use of pen-and-paper, often within a laboratory setting (e.g. Pennebaker & Beall, 1986), and it is through this methodology that positive results have been widely reported (Páez, Velasco & González, 1999; Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Two studies that have deviated from the pen-and-paper protocol by having participants write their narratives on PC's, but within the laboratory, have reported positive findings (Burton & King, 2008; Hemenover, 2003). Burton and King (2008) utilized computer based writing sessions for a brief two minute intervention conducted on two consecutive days and found an improvement in physical health at four-to-six week follow-up in disclosure group participants compared to controls. Likewise, in a study that utilized the standard 20 minute writing session on three consecutive days, Hemenover (2003) found a laboratory based computer-mediated writing intervention to be effective in reducing psychological distress and increasing feelings of mastery and personal growth. Taken together, the findings of these studies would suggest that the adaptation of the standard pen and paper protocol to a computer based format is acceptable, however, it is not clear from these findings if there are qualitative differences between the two modalities.

To date there are only two published studies that have compared the effect of writing modality in the standard laboratory context. In the first Brewin and Lennard (1999) hypothesised that there would be differential effects of writing longhand compared to typing. Based on the assumption that for most adults writing is a routinized activity, whereas typing is not, Brewin and Lennard (1999) hypothesised that writing would lead to a greater arousal of negative emotion immediately following the writing task and that there would be greater disclosure in those writing by hand. The results confirmed that

participants who wrote longhand did report a more negative mood immediately after the task than those who typed. Further analysis revealed that participants who wrote longhand reported that they revealed significantly more about the event and found it more beneficial than those who typed, leading the authors to speculate that the improvements in well-being seen in written disclosure studies may be partly dependent on the modality of expression.

A possible explanation for the differential effect of modality is that typing may place an excessive cognitive load on working memory (Brewin & Lennard, 1999). Writing longhand, although requiring the assimilation of orthographic knowledge[15] and fine motor skills, is considered largely an automated process by the time an individual reaches adulthood (Christensen, 2004). Conversely, having to attend to the task of typing, which for many people will be much less automated, may impede emotional involvement in producing the narrative. In addition to this, it is arguably the case that the disclosing of personal information is likely to be more readily associated with writing longhand (e.g. journals and diaries) than typing, as typing has tended to be used more for prescriptive forms of writing (e.g. formal letters, academic papers; Brewin & Lennard, 1999) although this is changing with the advent of online journals and blogging. Additionally, the speed at which text is produced by hand is often slower than text produced using a keyboard (Rogers & Case-Smith, 2002) and this may encourage deeper processing of thoughts and feelings (Pennebaker & Chung, 2007).

The findings of a more recent study examining modality were in sharp contrast to those of Brewin and Lennard (1999). Sharp and Hargrove (2004) found that post-writing affective arousal was not differentiated by modality, and that participants who wrote longhand or typed about an emotional topic reported similar levels of disclosure. It is conceivable that the difference in post-writing arousal between these two studies may be related to an increase in the use of computers between the times when the studies were conducted. In order to examine the impact of modality on writing content, analysis of the linguistic content of the narratives was conducted using Linguistic Inquiry and Word Count (LIWC; see section 5.4.3). Differences were found in eight of the word categories examined (positive emotion words, negative emotion words, anxiety words, anger words, sad words, pronouns, I and self reference) for the percentage of words used in the emotional essays by participants in the emotion group, who used significantly more of these words than their control group counterparts (the control

[15] An understanding of the visual representation of symbols as letters and the rules of how these letters are used i.e. 'i' before 'e' except after 'c'.

group participants were asked to provide a detailed description of the content of their closet). There were no differences as a function of modality beyond word count, with typing participants producing significantly more words than their longhand counterparts. The conflicting findings of the two modality studies presented above (Brewin & Lennard, 1999; Sharp & Hargrove, 2004) indicate that it is difficult to draw clear conclusions on the impact of modality on the Pennebaker paradigm. Although each of these studies has addressed the expression of emotion through differing writing modalities (hand written versus typing), a limitation of both the studies presented is that the results are based on a single writing session. The standard writing task involves between three-to-four writing sessions and the positive results that are seen in the standard writing studies are associated with changes in linguistic content across these writing sessions. Specifically, an increased use of causal and insight words from the first to the last day of writing in trauma group participants is associated with improvements in health (e.g. Pennebaker & Francis, 1996). This pattern of cognitive word use is thought to represent a change in cognitive processing of the event being written about (see section 2.4.5.3). Indeed, the appraisal of events as less stressful and more controllable is associated with a progressive increase in understanding, acceptance and congruency of the event over the writing sessions (Park & Blumberg, 2002). Therefore, the evidence would suggest that the modality by which the disclosure writing task is performed is unlikely to moderate the effectiveness of the intervention, however this hypothesis has not been adequately examined.

5.3 Aims

This aims of the current study are twofold, firstly this study seeks to test the hypothesis that the disclosure of thoughts and feelings relating to traumatic events is beneficial in improving well-being as measured by self-reports of general psychological distress, depression, anxiety and physical symptoms. In doing so this study also aims to test that hypothesis that expressing thoughts and feelings using a computer-based modality (typing) does not produce different immediate and longer-term effects to using a pen-and-paper modality (writing). In order to establish if the narrative content varies as a function of modality the study will also examine the linguistic content of essays written by disclosure group participants. In addition, changes in word use will be examined as predictors of outcome in the disclosure groups.

5.4 Method

5.4.1 Participants

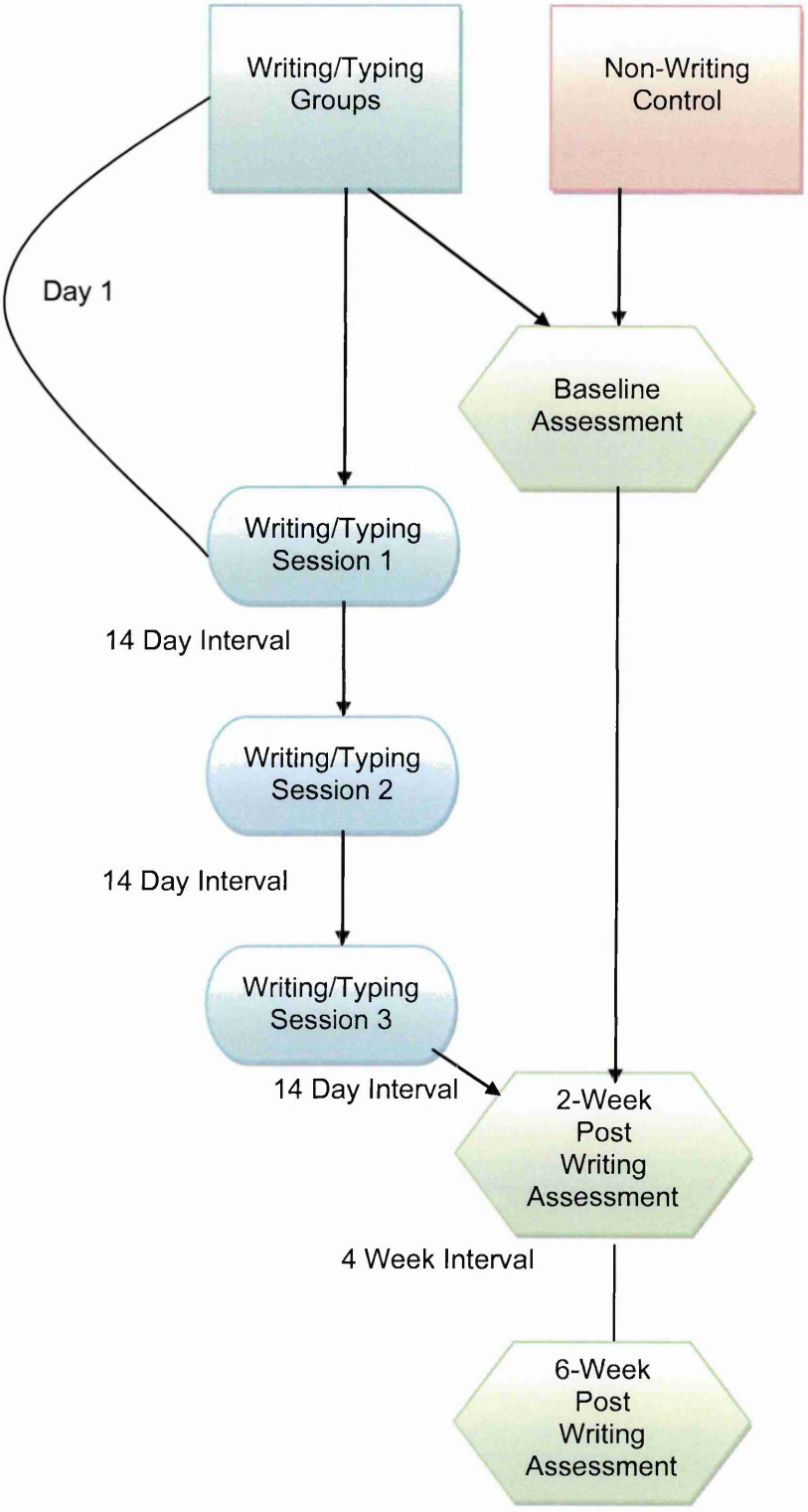
Eighty-seven participants (78 female; 9 male) completed the study. The mean age of the sample was 20.43 years (SD = 5.73) and age of participants ranged from 18 to 53 years.

5.4.2 Design

The study used a quasi-experimental, repeated measures design. Participants were non-randomly allocated to one of five groups: writing disclosure, writing control, typing disclosure, typing control and non-writing control.

Allocation to group was based on seating position in the classroom such that the first person was in the writing disclosure group, the second person in the typing disclosure group and so on. Non-writing control participants were recruited in separate classes so as not to bring attention to the fact that their role in the study was different to those who had writing tasks. Figure 5.1 shows the study design which comprised a baseline assessment, six week intervention period in which three 15 minute writing sessions were conducted at 14 day intervals by the writing/typing groups and then two follow-up assessments at 2-weeks and 6-weeks post-intervention were completed by all participants. The dependant variables measured at baseline and follow-up assessments were depression, anxiety, psychological distress, physical symptoms, intrusion and avoidance.

Figure 5.1: Flow diagram of study process and timescale of participation



5.4.3 Measures

The following measures were used:

Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979).

The IES is a 15-item self-report questionnaire that can be used to evaluate current subjective distress for any specific life event (total score) and cognitive processes of intrusion and avoidance (subscales). The intrusion subscale consists of seven items which measure intrusive symptoms including intrusive thoughts, nightmares, intrusive feelings and imagery. Eight items measure avoidance symptoms including numbing of responsiveness, avoidance of feelings, situations and ideas. Example items include *'I thought about it when I didn't mean to'* (intrusion) and *'I stayed away from reminders of it'* (avoidance). Responses are scored 0, 1, 3, and 5 which relate to frequency of occurrence. Higher scores reflect a more stressful impact of the event. Both the intrusion and avoidance subscales have demonstrated acceptable internal reliability (α = .79 and α = .82, respectively; Corcoran & Fischer, 1994) and test-retest reliability (α = .87 and α = .79; Horowitz et al., 1979).

Essay Evaluations Questionnaire (EEQ; Greenberg & Stone, 1992)

The EEQ is used to assess a participant's subjective evaluation of an event and their previous level of disclosure about that event (i.e. whether they have talked about their feelings previously). Respondents are asked to indicate on unipolar 7-point Likert scales the extent to which the essay they write is personal, meaningful, and revealing of their emotions, as well as how much they want to talk to others about the event, and how much they have talked to others, or how much they have held back from talking about the event with other people. Each item is individually scored (see Appendix A.3).

The Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988).

The PANAS is a 20-item self-report scale that is used to measure either state or trait dimensions of positive affect (PA) and negative affect (NA). The scale consists of ten adjectives that describe negative moods (e.g. irritable) and ten adjectives that describe positive moods (e.g. excited). In the present study the immediate version of the PANAS is used to evaluate participants' moods immediately following each writing session. Respondents are asked to give an answer from one to five (one being 'very slightly/not at all', five being 'extremely') to the question '*Indicate to what extent you feel this way at the present moment*'. Watson et al. (1988) found the PANAS to have good internal reliability (α = .87 for NA, α = .88 for NA), and good test-retest (8 weeks) reliability (r = 0.68 for NA, r = 0.71 for PA). Higher scores on each of the scales indicate a higher level of the appropriate affect.

The Physical Symptoms Inventory (PSI; Spector & Jex, 1998).

The PSI is an 18-item self-report causal indicator scale that assesses the presences of physical and somatic health symptoms. Each item represents a physical symptom for example headache, chest pain, or dizziness. Respondents are asked to indicate if they '*did not have it*', '*had it but did not see a doctor*', or '*had it and did see a doctor*' for each symptom in the past 30 days. Possible scores on the PSI range from 0 to 18, with higher scores representing higher levels of symptoms.

The Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1992).

The SCL-90-R is a 90-item self-report measure of general psychopathology. Participants are asked to rate how much a particular problem has bothered them over the previous seven days on a scale of zero to four (0 = not at all, 4 = extremely). The SCL-90-R measures nine primary symptom dimensions: somatization, obsessive-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. The inventory also measures three global indices of distress; Global Severity Index (GSI), Positive Symptom Distress Index and Positive Symptom Total. For the purpose of this study the depression and anxiety dimensions of the scale will be used as well as the GSI to assess psychological distress. Example items include, *'Feeling blue'* (depression) and *'Heart pounding or racing'* (anxiety). Both the depression and anxiety dimensions have demonstrated good internal consistency (α= .90 and α= .85 respectively; Derogatis, Rickels & Rock, 1976) and 1 week test-retest reliability (r = .75 and r = .80 respectively; Horowitz, Rosenberg, Baer, Ureno & Villasenor, 1988).

Derogatis (1992) suggests that SCL-90-R symptom dimension raw scores should be converted to standard normalized T-scores using the norm group that is most representatives of the individual being examined. Raw scores were converted to T-scores using the non-patient adult norms. Although the mean age of the adult norm group is 46.0 (SD = 14.7) which is higher than that of the current sample, the adolescent norms are more appropriate for those in the 13-18 age group. As 57 per cent of the current sample were outside this age range (only 5.4% of the sample were aged 18), and as adult norms have been used in previous research with a much younger student sample (Kerr, Johnson, Gans & Krumrine, 2004; mean age 17.9 years), it was decided that the adult norms were more appropriate for the current sample.

The Linguistic Inquiry and Word Count Programme (LIWC: Pennebaker, Francis & Booth, 2001)

The LIWC is a computerized text analysis programme that processes written text and calculates the proportion of words used based on 74 word categories such as negative emotions (e.g. hate, grief), positive emotions (e.g. happy, good), and cognitive mechanisms such as insight (e.g. think, know) and causation (e.g. because, effect). The programme also searches for a number of standard linguistic dimensions such as word count, percentage of pronouns, articles and prepositions from a dictionary of 2,300 words and word stems. The linguistic indices to be used in this study are word count, negative emotion, positive emotion and cognitive mechanism words.

In addition to the above questionnaires participants completed demographic information at baseline to determine their age, gender, their current diary keeping activities and current use of psychotropic medication as well as any involvement in psycho-therapeutic treatment.

5.4.4 Ethics

The study was conducted in accordance with the British Psychological Society guidelines for conducting research with human participants (Code of Conduct, Ethical Principles and Guidelines, 2004). The study was subject to scrutiny by the Faculty Research Ethics Committee, and approval was granted (see Appendix A.4 for the Ethics Proforma and Letter of Approval). Consideration was given to the sensitive and distressing nature of topics that participants could potentially disclose, as a result of which all participants were informed that there was the potential to experience emotional discomfort during their participation in the study and steps were taken to minimise this by providing contact information to services that were available to them should they experience any distress as a consequence of their participation.

5.4.5 Procedure

Recruitment for the study was conducted at the start of the second semester (January). All questionnaires and writing tasks were completed in the laboratory where participants were attending a timetabled session. After a brief introduction to the study, participants were given an information sheet specific to their allocation to group (see Appendix A.5 for information sheets) to read and asked to review and sign a consent form if they wished to participate in the study (see Appendix A.6 for consent form). Students who declined to take part were asked to take a 30 minute break from the

seminar and asked to leave the room. Those who agreed to participate were given the opportunity to ask questions, all participants were informed of their rights to withdraw and withhold information. All participants completed baseline assessments of physical symptoms and psychological well-being.

Those assigned to the typing conditions were directed to a computer and given a floppy disks containing a Rich Text Format (RTF)[16] with writing instructions and document in which to type. Participants in the handwriting conditions were provided with a writing booklet that contained the relevant condition instructions. Participants remained seated at their tables with approximately one typing participant and one writing participant at each table. Typing and writing participants completed their tasks simultaneously under exam conditions.

5.4.5.1 Writing instructions

The writing/typing instructions given to participants were adapted from Pennebaker (1994) to correspond with the requirements of the current study. The instructional set recommended by Pennebaker (1994) are devised for a study in which participants write over four consecutive days, in order for the instructions to correspond to the current study, in which three writing sessions were conducted at 14 day intervals, any wording within the instructional set which referred to the timing of the writing sessions was changed to relate to the current study. Although Pennebaker (1994) suggests that writing sessions be conducted over consecutive days, the current study utilised a 14 day interval between writing sessions to coincide with the timing of scheduled classroom sessions in which the study was conducted. Time between writing sessions (daily versus weekly) does not moderate the health effects of disclosure writing (Frattaroli, 2006; see section 3.4.2 for a detailed discussion).

On day one the disclosure condition participants were given the following instructions:

'What I would like to have you write about today and over the next two writing sessions is the most traumatic, upsetting experience of your entire life. In your writing, I want you to really let go and explore your very deepest emotions and thoughts. You can write about the same experience on all three days or about different experiences

[16] Rich Text Format (*.rtf) is a standard file format that allows documents to be transferred between different computer platforms, this type of document does not retain personal information of the author (metadata) that is routinely stored in Word document formats (*.doc) and thus the anonymity of the author is maintained.

each day. In addition to a traumatic experience, you can also write about major conflicts or problems that you have experienced or are experiencing now. Whatever you choose to write, however, it is critical that you really delve into your deepest emotions and thoughts. Ideally, we would also like you to write about significant experiences or conflicts that you have not discussed in great detail with others. You might tie your personal experiences to other parts of your life. How is it related to your childhood, your parents, people you love, who you are, or who you want to be. All of your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure. The only rule is that once you begin writing continue to do so until your time is up, if you run out of things to say just repeat what you have already written. Again, in your writing, examine your deepest emotions and thoughts.'

The following time management instructions were given to control participants:

'What I would like you to write about today and over the next two writing sessions is how you use your time. Each day, I will give you different writing assignments on the way you spend your time. In your writing, I want you to be as objective as possible. I am not interested in your emotions or opinions. Rather I want you to try to be completely objective. Feel free to be as detailed as possible. In today's writing, I want you to describe what you did yesterday from the time you got up until the time you went to bed. For example, you might start when your alarm went off and you got out of bed. You could include the things you ate, where you went, which buildings or objects you passed by as you walked from place to place. The most important thing in your writing, however, is for you to describe your days as accurately and as objectively as possible.'

Participants were instructed to write continuously in silence for 15 minutes. At the end of the 15 minutes participants were asked to complete the PANAS and EEQ. Session 2 and Session 3 writing/typing sessions were completed 14 days apart in the classroom, under the supervision of the investigator. Writing instructions were adjusted to correspond to the writing session, with disclosure condition participants given the option to write about the same or a different event at each session, whilst control participants continued to write about managing their time (see Appendix A.7 for writing instructions for all sessions and conditions).

As discussed in section 3.4.4 it is not known what the optimum follow-up period is for observing the beneficial effects of disclosure, however Frattaroli (2006) found that

studies that assessed participants less than a month post intervention had larger psychological effect sizes, than those that assessed participants for at least one month. Indeed, improvements in psychological functioning have been reported in the days post disclosure (e.g. Ullrich & Lutgendorf, 2002). In view of these findings the current study utilised multiple follow-up assessments. Assessment of physical symptoms and psychological well-being were completed in the timetabled sessions two weeks after the final writing session (2-week follow-up) and again four weeks later (6-week follow-up) by all groups (see Figure 5.1 for a flow diagram of the study process). Debriefing was conducted in a timetabled session approximately one week after the study had finished, in addition, a debriefing document outlining the background to the study, its aims and expected outcomes was made available to participants via the University's web pages (see Appendix A.8 for debriefing information).

5.5 Results

5.5.1 Preparation of Data

Data was entered into SPSS and screened for omissions and invalid entries. Missing items were identified for items on the SCL-90-R at baseline (n = 10), 2-week follow-up (n = 7) and 6-week follow-up (n = 6). Derogatis (1992) notes that up to 20 per cent (≤ 18) of the items can be omitted without having a substantial effect on the GSI, and the omission of any one item in each dimension does not affect the validity of the test. Two of the cases identified had a total of two items missing each belonging to a different dimension of the scale. Corrections for missing values where made when calculating raw scores (sum of item values were divided by the actual number of responses as opposed to the total possible number of responses). The IES data at baseline was missing for one participant and at 2-week follow-up for another due to non-completion. These cases were retained in the study and are included in the analysis of all other variables.

To allow for analysis of essay content, hand written essays were transcribed into type written format. Essay data for one participant (writing disclosure group) failed to save at the final session, so all essay data for this participant was removed from the analysis. Typed essays were 'cleaned' in preparation for analysis with the LIWC software according to guidelines (Pennebaker et al., 2001); spelling errors were corrected, and abbreviations, hyphenated words and time markers (e.g. 6.00 am should be 6.00 a.m. or 6.00am) were formatted appropriately for analysis.

5.5.1.1 Uptake and attrition

Two hundred and twenty seven participants were recruited into the study. Of the 120 participants allocated to writing groups, 12 participants did not complete the second writing session, and a further 13 did not complete the final writing session. Of the remaining 202 participants 81 did not return for the 2-week follow-up assessment and a further 32 did not return for the final 6-week assessment. Incomplete data was therefore collected from 138 participants (22 writing-control group; 27 experimental group; 89 non-writing control group). Overall 89 participants completed the study; two were removed (see section 5.4.1.2) from the final analysis leaving a total of 87 participants. A comparison of baseline GSI scores indicated that those who did not complete the study had higher levels of psychological distress at baseline (Mean = 0.86; SD = 0.70) than those who did complete the study, independent samples T-test (two-tailed) confirmed that participants who did not complete the study had marginally higher levels of psychological distress at study entry compared to those who did complete the study ($t_{(223.85)} = 1.93$, $p = .055$).

5.5.1.2 Checking assumptions

Data for all variables were examined to determine suitability for parametric analysis. Two cases were identified as having extreme scores on a number of the main outcome variables, inspection of the data sheets suggested that these participants had not responded to the questionnaires in line with the instructions so were removed from the data set. The grouped data was screened for univariate outliers based on the criterion, ≥3 standard deviations from the mean (Stevens, 2002). Eleven outliers were identified within the grouped data (essay evaluation scores n = 1; negative affect scores n = 3; positive emotion words n = 2; negative emotion words n = 2; anxiety scores n = 3) and the distribution of the grouped data was found to be significantly skewed (>2.58 or -2.58; Clark-Carter, 2004) in two of the grouped variables (positive emotion words = 3.07; negative affect = 2.71). Whilst it is advised by some that steps should be taken to reduce the impact of outlying scores through either transformation of the data or adjustment of the outlying score (Tabachnick & Fidell, 2001), there is variability in the treatment of outliers amongst researchers (Orr, Sackett & Dubois, 1991). On examination of the cases with outlying scores it was decided that the cases represented legitimate scores and were not due to errors or omissions so were retained in the subsequent analysis. In such situations Kruskal (1960) suggests that all analysis be conducted with and without the outlying scores. Analysis using adjusted scores did not alter the results, for this reason the results reported are for unadjusted scores.

5.5.1.3 Statistical analysis and sample size considerations

Consistent with the analysis techniques employed in a number of disclosure studies (Pennebaker & beall, 1986; Pennebaker & Francis, 1996; Schwartz & Drotar, 2004; Sloan, Marx, Epstein & Lexington, 2007) analysis of the immediate effects (positive affect and negative affect), longer-term effects (depression, anxiety, GSI, physical symptoms, intrusion and avoidance) and language use (negative emotion words, positive emotion words and cognitive mechanism words) of written disclosure were examined using a series of factorial analysis of variance (ANOVA). Hierarchical linear regressions were employed in the analysis of language change across writing sessions as a predictor of outcome. Change scores were calculated for each of the word categories by subtracting the total percentage of words used at the first writing session from the total percentage of words used at the final writing session as has been done in previous research (Pennebaker, Mayne & Francis, 1997; Rivkin, Gustafson, Weingarten & Chin, 2006; Schwartz & Drotar, 2004; Ullrich & Lutgendorf, 2002).

A series of *a priori* power analysis were conducted using Gpower 3.0.10 (Erdfelder, Lang & Buchner, 2007) to determine the optimal sample size requirements to obtain an effect size equivalent to those observed in previous disclosure writing studies. For example in the meta-analysis conducted by Smyth (1998) an effect size of d = .66 was calculated for psychological well-being and d = .42 for self-reported physical health which constitutes a medium effect size (Cohen, 1977). Using these previously published effect sizes as a guide, power calculations indicated that a total sample size of 86 (α = .05, power = .80, Critical f = (1, 84) = 3.95) would be required to detect between–group main effects, a total sample size of 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 40 (α = .05, power = .80, Critical f = (6, 72) = 2.51) would be required to detect interaction effects in the analysis of the short-term and longer-term effects of disclosure. Whilst the analysis of the longer-term effects with the inclusion of a control group for comparison would require a total sample size of 108 (α = .05, power = .80, Critical f = (2, 105) = 3.08) to detect between-group main effects, 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 36 (α = .05, power = .80, Critical f = (4, 66) = 2.51) would be required to detect interaction effects. Additionally, for the analysis of language use in disclosure a total sample size of 86 (α = .05, power = .80, Critical f = (1, 84) = 3.95) would be required to detect between–group main effects, a total sample size of 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 28 (α = .05, power = .80, Critical f = (2, 52) =

3.18) would be required to detect interaction effects. Consequently, the sample size in the present study is smaller than that which was determined to be adequate from *a priori* power calculations. However, the present study sample size is comparable to that of previous studies in which effects of disclosure have been detected using equivalent analysis techniques (Pennebaker & Beall, 1986; Pennebaker & Francis, 1996; Weinman, Ebrecht, Scott, Walburn & Dyson, 2008). When sample size is small this increases the probability of making a Type II error (rejecting the research hypothesis when it is indeed true). Consistent with method employed by O'Connor, Archer and Frederick (2004) to address this problem, the effect sizes (reported as partial eta squared) for all non-significant main and interaction effects are included for comparison. However, as is noted by O'Connor et al. (2004) any such effects may be due to chance alone and therefore the effect sizes reported alongside non-significant findings should be interpreted with this in mind.

A priori power calculations for the hierarchical linear regression analysis were also conducted in order to determine required sample size for the analysis of word change predictors of well-being and indicated that a total sample size of 85 (α = .05, power = .80, Critical f = (4, 80) = 2.49) would be required to detect effects in a design with four predictor variables. Again, the size of the sample to be included in this analysis is smaller than that recommended, but comparable to that of studies which have used hierarchical regression and found word change to be predictive of changes in wellbeing following disclosure (van Middendorp & Geenen, 2008; Schwartz & Drotar, 2004).

5.5.2 Sample Characteristics and Baseline Data

Ninety percent of the sample were female (n = 78). The mean age of participants (20.44 years, SD = 5.73) is comparable to that of other writing studies that have used a student sample (Lumley & Provezano, 2003; Park & Blumberg, 2002; Greenberg & Stone, 1992). Ninety seven per cent of the participants were Caucasian (n = 84), one person identified themselves as black, one as Asian and one classified themselves as 'other'. A small number of participants reported that they were currently using psychotropic medication (n = 3) and five were receiving counselling[17]. Although over half of the participants (n = 46) indicated that they currently kept a diary, only six of the diary keepers used their diary to write down their feelings and thoughts, the remainder of the sample used diaries for more practical purposes including recording

[17] Removing participants receiving counselling or psychotropic medication from the analysis did not alter the findings of the study.

appointments (n = 72), things to do (n = 2) and recording dates of significant events (n = 5). One person did not report for what purpose they kept a diary.

Descriptive information for all well-being measures at baseline is presented in Table 5.1. For the purpose of comparing this sample with other studies both raw score calculations and standard normalized T-scores for the SCL-90-R symptom dimensions are presented, all further analysis is conducted using the raw score calculations. In terms of physical health, symptom reporting was lower in this sample (Mean = 3.97) than that of published norms (Spector & Jex, 1998).

Table 5.1 Means, standard deviations and range of scores for well-being measures at study entry.

Measures	*N*	*Mean*	*SD*	*Range*
Physical Symptoms Inventory	87	3.97	2.39	0-11
SCL-90-R Variables				
Depression	87	0.98	0.71	0.08-3.08
		(59.74)	*(8.03)*	(42-80)
Anxiety	87	0.54	0.54	*0-3.0*
		(54.76)	*(9.78)*	(37-80)
Global Severity Index	87	0.70	0.46	*0.06-2.21*
		(59.60)	*(8.11)*	(37-79)
Impact of Event Subscales				
Intrusion	86	10.63	9.03	0-33
Avoidance	86	10.71	9.13	0-34

Normalized T-scores and standard deviations for the SCL-90- R variables are presented in parentheses.

Similarly, IES scores for intrusion and avoidance were lower than scores reported in studies that have used comparable samples (Schoutrop, Lange, Hanewald, Davidovich & Salomon, 2002; Lutgendorf & Antoni, 1999; Greenberg, Wortman & Stone, 1996). Sample mean raw scores on depression, anxiety and GSI dimensions were higher than

those of the adult norm group from which standard normalized T-scores were calculated.

The scores from the current sample were more in line with those in the adolescent non-patient norm group (depression, Mean = 0.80, SD = 0.69; anxiety, Mean = 0.66, SD = 0.62; GSI, Mean = 0.76, SD = 0.54), this may be due to the fact that 75 per cent of the current sample are closer in age (18-19) to the adolescent norm group (mean age 15.6) than the adult norm group (mean age 46.0).

5.5.3 Checking for Group Differences

To determine if there were any existing differences between the groups prior to the intervention phase of the study a series of one-way analysis of variance with the groups: writing disclosure, writing control, typing disclosure, typing control and non-writing control entered as the independent variables were conducted. The analysis showed that the groups did not differ in terms of age ($F_{(4, 86)} = 2.23$, $p = .073$), physical symptoms (PSI) ($F_{(4, 86)} = 0.04$, $p = .997$), psychological distress (GSI) ($F_{(4, 86)} = 1.16$, $p = .335$) or symptoms of depression ($F_{(4, 86)} = 0.72$,$p = .584$) and anxiety ($F_{(4, 86)} = 0.49$, $p = .740$). Groups also did not differ in terms of intrusive ($F_{(4, 85)} = 0.65$, $p = .628$) and avoidant ($F_{(4, 85)} = 0.33$, $p = .858$) symptoms relating to traumatic experiences (means and standard deviations are presented in Table 5.2).

Table 5.2 Means and standard deviations for age and well-being measures at study entry by group allocation.

	Group				
	Writing Disclosure	Writing Control	Typing Disclosure	Typing Control	Non-Writing Control
	(n = 17)	*(n = 18)*	*(n = 15)*	*(n = 19)*	*(n = 18)*
Age	19.00 (1.71)	19.72 (4.38)	19.60 (4.05)	19.79 (3.79)	23.89 (10.74)
PSI	3.94 (2.29)	3.78 (2.62)	4.07 (2.40)	3.95 (2.72)	4.06 (2.18)
Depression	1.09 (0.88)	0.93 (0.68)	1.14 (0.69)	1.01 (0.71)	0.76 (0.62)
Anxiety	0.61 (0.55)	0.59 (0.54)	0.57 (0.49)	0.56 (0.70)	0.39 (0.37)
GSI	0.78 (0.56)	0.81 (0.56)	0.78 (0.49)	0.56 (0.32)	0.59 (0.39)
Intrusion	11.38 (7.69)	9.06 (10.74)	13.67 (9.38)	10.00 (9.35)	9.67 (7.92)
Avoidance	11.44 (10.10)	10.56 (10.33)	12.29 (9.31)	8.84 (6.90)	10.89 (9.57)

Standard deviations are presented in parentheses.

5.5.4 Instruction Adherence and Content of Essays

A series of checks were conducted to determine if participants in the writing groups had adhered to the writing instructions. Independent sample T-tests (two-tailed) on post-writing scores on the EEQ (Greenberg & Stone, 1992) confirmed that participants in the disclosure groups rated their essays as more personal ($t_{(53.58)} = 9.60$, $p<.001$, $d = 2.62$), more meaningful ($t_{(67)} = 14.03$, $p<.001$, $d = 3.43$) and more revealing of their emotions

($t_{(54.12)}$ = 13.45, p<.001, d = 3.66) than controls, had wanted to talk to others about the event ($t_{(56.66)}$ = 7.51, p<.001, d = 2.00), and had held back from talking about the event ($t_{(57.25)}$ = 4.27, p<.001, d = 1.13) more than control groups. Consistent with previous research (e.g. Pennebaker & Francis, 1996) comparisons of emotional content of essays using LIWC text analysis was used to further validate adherence to writing instructions. Positive and negative emotion words were calculated as a percentage and averaged across the three writing sessions. Independent samples T-tests (two-tailed) revealed that disclosure group participants used significantly more negative emotion words ($t_{(33.90)}$ = 13.26, p<.001, d = 4.57), positive emotion words ($t_{(52.29)}$ = 5.09, p<.001, d = 1.41) and cognitive words ($t_{(66)}$ = 17.31, p<.001, d = 4.63) than control group participants in their essays. These results suggest that the experimental manipulation was successful and that the narratives from participants in the disclosure groups were revealing of peoples' emotions as per their writing task instructions.

The themes in the disclosure narratives were consistent with those reported in other disclosure studies (Epstein, Sloan & Marx, 2005; Greenberg et al., 1996; Lutgendorf & Antonio, 1999). The events disclosed at the first writing session included the death of a close family member or friend (25.8%); break-up of a relationship (25.8%); serious illness or accident involving self, close friend or family member (12.9%); breakdown of parent's marriage (12.9%); coming to university (9.7%); academic pressures (3.2%); and bullying (3.2%). Of the 31 disclosure participants 17 wrote about the same event at each session and 14 wrote about different events over the three sessions, other events disclosed in the following sessions included death of a pet, onset of a phobia, physical attack, miscarriage, loss of property and family moving away.

5.5.5 Post-Writing Arousal

Two separate 2 x 2 x 3 mixed design analysis of variance (ANOVA) were performed to assess the effects for the Independent Variables (IVs), *modality* (computer vs. hand writing), *condition* (disclosure vs. control) and *session* (writing session 1, 2, & 3) on post-writing affective arousal as measured by negative affect (NA) and positive affect (PA). Means and standard deviations across groups are presented in Table 5.3. For NA, analysis indicated an overall main effect for condition ($F_{(1, 65)}$ = 15.14, p <.001, η^2 = .19[18]), such that participants in the disclosure condition (those who expressed their emotions) reported higher levels of negative affect overall immediately after writing

[18] Reported effect sizes (η^2) represent *partial* eta squared.

compared to the control writers who wrote or typed about their plans for the day/week (Means 16.70 and 12.62 respectively).

Table 5.3 Mean affect scores post-writing as a function of modality, condition and session.

		Group			
		Disclosure		Control	
		Writing (n = 17)	Typing (n = 15)	Writing (n = 18)	Typing (n = 19)
Post-Session NA	WS 1	17.18 (6.12)	16.60 (5.10)	12.11 (3.11)	12.11 (4.69)
	WS 2	19.18 (8.34)	15.60 (7.39)	14.11 (4.89)	13.74 (6.80)
	WS 3	19.06 (7.93)	12.60 (3.01)	11.89 (2.25)	11.74 (2.81)
Post Session PA	WS 1	20.58 (6.10)	21.67 (7.97)	21.39 (6.58)	22.37 (6.82)
	WS 2	22.29 (9.12)	21.20 (8.04)	20.00 (7.09)	22.79 (7.38)
	WS 3	21.24 (6.51)	20.27 (8.71)	20.06 (5.16)	21.32 (6.63)

WS = Writing session. Standard deviations in parentheses

There was no significant main effect for modality ($F_{(1, 65)} = 3.13$, $p = .082$, $\eta^2 = .05$) and no significant interaction between modality and condition ($F_{(1, 65)} = 2.56$, $p = .115$, $\eta^2 = .04$). There was a significant within-participants main effect of writing session for NA ($F_{(2, 130)} = 3.30$, $p = .04$, $\eta^2 = .05$). Post hoc[19] pairwise comparisons indicated a significant reduction in NA from writing session two to writing session three ($p = .020$, $d = .29$; means 15.59 and 13.77 respectively). There were no interactions between writing session and modality ($F_{(2, 130)} = 2.18$, $p = .117$, $\eta^2 = .03$), writing session and condition ($F_{(2, 130)} = 0.42$, $p = .660$, $\eta^2 = .01$) or writing session by modality by condition ($F_{(2, 130)} = 1.97$, $p = .143$, $\eta^2 = .03$).

For PA there was no significant between-participants main effect for modality ($F_{(1, 65)} = 0.24$, $p = .623$, $\eta^2 = .004$) or condition ($F_{(1, 65)} = 0.01$, $p = .935$, $\eta^2 = .00$) and no significant interaction between modality and condition ($F_{(1, 65)} = 0.54$, $p = .465$, $\eta^2 = .01$). There was no within-participant main effect for writing session ($F_{(2, 130)} = 0.51$, $p = .60$, $\eta^2 = .01$) and no significant within-participant interactions between writing session and modality ($F_{(2, 130)} = 0.12$, $p = .883$, $\eta^2 = .002$), writing session and condition ($F_{(2, 130)}$

[19] All within-participant post-hoc procedures are conducted using least-significant difference (LSD) pairwise comparisons.

= 0.19, p = .829, η^2 = .003) or writing session by modality by condition ($F_{(2, 130)}$ = 0.57, p = .566, η^2 = .01).

5.5.6 Longer-term Effects of Writing

To examine for any differences in well-being as a function of writing group and modality a 3-way mixed ANOVA was conducted with *modality* (typing vs. writing) and *condition* (disclosure essay vs. control essay) as between-participant variables and *assessment period* (baseline, 2-week post writing and 6-week post writing) as the within-participant variable, separately for PSI, depression, anxiety, GSI, avoidance and intrusion. The means and standard deviations for outcome measures as a function of group and time of assessment are presented in Table 5.4.

5.5.6.1 Physical symptoms

Analysis of PSI scores showed no significant main effects for condition ($F_{(1, 65)}$ = 0.73, p = .396, η^2 = .001), modality ($F_{(1, 65)}$ = 0.01, p = .940, η^2 = .00), or for the interaction between condition and modality ($F_{(1, 65)}$ = 0.12, p = .731, η^2 = .002). Self reported physical symptoms did not differ significantly between assessment periods ($F_{(1.77, 115.22)}$ = 2.10, p = .133, η^2 = .03) and no interaction effects emerged between assessment period and modality ($F_{(1.77, 115.22)}$ = 0.21, p = .781, η^2 = .003), between assessment period and condition ($F_{(1.77, 115.22)}$ = 0.89, p = .404, η^2 = .01) or assessment period by modality by condition ($F_{(1.77, 115.22)}$ = 0.80, p = .437, η^2 = .01).

5.5.6.2 Psychological distress

An examination of the group means (Table 5.4) suggests a reduction in symptoms of depression, anxiety and psychological distress (GSI) from baseline to 2-week follow-up and again at 6-week follow-up. Depression scores did not differ between conditions ($F_{(1, 65)}$ = 3.40, p = .07, η^2 = .05) or modalities ($F_{(1, 65)}$ = 0.24, p = .878, η^2 = .00) and no significant interaction between condition and modality emerged ($F_{(1, 65)}$ = 0.75, p = .785, η^2 = .001).

A significant main effect of assessment period for depression scores ($F_{(1.82, 118.20)}$ = 16.15, p<.001, η^2 = .20) followed up with pairwise comparisons confirmed that symptoms reduced from baseline to 2-week assessment (p = .004, d = 0.33) and again from 2-week to 6-week assessment (p= .016, d = 0.22).

Table 5.4 Means and standard deviations for all outcome variables as a function of modality and condition for pre-writing, 2-weeks post writing and 6-week post writing assessment.

		Group											
		Disclosure						Control					
		Writing			Typing			Writing			Typing		
		B/line	2-week	6-week	B/line	2-week	6-week	B/line	2-week	6-week	B/line	2-week	6-week
Physical Symptoms													
			(n = 17)			(n = 15)			(n = 18)			(n = 19)	
PSI	*M*	4.00	5.18	3.94	4.07	4.87	4.60	3.78	4.22	4.33	3.94	4.00	3.74
	SD	2.24	2.94	1.95	2.40	2.72	3.27	2.62	2.65	2.43	2.72	2.87	1.99
SCL-90 Symptom Dimensions													
			(n = 17)			(n = 15)			(n = 18)			(n = 19)	
DEP	*M*	1.08	1.03	0.81	1.14	0.98	0.84	0.93	0.76	0.57	1.01	0.54	0.54
	SD	0.86	0.78	0.75	0.69	0.52	0.61	0.68	0.50	0.55	0.71	0.44	0.44
ANX	*M*	0.62	0.55	0.42	0.57	0.46	0.37	0.59	0.47	0.37	0.56	0.25	0.21
	SD	0.54	0.66	0.48	0.49	0.51	0.35	0.54	0.48	0.42	0.70	0.19	0.24
GSI	*M*	0.78	0.69	0.51	0.78	0.71	0.59	0.81	0.60	0.47	0.56	0.38	0.39
	SD	0.54	0.54	0.49	0.48	0.40	0.41	0.56	0.38	0.44	0.32	0.21	0.32
Impact of Event Scale Dimensions													
			(n = 16)			(n = 15)			(n = 18)			(n = 18)	
Intrusion	*M*	11.38	11.06	9.13	13.67	9.00	10.33	9.06	9.00	7.61	10.39	9.28	8.33
	SD	7.69	10.79	8.63	9.38	7.96	10.34	10.74	7.91	7.79	9.46	9.18	8.41
Avoidance	*M*	11.44	12.63	11.69	12.29	10.93	10.20	10.56	9.67	10.89	8.89	9.06	7.28
	SD	10.10	13.13	10.56	9.31	7.20	9.77	10.33	10.40	11.16	7.10	8.93	6.92

The failure to find any significant interaction effects for depression between assessment period and modality ($F_{(1.82, 118.20)} = 1.42$, $p = .246$, $\eta^2 = .02$), assessment period and condition ($F_{(1.82, 118.20)} = 1.54$, $p = .219$, $\eta^2 = .02$) or assessment period by modality by condition ($F_{(1.82, 118.20)} = 0.30$, $p = .723$, $\eta^2 = .01$) suggested that this improvement was independent of condition or mode of disclosure. Figure 5.2[20] illustrates changes in depression scores for each group at each assessment period.

Figure 5.2 Depression scores for groups by assessment period.

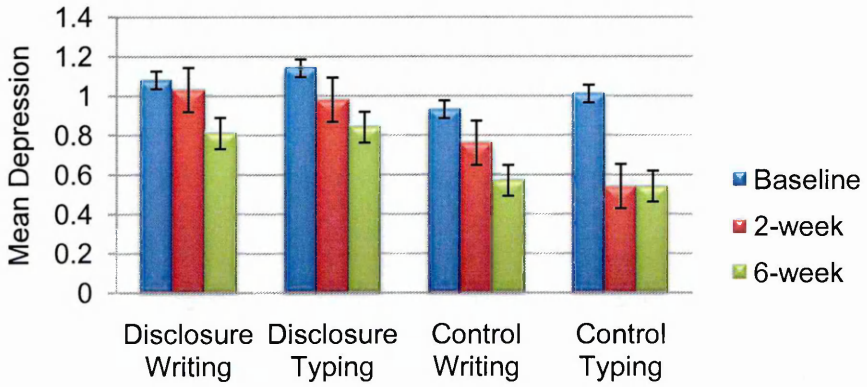
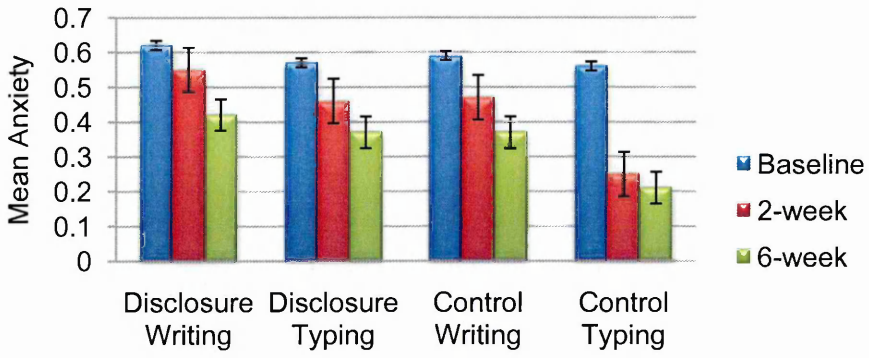


Figure 5.3 Anxiety scores for groups by assessment period.



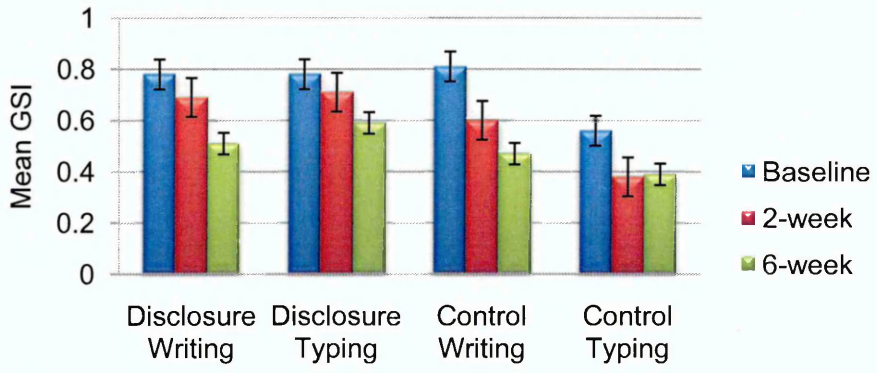
The same pattern of results was seen for symptoms of anxiety as illustrated in figure 5.3. There was no significant main effect for condition ($F_{(1, 65)} = 0.82$, $p = .367$, $\eta^2 = .01$)

[20] Error bars within figures represent standard error.

or modality ($F_{(1, 65)}$ = 0.97, p = .329, η^2 = .02) and no significant interaction between condition and modality ($F_{(1, 65)}$ = 0.15, p = .696, η^2 = .002). A significant main effect of assessment period suggested that anxiety scores changed over the study period ($F_{(1.65, 107.07)}$ = 10.55, p<.001, η^2 = .14). Pairwise comparisons indicated that anxiety symptoms reduced from baseline to 2-week assessment (p = .016, d = .30) and again from 2-week to 6-week assessment (p = .026, d = .21). No significant within group interaction effects were observed between assessment period and modality ($F_{(1.65, 107.07)}$ = 0.63, p = .507, η^2 = .01), assessment period and condition ($F_{(1.65, 107.07)}$ = 0.72, p = .464, η^2 = .01) or assessment period by modality by condition ($F_{(1.65, 107.07)}$ = 0.32, p = .686, η^2 = .01).

Similarly, GSI scores did not differ between conditions ($F_{(1, 65)}$ = 2.18, p = .144, η^2 = .03) or mode of disclosure ($F_{(1, 65)}$ = 0.64, p = .427, η^2 = .01). No significant interaction between modality and condition ($F_{(1, 65)}$ = 1.35, p = .250, η^2 = .02) emerged. A reduction in GSI mean scores across the study period for all groups was confirmed by a significant main effect of assessment period ($F_{(2, 130)}$ = 19.45, p<.001, η^2 = .23). Pairwise comparisons confirmed a significant reduction in GSI scores from baseline to 2-week assessment (p = .002, d = .31) and a further significant reduction was seen again at the 6-week assessment (p=.003, d = .27). Again there were no significant interaction effects between assessment period and condition ($F_{(2, 130)}$ = 1.28, p = .282, η^2 = .02), assessment period and modality ($F_{(2, 130)}$ = 1.27, p = .285, η^2 = .02) or time by condition by modality ($F_{(2, 130)}$ = 0.17, p = .848, η^2 = .003). Changes in GSI scores across groups are illustrated in Figure 5.4.

Figure 5.4 GSI scores for groups by assessment period.



Overall, results indicate that there were significant improvements in psychological well-being across the study, these improvements, however, were independent of condition or modality. This improvement in well-being did not extend to physical health which showed no significant change over the study period. The means and standard deviations based on main effects of time for all outcome variables are presented in Table 5.5.

5.5.6.3 Symptoms of intrusion and avoidance

Examination of the mean scores for intrusion indicated a gradual reduction in intrusive thoughts across the study in all but one of the groups (a reduction at 2-week assessment for the disclosure typing group was followed by a slight increase at 6-week assessment). No significant between group effects for condition ($F_{(1, 63)} = 0.91$, $p = .343$, $\eta^2 = .01$) or modality ($F_{(1, 63)} = 0.11$, $p = .742$, $\eta^2 = .002$) emerged.

Table 5.5 Means and standard deviations collapsed across groups for main effect of assessment period with F-Tests effect sizes for all outcome variables.

		Baseline	2-Week Post Writing	6-Week Post Writing	*F*	*P*=	η^2
PSI	*M*	3.94	4.54	4.13	2.10	.133	.03
	SD	2.46	2.78	2.39			
DEP	*M*	1.03[a]	0.81[a]	0.68[a]	16.15	**<.001**	.20
	SD	0.73	0.59	0.59			
ANX	*M*	0.59[a]	0.43[a]	0.34[a]	10.55	**<.001**	.14
	SD	0.57	0.48	0.38			
GSI	*M*	0.73[a]	0.59[a]	0.48[a]	19.45	**<.001**	.23
	SD	0.48	0.41	0.41			
Intrusion	*M*	11.00	9.57	8.78	2.66	.082	.04
	SD	9.36	8.86	8.63			
Avoidance	*M*	10.71	10.49	9.96	0.33	.721	-
	SD	9.15	10.02	9.64			

Note: Means with the same superscript are different at the .05 level.

The interaction between modality and condition was not significant ($F_{(1, 63)} = 0.01$, $p = .938$, $\eta^2 = .00$). No significant within-group main effect for assessment period ($F_{(1.75, 110.27)} = 2.66$, $p = .082$ $\eta^2 = .04$) or significant interactions emerged between assessment period and modality ($F_{(1.75, 110.27)} = 0.95$, $p = .380$, $\eta^2 = .02$), assessment period and condition ($F_{(1.75, 110.27)} = 0.45$, $p = .612$, $\eta^2 = .01$) or assessment period by modality by condition ($F_{(1.75, 110.27)} = 0.39$, $p = .648$, $\eta^2 = .01$).

The pattern of means for avoidance suggested that all but the disclosure typing group experienced a gradual reduction in avoidance across the study. However, avoidance scores did not significantly differ between conditions ($F_{(1, 63)} = 1.05$, $p = .310$, $\eta^2 = .02$) or mode of disclosure ($F_{(1, 63)} = 0.43$, $p = .515$, $\eta^2 = .01$). There was no significant interaction between modality and condition ($F_{(1, 63)} = 0.08$, $p = .778$, $\eta^2 = .001$). Avoidance did not significantly change between baseline and follow-up assessments ($F_{(2, 126)} = 0.33$, $p = .721$, $\eta^2 = .01$) and there were no interactions between assessment period and modality ($F_{(2, 126)} = 0.60$, $p = .549$, $\eta^2 = .01$), assessment period and condition ($F_{(2, 126)} = 0.04$, $p = .961$, $\eta^2 = .001$) or assessment period by modality by condition ($F_{(1, 126)} = 0.50$, $p = .610$, $\eta^2 = .01$).

5.5.7 Analysis with a Non-writing Control Group Comparison

As modality did not moderate the observed effects of writing, both writing and typing disclosure groups were collapsed into a disclosure condition and control condition for comparison with the non-writing control condition. A 3 x 3 mixed ANOVA was conducted with *condition* (disclosure, writing control and non-writing control) as a between-participant variable and *assessment period* (baseline, 2-week follow-up and 6-week follow-up) as the within-participant variable, separately for PSI, depression, anxiety, GSI, intrusion and avoidance. The means and standard deviations for outcome measures as a function of condition and time of assessment are presented in Table 5.6.

5.5.7.1 Physical symptoms

The pattern of mean scores for the PSI suggest an increase in self-reported physical symptoms in all conditions from baseline to 2-week follow-up assessment, followed by a reduction in symptoms at 6-week assessment. PSI scores did not differ significantly between conditions ($F_{(2, 84)} = 0.42$, $p = .656$, $\eta^2 = .01$). There was no significant main effect of assessment period ($F_{(1.86, 156.01)} = 2.73$, $p = .07$, $\eta^2 = .03$) although the data

suggested a trend, and there was no interaction between assessment period and condition ($F_{(3.72, 156.01)} = 0.54$, $p = .694$, $\eta^2 = .01$).

Table 5.6 Means and standard deviations for all outcome variables as a function of condition for pre-writing, 2-weeks post writing and 6-week post writing assessment.

		Disclosure			Writing-control			Control		
		B/line	2-week	6-week	B/line	2-week	6-week	B/line	2-week	6-week
			(n = 32)			(n = 37)			(n = 18)	
PSI	*M*	4.03	5.03	4.25	3.86	4.11	4.03	4.06	4.72	4.44
	SD	2.28	2.80	2.63	2.64	2.73	2.20	2.28	2.40	3.09
DEP	*M*	1.11	1.00	0.82	0.97	0.65	0.56	0.76	0.67	0.79
	SD	0.77	0.66	0.68	0.69	0.48	0.49	0.62	0.64	0.88
ANX	*M*	0.60	0.51	0.40	0.58	0.36	0.28	0.54	0.37	0.32
	SD	0.51	0.58	0.42	0.62	0.37	0.35	0.54	0.43	0.46
GSI	*M*	0.78	0.70	0.54	0.68	0.49	0.43	0.58	0.59	0.55
	SD	0.50	0.47	0.45	0.46	0.32	0.38	0.39	0.54	0.51
Intrusion	*M*	12.49	10.06	9.71	9.72	9.14	7.97	9.67	9.06	9.61
	SD	8.48	9.43	9.36	10.00	8.45	8.00	7.92	10.46	12.03
Avoidance	*M*	11.85	11.81	10.97	9.72	9.36	9.08	10.89	8.67	10.11
	SD	9.57	10.54	10.04	8.78	9.56	9.33	9.57	9.42	10.48

5.5.7.2 Psychological distress

Examination of the mean scores suggests a gradual reduction in psychological symptom reporting across the study period for all conditions with the exception of depression which improves at the 2-week assessment but appears to deteriorate at 6-weeks in the non-writing control condition. Depression scores did not differ significantly between conditions ($F_{(1, 84)} = 1.84$, $p = .165$, $\eta^2 = .04$). A significant within-group main effect for assessment period emerged ($F_{(2, 168)} = 8.18$, $p<.001$, $\eta^2 = .09$). Pairwise comparisons confirmed a significant overall reduction in depression scores from baseline to 2-week assessment ($p = .021$, $d = .30$), 6-week assessment scores remained significantly lower than baseline depression scores ($p<.001$, $d = .41$) but scores did not differ significantly between 2-week and 6-week assessment ($p = .368$).

There was a significant interaction effect for assessment period and condition ($F_{(4, 168)}$ = 2.98, p = .021, η^2 = .07). Both the writing control condition ($F_{(2, 72)}$ = 14.80, p<.001, η^2 = .29) and the disclosure condition ($F_{(2, 62)}$ = 4.59, p = .014, η^2 =.13) participants experienced a significant reduction in depressive symptoms overall. Further examination of this interaction effect also suggested that the reduction in depression scores in the writing control condition from baseline to 2-week follow-up was significantly greater than the reduction seen in the disclosure condition at this time (p = .035, d = .61), however at 6-week follow-up depression scores were not significantly different between the writing groups (p = .220). Non-writing control participants did not report any significant reduction in symptoms ($F_{(2, 34)}$ = 0.60, p = .556, η^2 = .03).

Analysis of anxiety scores showed no main effect of condition ($F_{(1, 84)}$ = 0.82, p = .443, η^2 = .02). Consistent with the pattern of mean scores there was a significant main effect of assessment period ($F_{(1.73, 145.67)}$ = 7.41, p = .001, η^2 = .08). Pairwise comparisons confirmed that there was a significant reduction in anxiety scores from baseline to 2-week follow-up (p = .05, d = .26) and between 2-week to 6-week follow-up (p = .046, d = .18). Six week assessment anxiety scores remained significantly lower than baseline scores (p<.001, d = .44). There was no significant interaction between assessment period and condition for anxiety scores ($F_{(3.47, 145.67)}$ = 1.11, p = .35, η^2 = .03).

Likewise, GSI scores did not differ between conditions ($F_{(1, 84)}$ = 1.12, p = .333, η^2 = .03) but did produce a significant main effect of assessment period ($F_{(2, 168)}$ = 9.88, p<.001, η^2 = .11). Again, pairwise comparisons indicated a significant reduction in GSI scores from baseline to 2-week follow-up (p = .03, d = .44) and between 2-week to 6-week follow-up (p = .03 d = .23). GSI scores remained significantly lower than baseline scores (p<.001, d = .47) at 6-week follow-up. There was no significant interaction between assessment period and condition for GSI scores ($F_{(4, 168)}$ = 1.90, p = .11, η^2 = .04).

Overall, the results suggest that writing about a traumatic event did not produce significant differential outcomes for symptoms of anxiety or global psychological functioning compared to writing about plans for the day/week or not writing at all. However, writing about either a traumatic event or plans for the day/week did appear to produce a significant reduction in depressive symptoms compared to not writing at all.

5.5.7.3 Symptoms of intrusion and avoidance

The pattern of the mean scores for intrusion indicated a gradual reduction in intrusive thoughts across the study in all but the non-writing control condition who reported an increase in intrusion from 2-week assessment to 6-week assessment. No significant between-group effect for condition ($F_{(1, 82)} = 0.44$, $p = .645$, $\eta^2 = .01$) emerged and there was no significant within-group effect for assessment period ($F_{(1.84, 150.77)} = 1.52$, $p = .223$, $\eta^2 = .02$). There was no significant interaction between assessment period and condition ($F_{(3.68, 150.77)} = 0.47$, $p = .743$, $\eta^2 = .01$).

Avoidance scores followed the same pattern as intrusion scores. Again avoidance scores did not significantly differ between conditions ($F_{(1, 82)} = 0.58$, $p = .563$, $\eta^2 = .01$). Avoidance scores did not significantly change between baseline and follow-up assessments ($F_{(2, 164)} = 0.50$, $p = .608$, $\eta^2 = .01$) and there was no interactions between assessment period and condition ($F_{(4, 164)} = 0.28$, $p = .888$, $\eta^2 = .01$).

5.5.8 Language Analysis

In order to determine if modality had a differential effect on the production of emotional narratives in terms of content, the analysis of the number of words produced and the percentage of positive emotion, negative emotion and cognitive words within disclosure narratives was conducted using a 2-way mixed ANOVA with *modality* (writing and typing) as the between-group variable and *writing session* (session 1, session 2, and session 3) as the within-group variables. The means and standard deviations for the linguistic indices are presented in Table 5.7. Modality did not have a significant effect on number of words written ($F_{(1, 29)} = 1.87$, $p = .182$, $\eta^2 = .06$). A significant main effect for writing session ($F_{(1.32, 38.30)} = 12.17$, $p<.001$, $\eta^2 = .30$) suggested that there was a significant difference in the number of words produced across writing sessions. Pairwise comparisons confirmed that the number of words produced reduced from the first to the second session ($p = .046$, $d = .23$), and again at the final session ($p = .001$, $d = .50$). There was no significant interaction between session and modality $F_{(1.32, 38.30)} = 2.56$, $p = .086$, $\eta^2 = .08$).

Disclosure groups did not differ in their use of positive emotion words as a function of modality ($F_{(1, 29)} = 1.38$, $p = .250$, $\eta^2 = .05$). The means indicated an overall increase in the percentage of positive emotion words used across the writing sessions but this did not reach statistical significance ($F_{(2, 58)} = 2.99$, $p = .058$, $\eta^2 = .09$). There was no significant interaction between session and modality ($F_{(2, 58)} = 1.34$, $p = .271$, $\eta^2 = .04$).

Similarly, the use of negative emotion words did not differ between modalities ($F_{(1, 29)}$ = 0.14, p = .710, η^2 =.01). Analysis did reveal a difference in the use of negative emotion words across writing sessions ($F_{(2, 58)}$ = 4.19, p = .020, η^2 = .13). Pairwise comparisons indicated that this effect was due to a reduction in the use of negative emotion words from session 2 to session 3 (p = .011, d = .38), the percentage of negative emotion words used from session one to session three also reduced significantly (p = .01, d = .50). The interaction effect between session and modality was not significant ($F_{(2, 58)}$ = 2.84, p = .067, η^2 = .09).

Table 5.7 Means and standard deviations for word count and total percentage of positive emotion, negative emotion and cognitive process words of disclosure group essays.

		Writing Group (n = 17)			*Typing Group (n = 14)*		
		WS 1	WS 2	WS 3	WS 1	WS 2	WS 3
Word Count	*M*	405.53	414.53	341.71	484.33	421.60	364.80
	SD	66.91	82.03	114.16	171.00	119.22	154.24
Pos. emotion words	*M*	1.34	1.73	1.53	1.62	1.66	2.45
(%)	*SD*	0.83	1.07	0.91	0.71	1.03	1.28
Neg. emotion words	*M*	3.56	3.50	3.41	3.89	3.65	2.44
(%)	*SD*	1.92	1.89	1.60	0.82	1.40	1.07
Cognitive Words	*M*	7.81	7.71	8.37	8.00	8.42	8.42
(%)	*SD*	2.12	2.16	2.50	1.76	1.92	2.01

WS = writing session

Finally, the use of cognitive words did not differ between modalities ($F_{(1, 29)}$ = 0.37, p = .546, η^2 = .01) or writing sessions ($F_{(2, 58)}$ = 0.52, p = .595, η^2 = .02). There was no significant interaction between session and modality ($F_{(2, 59)}$ = 0.25, p = .777, η^2 = .01). Taken together the analysis of narrative content suggests that writing longhand and typing are comparable in terms of linguistic output. Variations in word count and use of negative emotion words as a function of writing session were not differentiated by the mode through which they were produced.

5.5.8.1 Language use as a predictor of outcome

Regression analyses were used to establish if changes in word use across the writing sessions in the disclosure groups (writing and typing disclosure groups were examined together as modality was not found to moderate word usage across the writing session) were predictive of changes in well-being. Hierarchical linear regressions were conducted separately for the 2-week and 6-week assessment on each of the outcome variables (PSI, depression, anxiety, GSI, intrusion and avoidance). The baseline value of the dependent variable was entered in the first step of the regression as a control. The change scores for the word categories; negative emotion, positive emotion and cognitive mechanisms were entered together at the second step[21].

Results from the hierarchical regression analyses are summarized in Table 5.8 and Table 5.9. Table 5.8 presents the results of the regression analysis for the outcome variables assessed at 2-week follow-up. The analysis showed that a change in negative emotion words significantly predicted avoidance scores after controlling for baseline levels of avoidance (β = .34, t = 2.21, p = .04). Those who used fewer negative emotion words at writing session three compared to writing session one had fewer symptoms of avoidance at 2-week follow-up. Summarized in Table 5.9 are the regression analyses for outcome variables at 6-week assessment. Analyses showed that a change in negative emotion words significantly predicted anxiety scores after controlling for baseline levels of anxiety (β = .29, t = 2.53, p = .02). Those who used less negative emotion words at the final writing session compared to the first writing session reported fewer symptoms of anxiety at 6-week follow-up. Changes in word use did not predict scores for any other outcome variable at 2-week or 6-week assessment period[22] (non-significant findings are not reported here, SPSS outputs for all hierarchical regressions can be found in Appendix A.9).

[21] In their study with caregivers of children Schwartz and Drotar (2004) entered negative emotion word change prior to cognitive word change based on the theoretical rationale that habituation to negative emotion would proceed an increase in cognitive processing. However, the relative importance of word categories as predictors of change has not been consistent across studies and the mechanisms by which disclosure writing might influence well-being may differ as a function of the population under investigation. Therefore, word category change scores were entered together in the present study as has been done in previous research (Rivkin et al., 2006; Low, Stanton & Danoff-Burg, 2006).

[22] Analysis of the writing-control group data did not find these patterns of change.

Table 5.8 Summary of hierarchical regression analyses for outcome variables at 2-week assessment.

		Step1			Step 2		
Variable	Predictors	*B*	*SE B*	*β*	*B*	*SE B*	*β*
PSI	PSI (baseline)	0.45	0.21	**.37***	0.47	0.22	**.38***
	Neg. Emotion Change				-0.07	0.30	-.04
	Pos. Emotion Change				-0.23	0.33	-.13
	Cognitive Change				0.13	0.19	.13
	R^2		0.13			0.17	
	ΔR^2		-			0.03	
Depression	Depression (baseline)	0.53	0.12	**.63****	0.48	0.13	**.57****
	Neg. Emotion Change				0.03	0.06	.09
	Pos. Emotion Change				0.01	0.06	.02
	Cognitive Change				-0.05	0.04	-.21
	R^2		0.40			0.45	
	ΔR^2		-			0.05	
Anxiety	Anxiety (baseline)	0.80	0.16	**.69****	0.78	0.16	**.67****
	Neg. Emotion Change				0.04	0.04	.11
	Pos. Emotion Change				-0.08	0.05	-.21
	Cognitive Change				-0.05	0.03	-.23
	R^2		0.69			0.77	
	ΔR^2		-			0.12	
GSI	GSI (baseline)	0.66	0.12	**.71****	0.64	0.14	**.69****
	Neg. Emotion Change				0.01	0.04	.03
	Pos. Emotion Change				-0.03	0.04	-.11
	Cognitive Change				-0.03	0.02	-.19
	R^2		0.50			0.55	
	ΔR^2		-			0.05	
Intrusion	Intrusion (baseline)	0.45	0.20	**.42***	0.39	0.19	.35
	Neg. Emotion Change				1.35	0.97	.24
	Pos. Emotion Change				-1.39	1.00	-.23
	Cognitive Change				-0.47	0.59	-.13
	R^2		0.17			0.31	
	ΔR^2		-			0.14	
Avoidance	Avoidance (baseline)	0.76	0.15	**.70****	0.58	0.17	**.53****
	Neg. Emotion Change				2.09	0.94	**.34***
	Pos. Emotion Change				-0.58	0.88	-.09
	Cognitive Change				0.26	0.51	.07
	R^2		0.49			0.58	
	ΔR^2		-			0.10	

*$p < .05$. **$p < .01$.
N = 31 for PSI, depression, anxiety and GSI; N = 30 for intrusion and avoidance

Table 5.9 Summary of hierarchical regression analyses for outcome variables at 6-week assessment.

Variable		Step1			Step 2		
		B	*SE B*	*β*	*B*	*SE B*	*β*
PSI	PSI (baseline)	0.75	0.16	**.65****	0.74	0.17	**.64****
	Neg. Emotion Change				0 .11	0.23	.07
	Pos. Emotion Change				0.12	0.25	.07
	Cognitive Change				-0.04	0.15	-.05
	R^2		.43			.44	
	ΔR^2		-			.01	
Depression	Depression (baseline)	0.66	0.10	**.76****	0.64	0.11	**.74****
	Neg. Emotion Change				0 .04	0.05	.11
	Pos. Emotion Change				0.04	0.05	.10
	Cognitive Change				0.05	0.03	.18
	R^2		.58			.63	
	ΔR^2		-			.05	
Anxiety	Anxiety (baseline)	0.63	0.10	**.77****	0.58	0.10	**.70****
	Neg. Emotion Change				0 .07	0.03	**.29***
	Pos. Emotion Change				-0.02	0.03	-.06
	Cognitive Change				-0.02	0.02	-.10
	R^2		.77			.83	
	ΔR^2		-			.10	
GSI	GSI (baseline)	0.67	0.11	**.76****	0.68	0.13	**.77****
	Neg. Emotion Change				0.01	0.04	.05
	Pos. Emotion Change				-0.02	0.04	-.06
	Cognitive Change				0.01	0.02	.06
	R^2		.58			.59	
	ΔR^2		-			.01	
Intrusion	Intrusion (baseline)	0.50	0.18	**.46***	0.49	0.20	**.37***
	Neg. Emotion Change				1 .37	0.99	.25
	Pos. Emotion Change				0.05	1.02	.01
	Cognitive Change				-0.41	0.60	-.12
	R^2		.21			.28	
	ΔR^2		-			.07	
Avoidance	Avoidance (baseline)	0.58	0.16	**.56****	0.45	0.20	**.43***
	Neg. Emotion Change				1.27	1.11	.23
	Pos. Emotion Change				0.95	1.04	.15
	Cognitive Change				-0.09	0.60	-.03
	R^2		.31			.36	
	ΔR^2		-			.05	

*p < .05. **p < .01.
N = 31 for PSI, depression, anxiety and GSI; N = 30 for intrusion and avoidance

5.6 Discussion

This study aimed to replicate the findings of previous disclosure studies (e.g. Pennebaker et al., 1988; Pennebaker & Beall, 1986) in producing positive health benefits for individuals who wrote about a traumatic event compared to individuals who wrote objectively about their past, present and future daily routines. In this study writing about traumatic or stressful events was not associated with improvements in self-reported physical well-being measured by recent illness symptoms (PSI). Psychological well-being (depression, anxiety, GSI) improved significantly from the baseline to the 2-week post writing follow-up (six weeks after the start of the study) and again at the 6-week post writing follow-up in both the writing and typing disclosure groups and the writing and typing control groups. Improvements in psychological well-being were not differentiated by modality of disclosure. Inclusion of a non-writing control condition in follow-up analysis indicated that whilst there were improvements in all conditions (writing and non-writing) on symptoms of anxiety and global distress (GSI), symptoms of depression did not significantly improve in the non-writing control condition as they did in the writing conditions.

In terms of the immediate effects of writing, the findings of this study were consistent with those reported in the disclosure literature (see Smyth, 1998). Assessment of post-writing mood indicated that negative mood was significantly higher in the disclosure condition than the writing control condition, which corresponds with the highly emotional and personal nature of the topics that disclosure participants wrote about. However, it is not known if groups differed on negative or positive affect prior to starting writing, as this study failed to account for pre-writing mood, although it is important to note that there were no group differences on baseline measures of psychological well-being taken immediately preceding the first writing session. Similarly, the linguistic content of disclosure essays were more emotionally valenced than those produced by the control groups as indicated by the relative percentage of negative emotion and positive emotion words in the narratives.

Disclosure group essays were differentiated from those produced by control groups in the content of words that represented cognitive processes, such as words relating to insight and causation. Thus, the similar improvements seen in the well-being of participants in both the writing groups (disclosure and control) are unlikely to be due to similarities in the content of their writing per se. Although the improvements seen in psychological well-being in the present study were not limited to those in the disclosure groups, the way that disclosure participants wrote about the traumatic or stressful

events they had experienced appeared to influence some of the beneficial changes. Changes in the use of words from writing session one to session three indicated that a reduction in negative emotion words across the writing sessions was predictive of a reduction in symptoms of avoidance at 2-week follow-up and a reduction in anxiety at 6-week follow-up for disclosure participants, changes which were not replicated in the writing-control group. This decrease in the use of negative emotion words and subsequent changes in avoidant symptoms and anxiety are consistent with the habituation explanation of disclosure (see section 2.3.6.2) and point to the importance of emotional processing in disclosure.

One possible explanation for the overall improvements in psychological well-being seen in the writing/typing groups is that these changes could represent a gradual adjustment to university over the second semester of the participants' first year, however, the final follow-up assessment was conducted at a time when students would have been completing final assessments and revising for exams, which is a time usually associated with increases in psychological distress (Stowell, 2003). It is notable that in the non-writing control group, depressive symptoms did not reduce at follow-up, as they did in the disclosure and control writing groups, The finding that writing/typing-control participants in this study reported an improvement in psychological well-being is not unique. Marlo and Wagner (1999) and Horneffer and Jamison (2002) have also found a reduction in psychological distress in writing-control participants in their studies. A possible explanation for these unexpected findings advocated by both Marlo and Wagner (1999) and Horneffer and Jamison (2002) is that writing about life experiences, independent of emotional valence or content, may improve psychological well-being. It is noteworthy that the current study utilised similar control group writing instructions as used by Marlo and Wagner (1999) and Horneffer and Jamison (2002). These instructions, which ask participants to write about their 'plans for the day' and subsequently 'plans for the following week', may provide participants with the opportunity to organize and reflect on their responsibilities (Horneffer & Jamison, 2002). This possible explanation is supported by the findings that students who perceive being in control of their time, in relation to time management of their studies, is shown to be related to lower levels of stress (Macan, Shahani, Dipboye & Phillips, 1990). Considering the timing of the writing sessions in this study (start of a new semester) and assessment periods, it seems feasible that the time management style instructions given to the writing-control group may have inadvertently proved beneficial to participants. Tentative support for this comes from the reduction in levels of intrusion across the study, with participants reporting a near significant reduction in their

frequency of intrusive thoughts irrespective of group. Pennebaker (1989) suggested that disclosure writing may facilitate psychological adjustment by reducing the frequency of stressor-related intrusive thoughts, and this reduction is normally only seen in those who write about traumatic or stressful experiences (Lutgendorf & Antoni, 1999). The levels of intrusion amongst the participants in the present study were lower than those reported in other disclosure studies, and as such may represent a sample in which there was limited scope for change resulting in a floor effect.

The principal aim of the study presented in the current chapter was to determine the impact of writing modality on the immediate and longer-term outcomes of disclosure writing. Contrary to the findings of Brewin and Lennard (1999) that writing longhand about a trauma is associated with greater arousal of negative mood than typing, the current study found no differential effect of modality on post writing arousal. Consistent with the findings of Sharp and Hargrove (2004), this study found that writing and typing about a traumatic event were comparable in terms of linguistic output. There were no differences in the percentage of negative emotion, positive emotion or cognitive process words used between writing modalities. Sharp and Hargrove (2004) did find that typing was associated with the production of more words, however in the current study there were no differences in word count between typed and hand written essays.

The limitation of previous studies that have examined the impact of modality on disclosure writing is that conclusions have been based on a single writing session. This study sought to expand on these findings by examining the effect of modality on the longer-term outcomes of disclosure writing. The findings did not indicate that the improvement in psychological well-being seen in the writing groups was differentiated by the modality through which participants produced their narratives and as such the medium through which disclosure writing is produced appears to have no impact on the potential therapeutic properties of disclosure writing. The ability to generalise the current findings is limited by the fact that the sample consisted solely of undergraduate students who are arguably more familiar with computers than some subgroups of the population. Nonetheless, the findings would suggest that computer based applications of the Pennebaker paradigm are acceptable for individuals who are accustomed to using this modality.

One potential limitation of the present study is that, unlike Brewin and Lennard (1999), this study did not control for typing ability in individuals assigned to type their narratives. It is not clear then if typing ability impacts on either the short-term or long-

term outcome of a computer based intervention but given the higher level of post writing negative affect seen in the hand writing groups of the present study compared to the typing groups post writing, and that there were no differences in word count between the writing and typing groups it would seem that this sample were both comfortable with and competent with using this modality of writing.

5.7 Summary

This study sought to replicate and expand on the findings of previous research and in doing so examined the potential moderating effect of modality on the outcome of disclosure studies. Whilst, the study unexpectedly found a reduction in symptoms of anxiety and general distress across the study for all participants, irrespective of group assignment, the finding that symptoms of depression improved in the writing control group as well as the disclosure group, but not the non-writing control group, indicated the potential benefits of writing about time management. The study was able to provide support for Sharp and Hargrove's (2004) earlier contention that writing longhand and typing produced comparable levels of linguistic output and collectively these findings would suggest that adaptation of the writing intervention to a computer-based format does not moderate the effectiveness of the writing intervention when conducted in the standard laboratory setting. In order to advocate the adaptation of the intervention to a home-based format it is necessary to consider how context of writing may impact upon its efficacy. The delivery of the intervention within the context of the home deviates from the standard lab-based delivery used in the majority of studies. Therefore, the aim of the study in Chapter 6 is to examine directly the effect of context on disclosure writing.

Chapter 6

Testing Methodologies 2: Writing in the Laboratory versus Writing at Home

6.1 Introduction

The adaptation of the standard writing intervention to a home-based format alters the context in which disclosure occurs. In the first study conducted by Pennebaker and Beall (1986) a student sample of participants were directed by the experimenter to write in private cubicles in a laboratory setting. This laboratory based procedure has been the blueprint for numerous studies examining the effects of written emotional disclosure (e.g. Pennebaker & Francis, 1996; Greenberg, Wortman & Stone, 1996). Subsequently, researchers have taken the writing intervention out of the laboratory and into other settings such as the hospital room (Schwartz & Drotal, 2004) and the home (e.g. Langens & Schüler, 2005; Rosenberg et al., 2002). Arguably, the main rationale for this adaptation of the writing intervention has been to maximize recruitment and retention of specific populations, in particular the chronically ill (e.g. Wetherell et al., 2005). Whilst this adaptation of the standard protocol may help to widen the application of disclosure writing to other populations there is some debate as to what the consequences are of this change of setting on the efficacy of disclosure writing (Smyth & Catley, 2002; Solano, Bonadies & Di Trani, 2008).

The difficulty in making comparisons between disclosure studies that have been conducted in the laboratory and those conducted at home, is that published studies conducted in the home context have made additional changes to the standard writing protocol, and increased the diversity in population characteristics (see section 3.6.1) thus differentiating the effects of home writing over other changes is difficult. Primarily, the majority of home-based studies are conducted with chronic illness samples (e.g. Wethrell et al., 2005; Zakowski et al., 2004), although some have been conducted with students (Langens & Schüler, 2005; Sheffield, Duncan, Thomson & Johal, 2002; Ullrich & Lutgendorf, 2002; Wing, Schutte & Byrne, 2006) and a community sample (Swanbon, Boyce & Greenberg, 2008). The instructional set given to participants has also differed between these studies with some home-based participants writing about

their thoughts and feelings relating to a traumatic or stressful event (Vedhara et al., 2007; Wetherell et al., 2005) as per the standard writing instructions, whilst others have been instructed to write about positive experiences (Wing et al., 2006), their feelings about their illness (Rosenberg et al., 2002; Zakowski et al., 2004), how ongoing stressful events have affected their illness (Gills, Lumley, Mosley-Williams, Leisen & Roehers, 2006) or in the case of a study with HIV negative gay men, their thoughts and feelings about 'coming out' (Swanbon et al., 2008). For example, Ullrich and Lutgendorf (2002) had students write at home about a traumatic or stressful event. The instructions given to participants were designed to facilitate cognitive processing and emotional engagement in one group, whilst in another group the instructions directed the participants to focus only on their emotions. In contrast to the standard instructions usually given to control group participants, Ullrich and Lutgendorf (2002) asked their control group to write factually about loss and trauma in the media. Although the authors found that facilitating cognitive processing was effective in increasing positive growth compared to focusing on emotions or facts about trauma or loss, no health benefits emerged. In addition to this, the number and length of sessions were different to that of the standard protocol, whereby participants wrote for 10 minutes, twice a week over a period of a month. As discussed in section 3.4.1, the number and length of disclosure sessions has been found to moderate the overall effect of disclosure, such that studies with three or more writing sessions have marginally larger effect sizes for psychological health than studies with fewer than three sessions, and studies in which writing lasted at least 15 minutes had significantly larger effect sizes for physical health (but not psychological health) than those which utilized writing sessions of fewer than 15 minutes (Frattaroli, 2006). It is therefore not possible to determine what effect, if any, context alone had on the outcome of the Ullrich and Lutgendorf (2002) study.

The findings of one study that has attempted to replicate the standard protocol used in previous disclosure studies (e.g. Pennebaker & Beall, 1986) in a home-based context, led the authors to caution against the use of disclosure writing in the home. Sheffield et al. (2002) conducted a home-based study in a student sample and found that at 3-week follow-up participants who wrote emotionally over three consecutive days for 10 minutes experienced more physical symptoms and higher rates of absence from college due to illness compared to controls who wrote about a superficial topic, such as their plans for the day, and a non-writing control group. Groups did not differ on physical health measures at 7-week follow-up and 30-week follow-up. An increase in reporting of physical symptoms in disclosure participants is not unique to home-based studies. Previous studies conducted in the standard laboratory setting have reported

short-term increases in physical symptoms in disclosure group participants (Greenberg & Stone, 1992; Kloss & Lisman, 2002; Park & Blumberg, 2002). A possible explanation for the reported increase in physical symptoms in the Sheffield et al. (2002) study relates to timing of assessment. Participants were asked to report both the presence of physical symptoms and days absent due to illness during the previous month. Therefore it is possible that the group differences observed at 3-week follow-up represent differences prior to or during the writing period. Indeed, at 30-week follow-up disclosure group participants reported lower levels of anxiety and insomnia than control groups, suggesting that the home-based intervention was effective to an extent (Sheffield et al., 2002).

The evidence for the effectiveness of home-based disclosure interventions with chronic illness populations is also equivocal. For example, studies that have implemented home-based disclosure interventions with cancer sufferers have found only limited support for the effectiveness of the intervention in this population (Cepeda et al., 2008; Rosenberg et al., 2002; Zakowski et al., 2004). Cepeda et al. (2008) found no effect of disclosure on pain intensity or sense of well-being in oncology patients suffering a variety of different cancers (e.g. breast cancer, kidney cancer), though further analysis indicated that patients rated as disclosing a higher degree of emotion in their narratives reported lower pain intensity and had higher well-being scores at follow-up. Similarly, Zakowski et al. (2004) found that disclosure was only effective in buffering the effects of stress for prostrate and gynaecological cancer patients who reported high levels of social constraint. Equally, studies that have been conducted in lab-based settings with cancer sufferers have also found limited support for disclosure writing (see section 2.3.7.3) suggesting that this type of intervention may have limited utility in this population irrespective of the context in which it is conducted.

In contrast to writing in the laboratory under the supervision of the experimenter, disclosure studies conducted in the home environment are arguably less controlled (Smyth & Catley, 2002), and there is the potential for participants not to adhere to the protocol. In a study that specifically examined the adherence to, and feasibility of, home-based oral disclosure (into a tape recorder) in participants with rheumatoid arthritis, van Middendorp, Sorbi, van Doornen., Bijlsma, & Geenen (2007) adapted the standard disclosure instructions given to participants to induce emotional engagement, cognitive restructuring and positive future directedness in order to optimize the home application. They found that not only were participants able and willing to comply with the instructions given based on self-reported ratings and the content of the narratives

they produced, but that a reduction in negative emotion over the disclosure sessions was paralleled by an increase in positive emotions, suggesting that home application was tolerable in this population. In addition to this, the retention of participants in the study was high with a 99.6 per cent completion rate, suggesting that the intervention was acceptable to participants and adherence to the study requirements within this home-based setting was not problematic. This led van Middendorp et al. (2007) to advocate the adaptation of the standard lab-based disclosure intervention for home application. However, no follow-up assessments were reported so it is not possible to draw any conclusions from this study on overall effectiveness of the intervention on well-being, though a previous home-based disclosure intervention in this population reported improvements in mood and stability in disease activity compared to controls (Wetherell et al., 2005).

Whilst there are clear advantages to the provision of home-based interventions in terms of increasing accessibility and flexibility, especially for individuals with reduced mobility, the evidence produced thus far for the utility of written disclosure in the home is equivocal. The difficulty in evaluating the impact of context on disclosure from the available studies is attributable to the methodological inconsistencies and differing populations across studies, thus making comparisons difficult. Whilst a recent meta-analysis found higher psychological health effect sizes in home-based studies (Frattaroli, 2006) to date there has been no attempt to examine directly if context moderates the efficacy of disclosure writing.

6.2 Aims

This aim of the present study is to establish directly if the context in which thoughts and feelings are expressed moderates both the immediate and longer-term effects of disclosure writing. In order to establish if the narrative content varies as a function of context, the study will also examine the linguistic content of essays written by disclosure group participants, and changes in word use will be examined as predictors of outcome in the disclosure groups.

6.3 Method

6.3.1 Recruitment

The existing dataset from the study presented in Chapter 5, which consisted of data collected exclusively within a laboratory setting, was used in the current study to form the comparison lab-based condition. Recruitment of participants into the home-based

groups was conducted at the start of the first semester (October). To maintain consistency with the existing lab-based sample, first year undergraduate participants were recruited from the equivalent teaching sessions as the lab-based participants. An independent T-test (two-tailed) confirmed that lab-based participants and home-based participants did not differ in terms of their levels of psychological distress at recruitment ($t_{(487)} = -0.28$, $p = .782$).

6.3.2 Participants

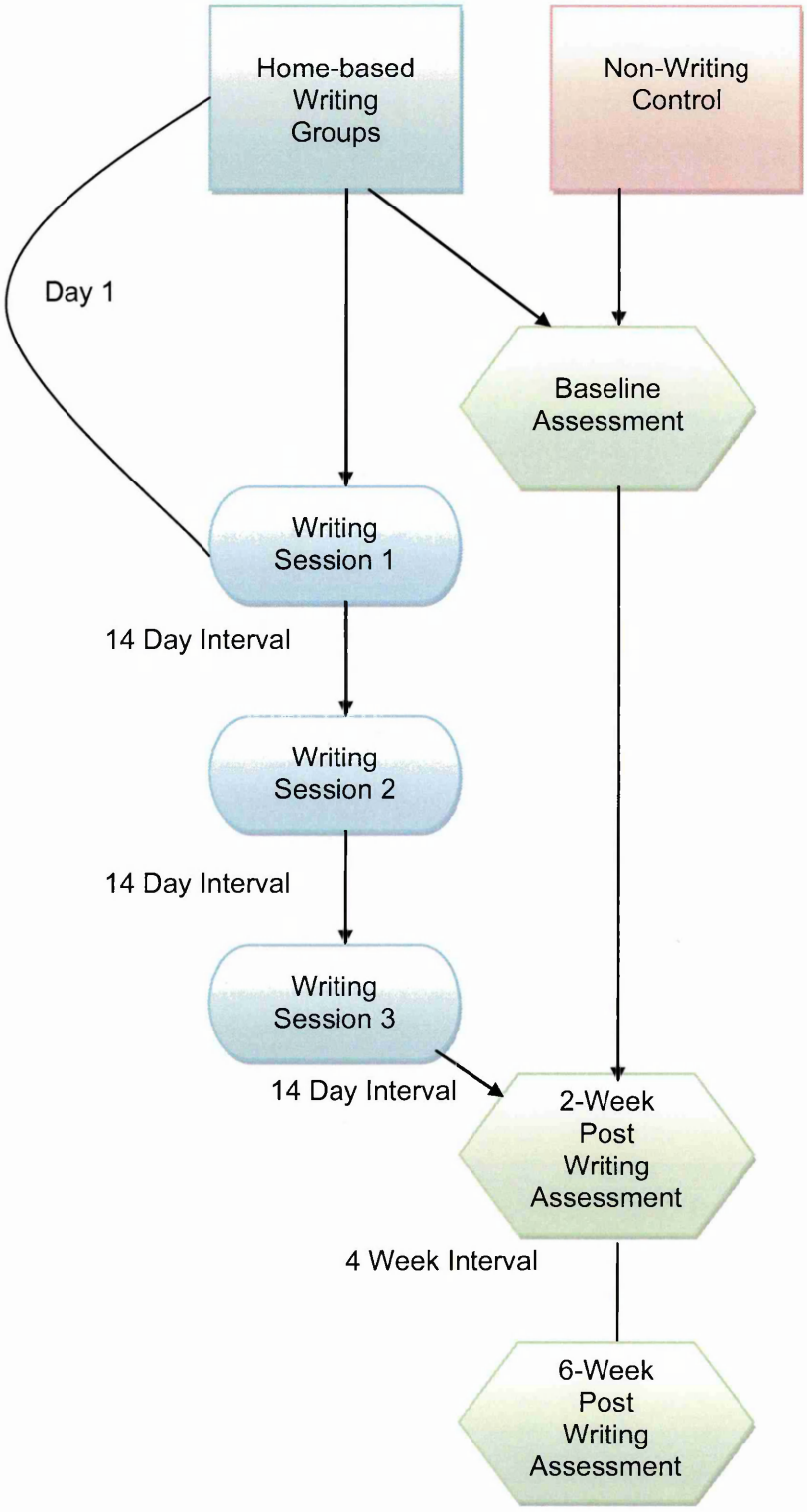
The home-based sample consisted of 129 females and 15 males, with a mean age of 20.29 years (SD = 5.07). Two hundred and thirty one participants (207 female; 24 male) were included in the final data set (87 lab-based, 144 home-based). The mean age of the sample was 20.35 years (SD = 5.32) and the age of participants ranged from 18 to 53 years. See section 5.4.1 for lab-based participants' information.

6.3.3 Design

The study used a quasi-experimental, repeated measures design. There were six groups in the current study, which includes the lab-based disclosure, lab-based writing control and the lab-based non-writing control conditions recruited in Chapter 5. Participants recruited into the home-based samples for the current study were non-randomly allocated to a home-based disclosure group, a home-based writing control group or a home-based non-writing control group.

As in Chapter 5, allocation to condition was based on seating position in the classroom, similarly the non-writing control participants were recruited in separate classes so as not to bring attention to the fact that their role in the study was different to those who had writing tasks. Figure 6.1 shows the study design which replicated that of Chapter 5 and comprised a baseline assessment, six week intervention period in which three 15 minute writing sessions were conducted at 14 day intervals by the home-based writing groups, and then two follow-up assessments at 2-weeks and 6-weeks post-intervention were completed by all participants. The dependant variables measured at baseline and follow-up assessments were depression, anxiety, psychological distress, physical symptoms, intrusion and avoidance.

Figure 6.1: Flow diagram of Chapter 5 process and timescale of participation for home-based participants.



6.3.4 Measures

This study utilised the same measures as Chapter 5 (see section 5.4.3) which include; the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1992), the Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979), the Essay Evaluations Questionnaire (EEQ; Greenberg & Stone, 1992), the Physical Symptoms Inventory (PSI; Spector & Jex, 1998) and the Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988). Content analysis of participant's narratives was conducted using the Linguistic Inquiry and Word Count Programme (LIWC: Pennebaker, Francis & Booth, 2001) which is described in section 5.4.3.

6.3.5 Ethics

The study was conducted in accordance with the British Psychological Society guidelines for conducting research with human participants (Code of Conduct, Ethical Principles and Guidelines, 2004). The study was subject to scrutiny by the Faculty Research Ethics Committee, Sheffield Hallam University for which approval was granted (see Appendix A.4 for the Ethics Proforma and Letter of Approval). Consideration was given to the sensitive and distressing nature of topics that participants could potentially disclose, all participants were informed that there was the potential to experience emotional discomfort during their participation in the study and steps were to taken to minimise this by providing contact information to services that were available to them should they experience any distress as a consequence of their participation.

6.3.6 Procedure

The procedure followed by lab-based participants is described in section 5.4.5. Potential participants for the home-based conditions were given a brief introduction to the study, identical to the one given to those in the lab-based conditions, and were given an information sheet to read (see Appendix A.10) and asked to review and sign a consent form if they wished to participate in the study (see Appendix A.6). Those who agreed to participate were given the opportunity to ask questions, and all participants were informed of their rights to withdraw and withhold information. Participants were asked to provide an e-mail address at which they could be contacted so that reminders could be sent to them at each time point of the study to remind them to complete the writing tasks and the questionnaire booklets on the correct days. All writing tasks booklets and questionnaire booklets were sealed in individual envelopes and were dated to indicate when participants should open them for completion. All envelopes

also included a stamped addressed envelope in which participants could return their completed booklets. Participants were instructed to complete the baseline assessment questionnaires (PSI, SCL-90-R and IES) that evening at home and return it in the envelope provided. As some participants also had writing tasks to complete, those with tasks to do were asked to also complete the first task that evening following completion of the baseline measures.

The writing instructions given to participants in the home-based conditions were identical to those used in Chapter 5 (see section 5.4.5.1 and Appendix A.7). Instructions included in the packs of those in the writing groups asked them to write continuously in silence for 15 minutes and at the end of the task to complete the PANAS and EEQ and return their writing and completed questionnaires in the envelopes provided.

Follow-up assessment questionnaires (identical to baseline measures) were also included in the study packs to be completed at home two weeks after the final writing session and again four weeks later. Detailed instructions of when and how each task or questionnaire should be completed were included in the study packs. To minimize attrition, all participants were sent an e-mail to remind them when to complete each writing task or questionnaire. At the end of the study all participants (including those who had not completed the study) were sent a debriefing document outlining the background to the study, its aims and expected outcomes (see Appendix A.11).

6.4 Results

6.4.1 Preparation of Data

Data for home-based participants was entered into SPSS and screened for omissions and invalid entries. The data for one participant was removed due to non-completion of large sections of the questionnaires. A number of missing items were identified on the SCL-90-R at baseline (n = 16), 2-week follow-up (n = 15) and 6-week follow-up (n = 3). No single participant had more than one item missing from one of the SCL-90-R dimensions or more than 20 per cent of the items omitted overall, thus calculation of the scales was not substantially affected (Derogatis, 1992). The total IES data was missing for two participants at 2-week follow-up and for three participants at 6-week follow-up due to non-completion. The total PSI data was missing for one participant at 6-week follow-up. A number of participants failed to complete the PANAS immediately after the first writing session (n = 7), second writing session (n = 4) and third writing

session (n = 3). The home-based diaries were transcribed into type written format and prepared for analysis with the LIWC software as described in section 5.5.1.

6.4.1.1 Uptake and attrition

A total of 264 participants were recruited into the home-based phase of the study. Of the 155 participants allocated to home-based writing groups, 22 participants failed to return the writing booklet for the first writing session, a further 10 participants did not return the second writing session booklet, and a further 28 did not return the final writing session booklet. Of the remaining 214 participants (including 109 non-writing control group participants) 33 failed to return the 2-week follow-up assessment booklet and a further 35 failed to return the final 6-week assessment booklet. Overall 145 home-based participants completed the study; one was removed from the final analysis because large sections of the questionnaires had not been completed, leaving a total of 144 participants (home-based disclosure n = 51; home-based writing control n = 38; home-based non-writing control n = 55). Of the home-based participants, those who did not complete the study did not differ on baseline GSI scores to those who did complete the study ($t_{(262)}$ = -.57, p = .566, two-tailed).

To determine if recruitment into the different context groups (home-based versus lab-based) was related to attrition, a 2 x 2 χ^2 was conducted which showed that there was a significant relationship between study context and attrition (χ^2 = 12.29, DF = 1, p<.001). Examination of the observed and expected frequencies indicated that this association is mainly attributable to the finding that fewer lab-based participants completed the study.

6.4.1.2 Checking assumptions

Data for all variables in the home-based sample were examined to determine suitability for parametric analysis. Maintaining consistency with the steps taken in Chapter 5, the criterion of ≥3 standard deviations from the mean (Stevens, 2002) was used to screen for univariate outliers. Thirty four outliers were identified within the grouped data (negative affect scores n = 7; positive affect scores n = 2; word count n = 1; positive emotion words n = 2; negative emotion words n = 2; cognitive words n = 1; PSI scores n = 1; depression scores n = 5; anxiety scores n = 6; GSI scores n = 6: intrusion scores n = 1) and the distribution of the grouped data was found to be significantly skewed (>2.58 or <-2.58) (Clark-Carter, 2004) in three of the grouped variables (session 1 negative affect = 2.88; session 2 negative affect = 3.66; session 3 negative affect =

3.13). Examination of the cases with outlying scores suggested that the cases represented legitimate scores and were not due to errors or omissions so were retained in the subsequent analysis. Again for consistency with Chapter 5 analysis was repeated with adjusted and unadjusted scores. Analysis using adjusted scores did not alter the results, for this reason the results reported are for unadjusted scores.

6.4.1.3 Statistical analysis and sample size considerations

Consistent with the analysis techniques employed in Chapter 5 analysis of the immediate effects (positive affect and negative affect), longer-term effects (depression, anxiety, GSI, physical symptoms, intrusion and avoidance) and language use (negative emotion words, positive emotion words and cognitive mechanism words) in written disclosure were examined using a series of factorial analysis of variance (ANOVA). Hierarchical linear regressions were employed in the analysis of language change across writing sessions as a predictor of outcome. Change scores were calculated for each of the word categories by subtracting the total percentage of words used at the first writing session from the total percentage of words used at the final writing session as in Chapter 5.

For the present study *a priori* power analysis conducted using Gpower 3.0.10 (Erdfelder, Lang & Buchner, 2007) indicated that a total sample size of 108 (α = .05, power = .80, Critical f = (2, 105) = 3.08) would be required to detect between–group main effects, 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 54 (α = .05, power = .80, Critical f = (10, 96 = 1.93) would be required to detect interaction effects in the analysis of the short-term and longer-term effects of disclosure. Additionally, for the analysis of language use in disclosure a total sample size of 86 (α = .05, power = .80, Critical f = (1, 84) = 3.95) would be required to detect between–group main effects, a total sample size of 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 28 (α = .05, power = .80, Critical f = (2, 52) = 3.18) would be required to detect interaction effects. Thus the achieved sample size in this study (n = 144) meets the pre-determined requirements. As already noted in Chapter 5, calculation of sample size requirements for hierarchical linear regression indicates a required sample size of 85 (α = .05, power = .80, Critical f = (4, 80) = 2.49) to detect effects in a design with four predictor variables. The size of the sample to be included in this analysis (n = 83) is only marginally smaller than that recommended.

6.4.2 Home Based Sample Characteristics and Baseline Data

As is common in writing studies, and consistent with Chapter 5, the majority of the home-based participants were female (n = 129). Comparable with Chapter 5, over ninety per cent (n = 132) of the participants recruited into the home-based conditions were Caucasian, three identified themselves as black, four as Asian and five classified themselves as 'other'. Four of the home-based participants reported using psychotropic medication and five were receiving counselling[23].

Table 6.1 Means, standard deviations and range of scores for well-being measures at study entry for home-based participants.

Measures	*N*	*Mean*	*SD*	*Range*
Physical Symptoms Inventory	144	4.62	2.83	0-13
SCL-90-R Variables				
Depression	144	1.01	0.75	0-3.77
		(60.17)	*(8.35)*	(38-80*)*
Anxiety	144	0.65	0.66	*0-3.10*
		(56.07)	*(10.65)*	*(37-80)*
Global Severity Index	144	0.76	0.57	*0.09-3.32*
		(60.35)	*(8.71)*	(40-80*)*
Impact of Event Subscales				
Intrusion	144	9.50	8.67	0-33
Avoidance	144	10.83	9.01	0-34

Normalized T-scores and standard deviations for the SCL-90- R variables are presented in parentheses.

Fewer than half of the participants (n = 63) indicated that they currently kept a diary, with the majority of diary keepers indicating that they used a diary for recording appointments or significant events (n = 53), whilst 10 reported using the diary to write down their feelings and thoughts.

Descriptive information for all well-being measures at baseline in the home-based sample is presented in Table 6.1. The descriptive information for the lab-based sample

[23] Removing participants receiving counselling or psychotropic medication from the analysis did not alter the findings of the study.

is presented in Table 5.1, section 5.5.2. Again, for the purpose of comparing this sample with other studies both raw score calculations and standard normalized T-scores for the SCL-90-R symptom dimensions are presented, all further analyses are conducted using the raw score calculations. The reporting of physical symptoms (Mean = 4.62) at baseline in the home-based sample is lower than that of published norms (Spector & Jex, 1998).

Similarly, IES scores for intrusion and avoidance were lower than scores reported in studies that have used comparable samples (Schoutrop, Lange, Hanewald, Davidovich & Salomon, 2002; Lutgendorf & Antoni, 1999; Greenberg et al., 1996) and are similar to those reported in the lab based sample in Chapter 5. As was found with the lab-based sample, the mean raw scores on depression, anxiety and GSI dimensions in the home-based sample were comparable to the normative scores for adolescent non-patients rather than the adult norm group from which the standardized normalized T-scores were calculated. See section 5.5.2.

6.4.3 Checking Group Difference

To determine if there were any existing differences between the lab-based and home-based groups on baseline measures, a series of one-way analysis of variance with the groups: lab-based disclosure, lab-based writing control, lab-based control; home-based disclosure; home-based writing control and home-based control entered as the independent variables were conducted. Means and standard deviations are presented in Table 6.2. The analysis showed that the groups did not differ significantly in terms of physical symptoms (PSI) ($F_{(5, 230)} = 1.17$, $p = .327$), psychological distress (GSI) ($F_{(5, 230)} = 0.94$, $p = .454$), symptoms of depression ($F_{(5, 230)} = 0.77$, $p = .576$) or anxiety ($F_{(5, 230)} = 0.89$, $p = .491$).

Groups also did not differ in terms of intrusive ($F_{(5, 229)} = 0.74$, $p = .597$) and avoidant ($F_{(5 ,229)} = 0.39$, $p = .854$) symptoms relating to traumatic experiences. A Kruskal-Wallis one-way ANOVA indicated that the groups differed in terms of age ($\chi^2 = 11.64$, $p = .04$). Post hoc analysis showed that the lab-based control group were significantly older than all other groups (see Table 6.2 for means).

Table 6.2 Means and standard deviations for age and well-being measures at study entry for all groups.

	Group					
	Home-based Disclosure	Home-based Writing-Control	Home-based Control	Lab-based Disclosure	Lab-based Writing Control	Lab - based Control
	(n = 51)	*(n = 38)*	*(n = 55)*	*(n = 31)*	*(n = 37)*	*(n = 18)*
Age	20.24 (4.93)	19.84 (4.94)	20.65 (5.35)	19.29 (3.04)	19.76 (4.03)	23.89 (9.96)
PSI	5.04 (2.55)	4.13 (3.18)	4.56 (2.81)	4.00 (2.31)	3.86 (2.64)	4.06 (2.18)
Depression	1.00 (0.76)	0.92 (0.66)	1.09 (0.81)	1.11 (0.78)	0.97 (0.69)	0.76 (0.62)
Anxiety	0.64 (0.65)	0.56 (0.57)	0.72 (0.73)	0.59 (0.51)	0.58 (0.62)	0.39 (0.38)
GSI	0.74 (0.51)	0.68 (0.46)	0.85 (0.68)	0.78 (0.51)	0.68 (0.46)	0.59 (0.39)
Intrusion	9.00 (8.26)	9.08 (8.50)	10.26 (9.23)	12.48 (8.48)	9.54 (9.92)	9.67 (7.92)
Avoidance	9.88 (7.66)	10.95 (10.08)	11.63 (9.46)	11.85 (9.57)	9.68 (8.66)	10.89 (9.57)

Standard deviations are presented in parentheses.

6.4.4 Instruction Adherence and Content of Home-based Essays

Manipulation checks were conducted to determine if participants in the home-based writing groups had adhered to the writing instructions (results of manipulation checks

for lab-based groups are presented in see section 5.5.4). Independent sample t-tests (two-tailed) on post-writing scores on the EEQ confirmed that participants in the disclosure group rated their essays as more personal ($t_{(55.55)}$ = 10.60, p<.001, d = 2.43), more meaningful ($t_{(80)}$ = 14.01, p<.001, d = 3.07) and more revealing of their emotions ($t_{(80)}$ = 15.53, p<.001, d = 3.50) than writing controls; in addition they had wanted to talk to others about the event ($t_{(81)}$ = 3.04, p= .003, d = 0.69), and had held back from talking about the event ($t_{(80)}$ = 4.38, p<.001, d = 0.97) more than the writing control group. As further validation of participants' adherence to writing instructions, comparisons of emotional content of essays using LIWC text analysis was conducted. The percentage of positive and negative emotion word content was averaged across the three writing sessions. Independent samples t-tests (two-tailed) revealed that home-based disclosure group participants used significantly more negative emotions words ($t_{(56.82)}$ = 14.63, p<.001, d = 2.93), positive emotion words ($t_{(87)}$ = 6.78, p<.001, d = 1.49) and cognitive words ($t_{(86.25)}$ = 20.37, p<.001, d = 4.24) than control group participants in their essays. These results suggest the narratives produced by the home-based disclosure group were revealing of their emotions as per their writing task instructions and consistent with the lab-based disclosure narratives in Chapter 5.

The diversity of events disclosed by the home-based disclosure group were again consistent with those reported in other disclosure studies (e.g. Epstein, Sloan & Marx, 2005). The variety of events disclosed at the first writing session included the death of a close family member or friend (27.5%); serious illness or accident involving self, close friend or family member (27.5%); breakdown of parent's marriage (11.8%); break-up of a relationship (9.8%); physical or sexual abuse (7.8%) coming to university (3.9%); suicide attempt (3.9%); and bullying (3.9%). Of the 51 home-based disclosure group participants 28 wrote about the same event at each session and 23 wrote about different events over the three sessions.

6.4.5 Post-Writing Arousal

Two separate 2 x 2 x 3 mixed design analysis of variance (ANOVA) were performed to assess the effects for the Independent Variables (IVs), *context* (home vs. lab), *condition* (disclosure vs. control) and *session* (writing session 1, 2, & 3) on post-writing affective arousal as measured by negative affect (NA) and positive affect (PA). Means and standard deviations across groups are presented in Table 6.3. For NA, analysis indicated an overall main effect for condition ($F_{(1, 145)}$ = 50.86, p <.001, η^2 = .26[24]), such

[24] Reported effect sizes (η^2) represent *partial* eta squared.

that participants in the disclosure groups reported higher levels of negative affect overall immediately after writing compared to those who wrote about their plans for the day/week (means 18.70 and 12.44 respectively).

Table 6.3 Mean affect scores post-writing as a function of context, group and session.

		Group			
		Disclosure		Writing-Control	
		Home (n =45)	Lab (n =32)	Home (n =35)	Lab (n =37)
Post-Session NA	WS 1	21.53 (9.40)	16.91 (5.58)	12.06 (3.50)	12.11 (3.97)
	WS 2	20.78 (8.60)	17.50 (8.00)	12.26 (3.19)	13.92 (5.87)
	WS 3	19.42 (8.76)	16.03 (6.88)	12.46 (2.99)	11.81 (2.51)
	Overall means	20.10 (7.53)	16.81 (5.60)	12.32 (1.85)	12.61 (3.14)
Post Session PA	WS 1	22.53 (8.95)	21.09 (6.94)	23.89 (7.36)	21.89 (6.63)
	WS 2	20.07 (8.30)	21.78 (7.27)	21.97 (7.94)	21.43 (7.27)
	WS 3	21.36 (7.83)	20.78 (8.38)	24.00 (9.47)	20.70 (6.65)
	Overall means	21.22 (6.99)	21.22 (6.21)	23.01 (6.99)	21.34 (5.02)

A marginally significant main effect of context ($F_{(1, 145)} = 3.77$, $p = .055$, $\eta^2 = .03$) suggested that home-based participants experienced higher levels of NA post-writing than those who wrote in the lab. These main effects were, however, moderated by a significant interaction between context and condition ($F_{(1, 145)} = 5.51$, $p = .020$, $\eta^2 = .04$), which was followed-up with post hoc comparisons. An independent T-test (two-tailed) confirmed that the home-based disclosure participants reported higher levels of NA post-writing than their lab-based counterparts ($t_{(81)} = 2.12$, $p = .037$, $d = 0.51$). No significant within-participant main effect of writing session for NA ($F_{(2, 290)} = 2.63$, $p = .074$) or interactions between writing session and context ($F_{(2, 290)} = 1.15$, $p = .318$), writing session and condition ($F_{(2, 290)} = 1.17$, $p = .313$) or writing session by context by condition ($F_{(2, 290)} = 0.67$, $p = .515$) emerged.

For PA there was no significant between-participants main effect for context ($F_{(1, 145)}$ = 0.94, p = .335) or condition ($F_{(1, 145)}$ = 0.98, p = .323) and no significant interaction between context and condition ($F_{(1, 145)}$ = 0.76, p = .384). There was no within-participant main effect for writing session ($F_{(2, 290)}$ = 1.33, p = .265) and no significant within-participant interactions between writing session and context ($F_{(2, 290)}$ = 2.37, p = .095), writing session and condition ($F_{(2, 290)}$ = 0.08, p = .925) or writing session by context by condition ($F_{(2, 290)}$ = 0.40, p = .674).

6.4.6 Longer-term Effects of Writing

To examine for any differences in well-being as a function of condition and study context a 3-way mixed ANOVA was conducted with *context* (home-based vs. lab-based) and *condition* (disclosure writing vs. control writing vs. non-writing control) as between-participant variables and *assessment period* (baseline, 2-week post writing and 6-week post writing) as the within-participant variable, separately for PSI, depression, anxiety, GSI, avoidance and intrusion. The means and standard deviations for outcome measures as a function of group and time of assessment are presented in Table 6.4.

6.4.6.1 Physical symptoms

Analysis of PSI scores showed no significant between group main effects for condition ($F_{(2, 223)}$ = 1.34, p = .264), study context ($F_{(1, 223)}$ = 0.96, p = .327), or for the interaction between condition and context ($F_{(2, 223)}$ = 0.08, p = .925). A significant within group main effect of time for self reported physical symptoms ($F_{(1.93, 430.34)}$ = 3.29, p = .04, η^2 = .03) indicated an overall change in physical symptoms for the sample. Pairwise[25] comparisons indicated that physical symptoms increased from baseline to 2-week assessment (p = .02, d = 0.14) and then decreased from 2-week to 6-week assessment (p = .047, d = 0.10) to a level that was not different from baseline (p = .508). No interaction effects emerged between time and context ($F_{(1.93, 430.34)}$ = 0.98, p = .382), between assessment period and condition ($F_{(3.86, 430.34)}$ = 0.54, p = .702) or assessment period by context by condition ($F_{(3.86, 430.34)}$ = 0.24, p = .910).

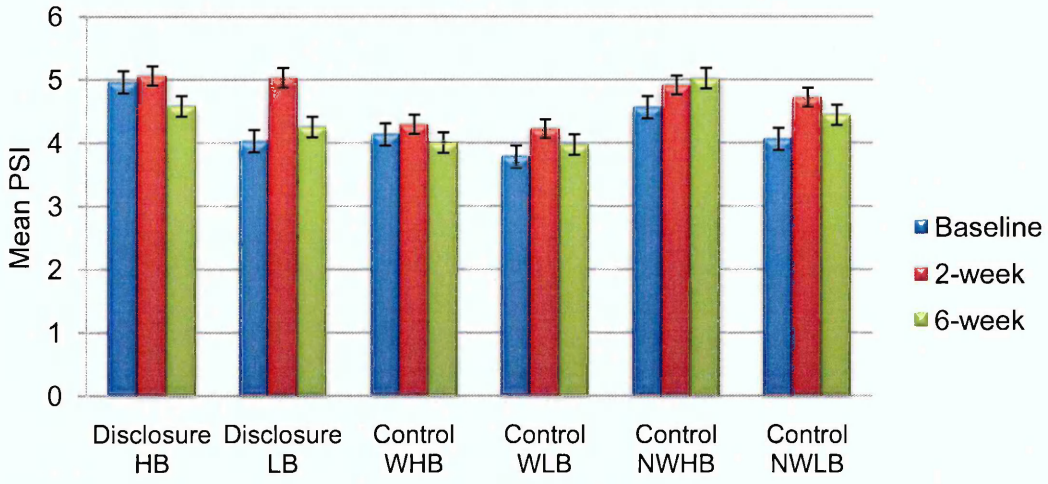
[25] All within-participant post-hoc procedures are conducted using least-significant difference (LSD) pairwise comparisons.

Table 6.4 Means and standard deviations for all outcome variables as a function of context and condition for baseline, 2-weeks post writing and 6-week post writing assessment.

			Physical Symptoms		SCL-90 Symptom Dimensions						Impact of Event Scale Dimensions				
			PSI		DEP		ANX		GSI		Intrusion		Avoidance		
	n		*M*	*SD*	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*n*	*M*	*SD*	*M*	*SD*
Disclosure																
Home-based	*50*	B/line	4.96	2.51	*51*	1.00	0.76	0.64	0.64	0.74	0.51		9.00	8.40	9.81	7.52
		2-week	5.06	2.80		1.01	0.76	0.58	0.59	0.73	0.55	*47*	8.32	9.47	9.57	9.95
		6-week	4.58	3.21		0.84	0.82	0.57	0.68	0.65	0.60		8.02	9.62	9.43	5.89
Lab-based		B/line	4.03	2.28		1.11	0.77	0.60	0.51	0.78	0.50		12.48	8.48	11.85	9.57
	32	2-week	5.03	2.80	*32*	1.00	0.66	0.51	0.58	0.70	0.47	*31*	10.06	9.43	11.81	10.54
		6-week	4.25	2.63		0.82	0.68	0.40	0.42	0.54	0.45		9.71	9.36	10.97	10.04
Writing Control																
Home-based	*38*	B/line	4.13	3.18	*38*	0.92	0.66	0.56	0.57	0.68	0.46		9.00	8.60	10.51	9.85
		2-week	4.29	3.20		0.79	0.62	0.42	0.40	0.58	0.42	*37*	9.11	9.55	11.27	10.78
		6-week	4.00	2.75		0.78	0.57	0.48	0.65	0.55	0.43		7.68	8.93	9.35	9.94
Lab-based		B/line	3.78	2.62		0.97	0.69	0.58	0.62	0.68	0.46		9.72	1.00	9.72	8.78
	36	2-week	4.22	2.67	*37*	0.65	0.48	0.36	0.37	0.49	0.32	*36*	9.14	8.45	9.36	9.56
		6-week	3.97	2.21		0.56	0.49	0.28	0.35	0.43	0.38		7.97	8.00	9.08	9.33
Non-Writing Control																
Home-based	*55*	B/line	4.56	2.81	*55*	1.09	0.81	0.71	0.73	0.85	0.68		10.26	9.23	11.63	9.46
		2-week	4.91	3.06		1.08	0.89	0.61	0.75	0.77	0.68	*55*	9.13	9.75	10.95	10.16
		6-week	5.02	3.31		0.96	0.86	0.58	0.77	0.71	0.69		8.84	9.39	9.40	9.66
Lab-based		B/line	4.06	2.18		0.76	0.62	0.39	0.37	0.59	0.39		9.67	7.92	10.89	9.57
	18	2-week	4.72	2.40	*18*	0.68	0.64	0.37	0.43	0.53	0.41	*18*	9.06	10.46	8.67	9.42
		6-week	4.44	3.09		0.79	0.88	0.32	0.46	0.55	0.51		9.61	12.03	10.11	10.48

Figure 6.2 illustrates changes in physical symptoms for each group at each assessment period.

Figure 6.2 PSI scores for groups by assessment period.



Key: HB = Home-based, LB = Lab-based. WHB = Writing home-based, WLB = Writing lab-based, NWHB = Non-writing home-based, NWLB = Non-writing lab-based.

6.4.6.2 Psychological distress

An examination of the group means (Table 6.4) suggests a reduction in symptoms of depression, anxiety and psychological distress (GSI) from baseline to 2-week follow-up and again at 6-week follow-up, these changes are illustrated in Figure 6.3. Depression scores did not differ between conditions ($F_{(2, 225)}$ = 1.62, p = .200) or context ($F_{(1, 225)}$ = 1.95, p = .164) and no significant interaction between condition and context emerged ($F_{(2, 225)}$ = 1.06, p = .349). A significant main effect of assessment period for depression scores ($F_{(1.78, 400.92)}$ = 9.43, p<.001, η^2 = .04) followed up with pairwise comparisons confirmed that symptoms reduced from baseline to 2-week assessment (p = .018, d = 0.14) and again from 2-week to 6-week assessment (p= .031, d = 0.12). None of the interaction effects for depression between assessment period and context ($F_{(1.78, 400.92)}$ = 1.24, p = .289), assessment period and condition ($F_{(3.56, 400.92)}$ = 2.07, p = .093) or assessment period by context by condition ($F_{(3.56, 400.92)}$ = 1.16, p = .327) reached statistical significance suggesting that this improvement was independent of condition or context of study.

Figure 6.3 Depression scores for groups by assessment period.

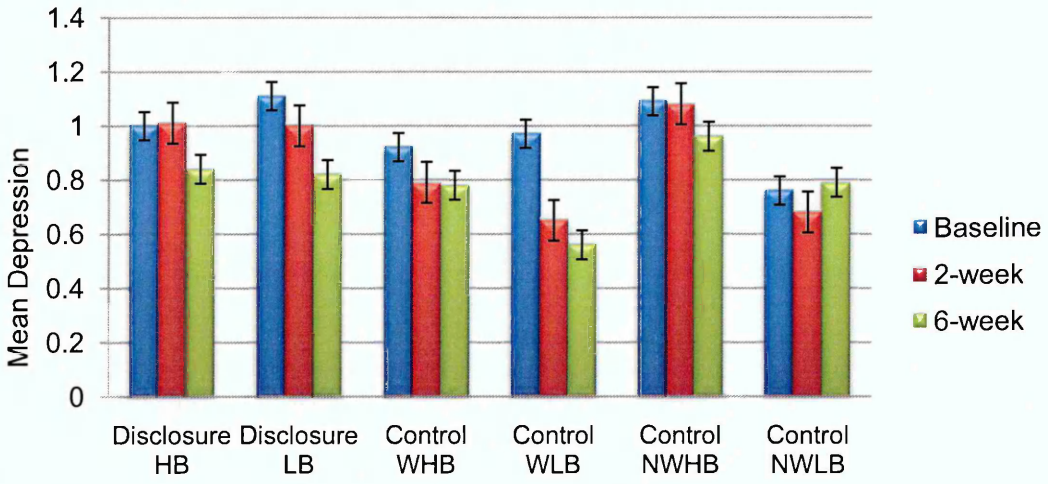


Figure 6.4 Anxiety scores for groups by assessment period.

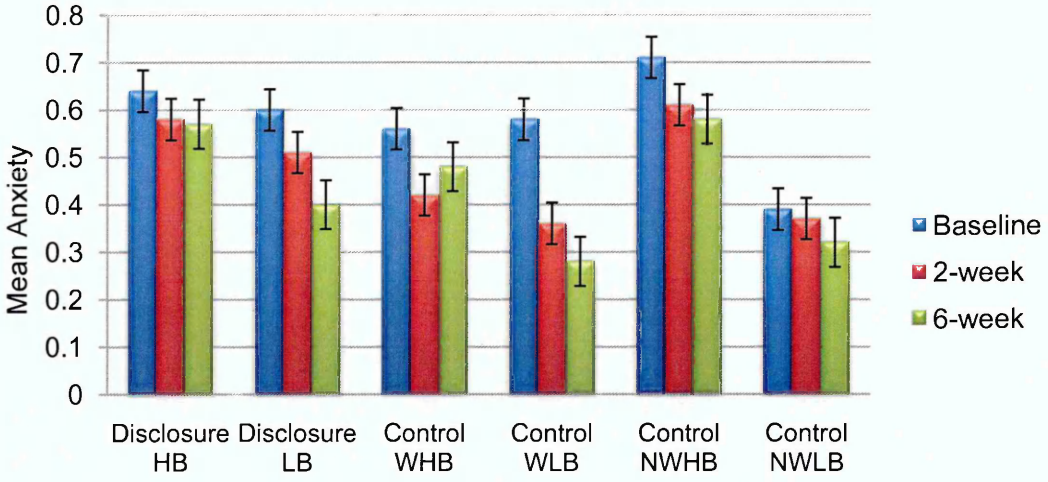
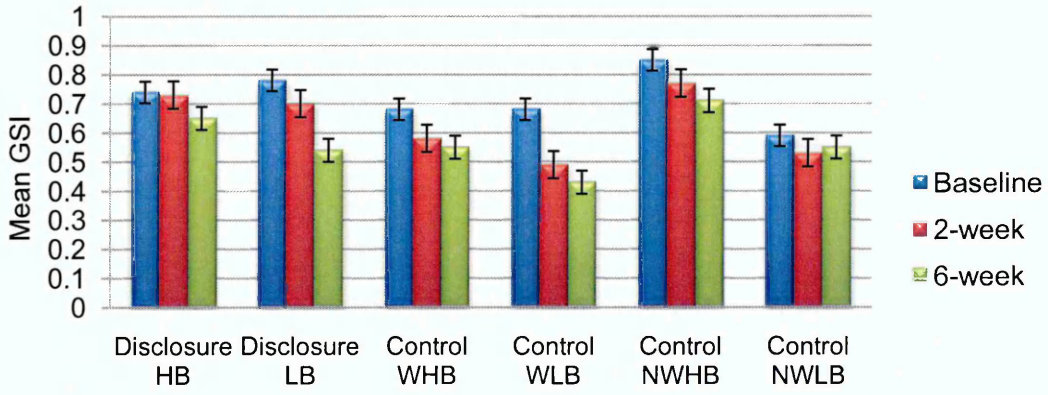


Figure 6.4 illustrates symptoms of anxiety at each assessment period. Symptoms of anxiety did not differ between conditions ($F_{(2, 225)} = 0.74$, $p = .479$) but a significant main effect of context ($F_{(1, 225)} = 4.19$, $p = .042$, $\eta^2 = .02$) suggested that overall home-based participants reported more symptoms of anxiety than the lab-based participants (means 0.58 and 0.43 respectively). There was no interaction between condition and context

($F_{(2, 225)}$ = 0.63, p = .533). A significant main effect of assessment period suggested that symptoms of anxiety changed over the study period ($F_{(1.74, 390.87)}$ = 8.20, p = .001, η^2 = .04). Pairwise comparisons indicated that anxiety symptoms reduced from baseline to 2-week assessment (p = .005, d = 0.18) but did not differ significantly between the 2-week and 6-week assessment (p = .211) although anxiety symptoms remained significantly lower at 6-week assessment than reported at baseline (p = .001, d = 0.23). No significant within group interaction effects were observed between assessment period and context ($F_{(1.74, 390.87)}$ = 0.96, p = .373), assessment period and condition ($F_{(3.47, 390.87)}$ = 0.59, p = .647) or assessment period by context by condition ($F_{(3.47, 390.87)}$ = 0.62, p = .623).

GSI scores did not differ between conditions ($F_{(2, 225)}$ = 1.35, p = .261) or context of study ($F_{(1, 225)}$ = 2.57, p = .110). There was no significant interaction between context and condition ($F_{(2, 225)}$ = 0.67, p = .513). Similarly to depression and anxiety, GSI scores reduced across the study period for all groups (see Figure 6.4) as indicated by a significant main effect of assessment period ($F_{(1.76, 395.69)}$ = 13.48, p<.001, η^2 = .06). Pairwise comparisons confirmed a significant reduction in GSI scores from baseline to 2-week assessment (p = .003, d = 0.15) and a further significant reduction was seen again at the 6-week assessment (p=.0.01, d = 0.13). Again there were no significant interaction effects between assessment period and condition ($F_{(3.52, 395.69)}$ = 1.21, p = .306), assessment period and context ($F_{(1.76, 395.69)}$ = .63, p = .513) or assessment period by context by mode ($F_{(3.52, 395.69)}$ = 0.91, p = .449).

Figure 6.5 GSI Scores for groups by assessment period.



Overall, results indicate that there were significant improvements in psychological well-being across the study, these improvements, however, were independent of condition and context. This improvement in well-being did not extend to physical symptoms which significantly increased between baseline and 2-week follow-up assessment before returning to baseline levels at 6-week follow-up. The means and standard deviations based on main effects of time for all outcome variables are presented in Table 6.5.

6.4.6.3 Symptoms of intrusion and avoidance

Examination of the mean scores for intrusion indicated a gradual reduction in intrusive thoughts across the study in all but two of the groups, a reduction at 2-week assessment for the lab-based control group was followed by a return to baseline levels at 6-week assessment and home-based writing control group showed a slight increase at 2-week assessment followed by a reduction at 6-week assessment to below baseline levels. No significant between group effects for condition ($F_{(2, 218)} = 0.22$, $p = .802$) or study context ($F_{(1, 218)} = 0.63$, $p = .427$) emerged. The interaction between context and condition was not significant ($F_{(2, 218)} = 0.42$, $p = .660$).

Table 6.5 Means and standard deviations collapsed across groups for main effect of time with F Tests and effect sizes for all outcome variables.

		Baseline	2-Week Post Writing	6-Week Post Writing	*F*	*P*=	η^2
PSI	*M*	4.34[a]	4.73[ab]	4.43[b]	3.29	**.04**	.02
	SD	2.68	2.88	2.93			
DEP	*M*	1.00[ab]	0.90[a]	0.81[ab]	9.43	**<.001**	.04
	SD	.74	0.73	0.74			
ANX	*M*	0.61[a]	0.50[a]	0.47	8.20	**.001**	.04
	SD	0.62	0.57	0.61			
GSI	*M*	0.74[a]	0.65[a]	0.59[a]	13.48	**<.001**	.06
	SD	0.53	0.52	0.55			
Intrusion	*M*	9.96	9.08	8.52	2.83	.066	.01
	SD	8.86	9.38	9.31			
Avoidance	*M*	10.73	10.39	9.62	1.39	.25	.01
	SD	9.01	9.87	9.47			

Note: Means with the same superscript are different at the .05 level

The within-group main effect for assessment period failed to reach significance ($F_{(1.81, 394.07)} = 2.83$, $p = .066$, $\eta^2 = .01$) and no significant interactions emerged between

assessment period and context ($F_{(1.81,\ 394.07)}$ = 0.15, p = .844), assessment period and condition ($F_{(3.62,\ 394.07)}$ = 0.42, p = .773) or assessment period by context by condition ($F_{(3.62,\ 394.07)}$ = 0.30, p = .858).

Similarly, the pattern of means for avoidance suggested that all but the lab-based control and lab-based writing control groups experienced increases in avoidance at follow-up. Again, avoidance scores did not significantly differ between conditions ($F_{(2,\ 218)}$ = 0.13, p = .879) or context of study ($F_{(1,\ 218)}$ = 0.003, p = .959). There was no significant interaction between context and condition ($F_{(2,\ 218)}$ = 0.70, p = .498). Within-group analysis showed that avoidance did not significantly change between baseline and follow-up assessments ($F_{(1.94,\ 422.54)}$ = 1.39, p = .250) and there were no interactions between assessment period and context ($F_{(1.94,\ 422.54)}$ = 0.60, p = .545), assessment period and condition ($F_{(3.88,\ 422.54)}$ = 0.35, p = .842) or assessment period by context by condition ($F_{(3.88,\ 422.54)}$ = 0.39, p = .808).

6.4.7 Language Analysis

In order to determine if context had a differential effect on the production of emotional narratives in terms of content, analysis of the number of words produced and the percentage of positive emotion, negative emotion and cognitive words within disclosure group narratives was conducted using a 2-way mixed ANOVA with *context* (home and lab) as the between-group variable and *writing session* (session 1, session 2 and session 3) as the within-group variables. The means and standard deviations for the linguistic indices are presented in Table 6.6. Context had a significant effect on the number of words produced in the trauma narratives ($F_{(1,\ 80)}$ = 5.39, p = .023, η^2 = .06), the means indicated that home-based participants produced fewer words than their lab-based counterparts. A significant main effect for writing session ($F_{(1.84,\ 147.30)}$ = 29.77, p<.001, η^2 = .27) suggested that there was a significant difference in the number of words produced across writing sessions irrespective of context. Pairwise comparisons confirmed that the number of words produced reduced from the first to the second session (p = .006, d = 0.26), and again at the final session (p <.001, d = 0.41). There was no significant interaction between session and study context $F_{(1.84,\ 147.30)}$ = 0.60, p = .538).

Context of study also appeared to have an impact on the number of positive emotion words in the narratives ($F_{(1,\ 80)}$ =4.05, p = .057, η^2 = .05) with home-based participants using a higher percentage of positive emotion words in their writing than lab-based

participants. The means also indicated an increase in the percentage of positive emotion words used across the writing sessions which was confirmed by a significant within-group main effect ($F_{(1.83, 146.52)} = 4.53$, $p = .015$, $\eta^2 = .05$). Although the use of positive emotion words remained stable from writing session one to session two ($p = .616$), at session three all participants used significantly more positive emotion words than at session one ($p = .013$, $d = 0.35$) and session two ($p = .026$, $d = 0.31$). There was no significant interaction between session and study context ($F_{1.83, 146.52)} = 0.29$, $p = .728$). Conversely, the use of negative emotion words did not differ between contexts ($F_{(1, 80)} = 0.01$, $p = .910$). Analysis did reveal a difference in the use of negative emotion words across writing sessions ($F_{(2, 160)} = 3.49$, $p = .033$, $\eta^2 = .04$). Pairwise comparisons indicated that this effect was due to a reduction in the use of negative emotion words from session two to session three ($p = .030$, $d = 0.22$). There was no interaction effect between session and context ($F_{(2, 160)} = 2.09$, $p = .127$).

Table 6.6 Means and standard deviations for word count and total percentage of positive emotion, negative emotion and cognitive process words of disclosure group essays.

		Home-based Writing (n = 52)				*Lab-based Writing (n = 32)*			
		WS 1	WS 2	WS 3	*Mean Total*	WS 1	WS 2	WS 3	*Mean Total*
Word Count	*M*	385.20	351.84	310.00	350.71	442.47	417.84	352.53	404.28
	SD	100.85	119.43	124.59	102.75	130.82	99.52	138.54	108.39
Pos. emotion words (%)	*M*	1.98	1.93	2.34	2.07	1.47	1.65	1.98	1.70
	SD	1.06	1.12	1.34	0.88	0.77	1.05	1.43	0.77
Neg. emotion words (%)	*M*	3.36	3.46	3.28	3.45	3.75	3.56	2.88	3.40
	SD	1.45	1.82	1.67	1.42	1.50	1.63	1.52	1.19
Cognitive Words (%)	*M*	8.08	8.46	8.30	8.28	7.90	8.13	8.13	8.06
	SD	2.08	2.16	2.43	1.52	1.91	2.10	2.67	1.42

WS = writing session

Finally, the use of cognitive words did not differ between contexts ($F_{(1, 80)} = 0.44$, $p = .508$) or writing sessions ($F_{(2, 160)} = 0.46$, $p = .630$). There was no significant interaction between session and context ($F_{(2, 160)} = 0.03$, $p = .966$).

6.4.7.1 Language use as a predictor of outcome

As was done in Chapter 5, regression analyses were used to establish if changes in word use across the writing sessions in the disclosure groups were predictive of changes in well-being. The previous analysis of word use across contexts and sessions (section 6.4.7) indicated that home-based participants used significantly more positive emotion words in their writing than lab-based participants overall. However, increases in positive word use across the writing sessions were not differentiated by context. Therefore, as in Chapter 5, disclosure groups (home-based and lab-based) were collapsed into one group for the regression analysis. Hierarchical linear regressions were conducted separately for the 2-week and 6-week assessment on each of the outcome variables (PSI, depression, anxiety, GSI, intrusion and avoidance). The baseline value of the dependent variable was entered in the first step of the regression as a control. The change scores for the word categories; negative emotion, positive emotion and cognitive mechanisms were entered together at the second step as in Chapter 5.

Results from the hierarchical regression analyses are summarized in Table 6.7 and Table 6.8. The analysis showed that at 2-week follow-up a change in the use of negative emotion words ($\beta = .29$, $t = 3.49$, $p = .001$) and cognitive mechanism words ($\beta = -.23$, $t = -2.75$, $p = .007$) significantly predicted anxiety scores after controlling for baseline levels of anxiety. Those who used less negative emotion words and more cognitive mechanism words at writing session three compared to writing session one had fewer symptoms of anxiety at 2-week assessment. An increase in the use of cognitive mechanism words across the writing sessions also predicted a reduction in symptoms of depression ($\beta = -.19$, $t = -2.08$, $p = .041$), psychological distress (GSI; $\beta = -.20$, $t = -2.35$, $p = .021$) and intrusion ($\beta = -.21$, $t = -2.08$, $p = .041$) at 2-week follow-up after controlling for baseline levels (all regression analysis for outcome measures at 2-week follow-up are summarized in Table 6.7). Changes in word use did not predict scores on the avoidance and PSI measures at 2-week follow-up.

Table 6.7 Summary of Hierarchical Regression Analyses for outcome variables at 2-week assessment.

		Step1			Step 2		
Variable	Predictors	*B*	*SE B*	*β*	*B*	*SE B*	*β*
PSI	PSI (baseline)	0.61	0.10	**.55****	0.61	0.11	**.54****
	Neg. Emotion Change				0.02	0.13	.01
	Pos. Emotion Change				-0.02	0.18	-.01
	Cognitive Change				-0.03	0.09	-.03
	R^2		0.30			0.30	
	ΔR^2		-			0.001	
Depression	Depression (baseline)	0.56	0.09	**.59****	0.53	0.08	**.56****
	Neg. Emotion Change				0.05	0.03	.16
	Pos. Emotion Change				0.03	0.04	.06
	Cognitive Change				-0.05	0.02	**-.19***
	R^2		0.35			0.40	
	ΔR^2		-			0.05	
Anxiety	Anxiety (baseline)	0.61	0.09	**.62****	0.57	0.08	**.58****
	Neg. Emotion Change				0.08	0.02	**.29****
	Pos. Emotion Change				-0.01	0.03	-.03
	Cognitive Change				-0.05	0.02	**-.23****
	R^2		0.38			0.50	
	ΔR^2		-			0.12	
GSI	GSI (baseline)	0.67	0.09	**.65****	0.64	0.09	**.62****
	Neg. Emotion Change				0.03	0.02	.14
	Pos. Emotion Change				0.02	0.03	.04
	Cognitive Change				-0.04	0.02	**-.20***
	R^2		0.43			0.47	
	ΔR^2		-			0.05	
Intrusion	Intrusion (baseline)	0.48	0.11	**.43****	0.46	0.11	**.41****
	Neg. Emotion Change				0.29	0.46	.06
	Pos. Emotion Change				0.37	0.63	.06
	Cognitive Change				-0.69	0.33	**-.21***
	R^2		0.19			0.23	
	ΔR^2		-			0.05	
Avoidance	Avoidance (baseline)	0.66	0.11	**.55****	0.62	0.12	**.52****
	Neg. Emotion Change				0.23	0.48	.05
	Pos. Emotion Change				0.90	0.66	.13
	Cognitive Change				-0.47	0.34	-.13
	R^2		0.30			0.33	
	ΔR^2		-			0.03	

*p < .05. **p < .01.
N = 83 for PSI, depression, anxiety and GSI; N = 81 for intrusion and avoidance

Table 6.8 Summary of Hierarchical Regression Analyses for outcome variables at 6-week assessment.

Variable		Step1			Step 2		
		B	*SE B*	*β*	*B*	*SE B*	*β*
PSI	PSI (baseline)	0.67	0.11	**.55****	0.67	0.12	**.55****
	Neg. Emotion Change				0 .02	0.14	.01
	Pos. Emotion Change				0.08	0.19	.04
	Cognitive Change				-0.02	0.10	-.02
	R^2		0.31			0.31	
	ΔR^2		-			0.002	
Depression	Depression (baseline)	0.71	0.08	**.71****	0.68	0.09	**.68****
	Neg. Emotion Change				0 .07	0.03	**.18***
	Pos. Emotion Change				0.04	0.04	.08
	Cognitive Change				-0.03	0.02	-.13
	R^2		0.50			0.54	
	ΔR^2		-			0.04	
Anxiety	Anxiety (baseline)	0.63	0.09	**.64****	0.60	0.08	**.60****
	Neg. Emotion Change				0 .08	0.02	**.28****
	Pos. Emotion Change				0.01	0.03	.01
	Cognitive Change				-0.04	0.02	**-.19***
	R^2		0.40			0.50	
	ΔR^2		-			0.10	
GSI	GSI (baseline)	0.76	0.09	**.69****	0.72	0.09	**.67****
	Neg. Emotion Change				0.04	0.02	.15
	Pos. Emotion Change				-0.01	0.03	-.02
	Cognitive Change				-0.03	0.02	-.15
	R^2		0.48			0.52	
	ΔR^2		-			0.04	
Intrusion	Intrusion (baseline)	0.54	0.11	**.48****	0.51	0.11	**.46****
	Neg. Emotion Change				1 .37	0.99	.25
	Pos. Emotion Change				0.22	0.64	.04
	Cognitive Change				-0.46	0.33	-.14
	R^2		0.23			0.27	
	ΔR^2		-			0.02	
Avoidance	Avoidance (baseline)	0.56	0.11	**.51****	0.54	0.11	**.50****
	Neg. Emotion Change				0.58	0.44	.13
	Pos. Emotion Change				-0.10	0.62	-.02
	Cognitive Change				-0.02	0.32	-.01
	R^2		0.26			0.28	
	ΔR^2		-			0.02	

*p < .05. **p < .01.
N = 83 for PSI, depression, anxiety and GSI; N = 81 for intrusion and avoidance

Table 6.8 presents the results of the regression analysis for the outcome variables assessed at 6-week follow-up. As was found at 2-week follow-up, those who used less negative emotion words (β = .28, t = 3.43, p = .001) and more cognitive mechanism words (β = -.19, t = -2.36, p = .021) at writing session three compared to writing session one had fewer symptoms of anxiety at 6-week follow-up. A decrease in negative emotion words significantly predicted a reduction in depressive symptoms at 6-weeks after controlling for baseline levels (β = .18, t = 2.26, p = .027). Changes in word use did not significantly predict scores for any other outcome variables at 6-week follow-up[26] (non-significant findings are not reported here, SPSS outputs for all hierarchical regressions can be found in Appendix A.12).

6.5 Discussion

Writing about traumatic or stressful events was not directly associated with improvements in physical or psychological well-being. All study participants reported a reduction in depressive symptoms and psychological distress (GSI) from baseline to the 2-week post writing follow-up and again at the 6-week post writing follow-up. Anxiety symptoms improved between baseline and 2-week follow-up and remained stable at 6-week follow-up. All participants reported an increase in physical symptoms from baseline assessment to 2-week follow-up, by the 6-week assessment reporting of physical symptoms had returned to baseline levels. Home-based participants reported having more symptoms of anxiety overall across the study period, yet the improvements seen on the psychological well-being measures across the study were not differentiated by study context.

Assessment of post-writing mood indicated that negative mood was significantly higher in the disclosure groups than the writing control groups, which corresponds with the highly emotional and personal nature of the topics that trauma group participants wrote about and is consistent with the literature (see section 2.3.3.1). However, the home-based disclosure group reported experiencing more negative mood following writing than the lab-based disclosure group. Whilst this finding might suggest that home-based participants were better able to emotionally engage with the task than their lab-based counterparts, the pattern of linguistic content in the disclosure narratives does not reflect this differentiation between the contexts (negative emotion word content of lab and home based narratives were equivalent). However, it is suggested here that perhaps a more plausible explanation is that those in the lab, who wrote not only under

[26] Analysis of the writing-control group data did not find these patterns of change.

the supervision of the experimenter but in the presence of their peers, may have felt it necessary to regulate the emotions evoked by disclosure compared to disclosure participants afforded the privacy of the home environment. The lab-based context of this study is not exactly equivalent to that of the lab-based protocol described and advocated by Pennebaker (1994). In order to maximise recruitment, and save time and resources, participants completed the study in timetabled classroom sessions. Writing in a solitary environment has been found to produce larger psychological effect sizes in the long-term, compared to writing in the presence of an audience (Frattaroli, 2006), irrespective of the differences found in the short-term between lab-based and home-based disclosure groups this study did not find that context moderated the longer-term effects of disclosure (see section 3.6.2 for a discussion of audience effects). The level of post-writing distress did not diminish significantly across writing sessions although there was a trend towards an overall reduction, though the level of post-writing distress experienced by participants is not thought to be related to subsequent changes in health (Smyth, 1998).

Consistent with the writing instructions given, the linguistic content of disclosure essays were more emotionally valenced than those produced by the writing control group as indicated by the relative percentage of negative emotion and positive emotion words in the narratives. Disclosure group essays were also differentiated from those produced by control groups in the content of words that represented cognitive processes, such as words relating to insight and causation. The percentage of negative emotion words in the disclosure narratives reduced at each writing session and the positive emotion words significantly increased by the third writing session. Previous research has found this pattern of emotion word change to predict improved health (Pennebaker, Mayne & Francis, 1997), in particular that positive emotion words are linearly related to health (Pennebaker & Francis, 1996; see section 2.4.5.3). However, in this study positive emotion word change did not predict improvements on any of the physical and psychological measures. Consistent with the findings in Chapter 5, a reduction in negative emotion words predicted a reduction in symptoms of anxiety. Improvements in anxiety were also predicted by an increase in cognitive mechanism words, these changes in word use influenced anxiety symptoms at the 2-week and 6-week follow-up. Additionally, an increase in the use of cognitive mechanism words predicted a reduction in intrusive thoughts and a reduction in depressive symptoms and psychological distress at 2-week follow-up but not 6-week follow-up. A reduction in depressive symptoms at 6-week follow-up was predicted by a reduction in negative emotion words but not by cognitive mechanism words (as at 2-weeks). Consistent with

other findings (Pennebaker et al., 1997; Ulrich & Lutgendorf, 2002; Warner et al., 2006) these results highlight the benefits of both emotional and cognitive processing in disclosure.

The difference in word count between home-based and lab-based disclosure narratives suggests that home-based participants wrote fewer words overall, although the number of words produced in both disclosure groups reduced over the three writing sessions. It is possible that home-based participants did not strictly adhere to the 15 minute timing of the writing session as was instructed. To counter this some studies have contacted participants via telephone at designated times to remind them when to start writing and followed this with a return call to tell them when to stop (Vedhara et al., 2007; Wetherell et al., 2005). Additionally, attrition from the study was found to be higher in the lab-based groups than the home-based group with over 60 per cent of lab-based participants failing to complete the study (compared to 45% in the home-based condition). However, this is likely related to non-attendance at class rather than actual withdrawal from the study. Withdrawal from the home-based groups in this study was also higher than that reported by other home-based studies in student samples (Langens & Schüler, 2005; Ullrich & Lutgendorf, 2002).

The finding that changes in psychological well-being were not moderated by context is promising for the applicability of disclosure writing outside of the laboratory. Although, the reporting of anxiety was higher in the home-based groups, an overall reduction from baseline to 2-week follow-up across all groups was seen. The fact that changes in psychological well-being were not differentiated by condition in the home-based sample is comparable to that seen in Chapter 5 from which the lab-based participants were drawn. It seems plausible that these changes could represent a gradual adjustment to university. Though this idea was rejected as a possible explanation for the findings of Chapter 5, unlike the lab-based sample, the home-based sample were recruited at the beginning of the first semester with the final follow-up assessment being completed just prior to Christmas break and as such students would arguably have been looking forward to their first break from studies and for some an eagerly anticipated return to their families. Additionally, as discussed in some detail in Chapter 5, previous studies have reported improvements in psychological well-being in study participants that is not differentiated by writing condition (Horneffer & Jamison, 2002; Marlo & Wagner, 1999). Contrary to the findings in Chapter 5; the non-writing control groups experienced the same reduction in psychological symptoms as the two writing groups.

The deterioration in physical health at 2-week follow-up is similar to that reported by Sheffield et al. (2002), however this deterioration was not differentiated by context, and was seen in all groups. This increase in the reporting of physical symptoms is not unusual in the disclosure literature. This is especially so in studies with generally healthy student samples, where symptoms are assessed using self-report measures (Greenberg & Stone, 1992; Kloss & Lisman, 2002; Park & Blumberg, 2002). As this deterioration in physical health was not differentiated by experimental condition it is likely that this finding represents a seasonal change in the health status associated with coming to university (University of Bath, 2008).

6.5.1 Discussion of Findings for Chapters 5 and 6

A common aim of Chapter 5 and Chapter 6 was to replicate the findings of previous work that have found the written expression of thoughts and feelings relating to traumatic events to be beneficial in improving both psychological and physical well-being. The finding that symptoms of depression, anxiety and psychological distress (GSI) improved within all groups with the exception of the non-writing control group in Chapter 5 was unexpected but not unique. Considering these unexpected findings in both studies, one possible explanation that needs to be considered is that the results were confounded by response expectancy effects (Kirsch, 1985) and the mere suggestion that there may be a relationship between writing and health, as was communicated to participants via the information sheet at recruitment, could account for the direction of psychological change in participants. According to response expectancy theory, response expectancy is the anticipation of one's own non-volitional reaction to a specific event or behaviour, including emotional reactions, that are self-fulfilling, that is they tend produce the expected effect (Kirsch, 1985). Response expectancies are an important determinant of the placebo effect (Kirsch, 1997), more specifically and of particular importance to the findings in Chapter 5, response expectancies have been shown to have a direct effect on depressive symptoms in undergraduate students (Kirsch, Mearns & Catanzaro, 1990). Kirsch et al. (1990) found that the best single predictor of depression scores was coping expectancy, that is, the belief that the use of various coping strategies would make them feel better. Surprisingly, the frequency with which active coping strategies were used was not related to levels of depression, suggesting that the expectancy of feeling better may be sufficient to make you feel better independent of the behaviour on which the expectancy is predicted (Kirsch et al., 1990). It is conceivable then that in studies one and two the mere suggestion that there is a relationship between writing and well-being

that was expressed to the writing groups may have led participants to expect some positive outcome from their participation, thus creating positive response expectancy and consequently a reduction in symptoms. Problematic for this explanation is that the non-writing control groups did not write and should not therefore have had such expectancies. However, non-writing control groups were told that their involvement in the study was necessary to understand how well-being changes over time, thus the suggestion that the researcher was interested in 'change' may have served to produce a demand effect in these groups too.

The possibility that the effects of disclosure writing may in part depend on positive expectancies of writing is something that has recently been considered. In a study that manipulated the positive expectancies, Patterson and Singer (2007-2008) found that women who were given the expectancy that writing about trauma would be beneficial for their physical and psychological well-being reported a reduction in symptoms of interpersonal sensitivity and psychoticism at one month follow-up, participants who were given expectancies in the control group did not report any reduction in symptoms at follow-up. However, control participants who were not given expectancy information also reported a reduction in symptoms of psychoticism. Additionally, participants who were told that they could expect beneficial effects from the writing task (control and disclosure) reported having similar expectations of the possible positive or negative effects of the task as those who were not given expectancy information, thus suggesting the manipulation of positive expectancies was not successful. Conversely, Langens and Schüler (2007) found that writing about emotional events induced positive expectancies and that these positive expectancies were related to improvements in physical well-being and the emotional impact of events (as assessed by the IES). However, Langens and Schüler (2007) suggest that positive expectancies do not present a sufficient condition for a change in emotional well-being as positive expectancies were not related to changes in well-being in the control group. These findings appear to challenge the suggestion that the effects found in the present study may be due to response expectancies in both the trauma and writing control groups. However, the method by which Langens and Schüler (2007) assessed expectancies, may have contributed to the direction of their findings. All participants, irrespective of the condition they were allocated to, were asked to bring to mind an emotional event and write down eight words they associated with the event, they were then asked to rate the emotional impact of this event on the IES. Whilst experimental participants went on to write about this event in detail at the subsequent intervention sessions, control participants were asked to describe their surroundings or their journey to the

venue. It was after the intervention period had finished that participants were asked to rate their expectancies associated with the writing intervention, however, all questions related to 'the upsetting experience'. Whilst these instructions would have been pertinent to the three writing sessions for the experimental group, for the control group their point of reference would have been the phase at which they wrote eight words relating to an upsetting event and not the actual intervention phase per se. It seems likely therefore that the expectancies of the two groups were different because they were rating different writing events.

Notwithstanding the outcome of studies in Chapters 5 and 6, the finding that both modality and context did not moderate this outcome is promising for the adaptation of the standard disclosure intervention to an internet-mediated protocol. Although the findings of this study raised the concern that the lack of experimenter control in studies conducted in the home environment may lead to problems with protocol adherence and high attrition it is anticipated that with the adaption to an internet-mediated protocol, the issue of timing in particular can be addressed and that the population of focus (individuals experiencing infertility) may have more motivation to continue once involved as has been found with other patient populations (van Middendorp et al., 2007; Wetherell et al., 2005).

The failure to measure pre-writing affect in studies one and two limits the interpretation of the difference seen in post-writing affect, however the fact that there were no group differences on the baseline measures of psychological well-being taken immediately preceding the first writing session adds some validity to the post-writing outcomes. Finally, the possibility that the longer-term psychological effects reported in studies one and two may in part be due to expectancy effects needs to be addressed in future studies.

6.6 Overall Summary

The findings of Chapter 5 and Chapter 6 combined, show that the modality by which participants disclose their thoughts and feelings relating to stressful and traumatic experiences and the context in which disclosure occurs does not moderate the longer-term effects of a disclosure intervention. These findings would indicate that the adaptation of the standard lab-based written protocol to one that is delivered via a computer within the context of the home is feasible.

Whilst the studies the studies in Chapter 5 and Chapter 6 were not able to replicate the findings of previous research that have found improvements in physical (e.g. Pennebaker & Beall, 1986) and psychological well-being (e.g. Epstein et al., 2005) in student samples who have written about traumatic or stressful events compared to controls who have written about neutral events, analysis of the language used by disclosure participants in their writing suggested that emotional and cognitive processing did occur in the writing sessions. A reduction in the use of negative words and increase in the use of cognitive mechanism words influenced improvements in psychological well-being in disclosure participants, a pattern of change that has been found in previous studies (e.g. Pennebaker et al., 1997). Notwithstanding these positive changes for disclosure group participants, the overall improvements seen in all participants (control and disclosure) are problematic for interpretation of the current findings. The possibility that expectancy and demand effects might account for the changes seen in control group participants needs to be addressed in the design of the subsequent study in individuals with infertility.

The principal aim of this thesis is to examine the efficacy of a written disclosure intervention for individuals experiencing infertility. Whilst the findings of Chapter 5 and Chapter 6 are not able to be generalized readily beyond a student sample, combined with the positive findings of previous home-based studies in patients with chronic conditions (see section 2.3.7.3) the prospect of developing and providing an effective computer mediated home-based disclosure intervention for individuals experiencing infertility is encouraging. As discussed in Chapter 1 the development and implementation of a study recruiting individuals with infertility attending an assisted conception unit proved to be unfeasible (see Appendix A.2 for details of the development of this study). Therefore, internet based infertility support forums were employed as an alternative method of recruitment; subsequently the intervention was adapted to be delivered via the internet. Internet-mediated research presents a number of ethical and methodological challenges. Chapter 7 presents a review of these challenges that need to be considered in the design and implementation of a web-based disclosure intervention.

Chapter 7

Internet-Mediated Research: Ethics, Methodological Issues and Interventions.

7.1 Overview

The potential consequences of delivering a written disclosure intervention in a home based, computer-mediated format have been examined in Chapter 5 and Chapter 6, and findings suggest this format to be feasible. In adapting the written emotional disclosure protocol to be delivered via the internet, there are a number of ethical and methodological challenges that need to be considered. The methodological and ethical issues of conducting an internet based intervention are thus presented in this chapter. Initially, the use of the internet by infertile individuals is described in section 7.2.1. The ethical challenges associated with using internet users for the purpose of research are discussed in detail in section 7.3 and the implications of using internet-based methodologies are considered in section 7.4. Section 7.5 provides a brief overview of internet-mediated interventions and evidence for the application of a written emotional disclosure to this format.

7.2 Accessing Special Groups via the Internet

In 2008, 65 per cent of households within Great Britain had internet access (Office for National Statistics, 2008). This represented an increase of 5.03 million households since 2002. The internet can often be the primary source of information and support for individuals experiencing health issues. There has been a rapid growth of health related resources available on the internet including virtual communities and online support groups. Indicative of the availability of these resources, Coulson (2008) reports that the results of a search of online support groups via the Yahoo Groups 'health and wellness' section returned a listing of 136,000 groups. With the growing accessibility of the internet this medium offers new possibilities for recruiting participants for health research (Brownlow & O'Dell, 2002). There are a number of advantages to accessing

participants via the internet, including access to larger and more geographically diverse populations and those with specific conditions or illnesses that cannot be easily accessed through traditional recruitment methods (Hamilton & Bowers, 2006; Keller & Lee, 2003). Additionally, the internet provides the opportunity to conduct research in patient groups that would normally only be accessible via hospital departments and doctors' surgeries.

7.2.1 Use of the Internet by Infertile Individuals

Individuals experiencing infertility are increasingly using the internet as a source of information and support (Malik & Coulson, 2008a). The internet can provide a quick and relatively inexpensive resource for obtaining information relating to infertility problems and treatment (Rawal & Haddard, 2006). The use of the internet for fertility related issues is particularly high amongst treatment seeking individuals (Haagen et al. 2003; Rawal & Haddard, 2006; Weissman, Gotlieb, Ward, Greenblatt & Casper, 2000). Rawal and Haddard (2006) found that 58 per cent of a sample of patients currently undergoing treatment in a UK based hospital reported using the internet for infertility related issues. Other studies have reported similarly high rates of fertility specific internet use amongst infertility patients (Haagen et al., 2003; Weissman et al., 2000). Although the majority of infertility patient internet users appear to seek information specifically relating to diagnosis and treatment, studies report that between 10 and 41 per cent of patients also use the internet to seek emotional support (Haagen et al., 2003; Rawal & Haddard, 2006; Weissman et al., 2000).

The range of negative psychosocial consequences of infertility, and the protective effect that perceived social support can have on psychological adjustment to the stressful nature of infertility, are discussed in section 2.2.4.1. However, couples who are dealing with fertility problems often find it difficult to access support from within their social circles (Domar, 1997). Infertility patients also report that they often feel unable to talk to their own doctors about psychological problems, somatic complaints and sexual and relationship problems (Himmel, Meyer, Kochen & Michelmann, 2005). For some therefore, fertility related online support groups can be a valuable source of emotional support.

Previous research has shown that accessing online support for health related issues can have a number of psychosocial benefits (Davison, Pennebaker & Dickerson, 2000). Indeed, Malik and Coulson (2008a) found that individuals who contributed to or

lurked[27] on infertility related discussion boards reported a number of benefits of online social support. Seeking support and advice through online interactions provided a number of benefits over that of face-to-face interactions, in particular, issues of convenience and availability of 24hr support were identified, and it appears that the anonymity afforded by the internet removed the fear or embarrassment of discussing particularly painful and negative emotions and being able to communicate with individuals who were in similar situations to themselves reduced feelings of isolation and improved their relationship with their partner (Malik & Coulson, 2008a).

Notwithstanding the benefits of internet-mediated support and the availability of fertility related information via the web, there can also be drawbacks to seeking information or support in this manner. Concerns have been raised about the quality and trustworthiness of infertility related information available on the internet (Marriott et al., 2008) and the potential for this information to be harmful or distracting rather than helpful (Rawal & Haddad, 2006). For some there can also be the danger of becoming obsessed with or reliant on the online community to the cost of their offline relationships (Epstein, Rosenberg, Venet Grant & Hemenway, 2002). Epstein et al. (2002) surveyed visitors to an international infertility resource website and obtained information about their use of internet resources including infertility related discussion boards. The study identified two types of internet users in this predominantly female (99.1%) sample: namely those who acknowledged the internet as the only outlet for talking about their infertility, and those who had alternative outlets. Not surprisingly individuals whose only outlet was the internet reported spending more hours per day on the internet and getting more support from the discussion boards. Individuals who had alternative outlets for talking about their infertility reported less depression, considered infertility to be less stressful, worried less, reported using better coping strategies for dealing with their infertility and were more satisfied with their relationships. However, it is not clear from the results of this study if the poor emotional profile of infertile individuals who rely on the internet for support is due to their over reliance on the internet or if it is that individuals who experience more infertility related distress are more inclined to seek out and be over-reliant on this type of support.

[27] Reading online or e-mail communications without taking part in the discussions (Merriam-Webster Online Dictionary).

7.3 Ethical Issues in Internet-Mediated Research

7.3.1 Research Involving Online Communities

Research involving online communities poses complex ethical issues for researchers. In studies that utilise a 'planned' research methodology, discussion groups are set up specifically to generate research data (Alpers et al., 2005; Skinner et al., 1997). In this context users who complete the registration process to become a member of the discussion group are informed of the research purpose of the site. For example, the TeenNet Project (Skinner at al., 1997) has developed an interactive health promotion website in which users between 10 and 24 years of age are able to access health information and communicate with their peers about such issues as smoking, body image, sex and relationships. This communication is conducted through the message board section of the site named HotTalk. Whilst registration to the site is compulsory, in order to use the features of the site, users do not have to consent to take part in research and so are free to use the site without the obligation of being a participant. There is clearly an ethical responsibility to seek consent from users when websites are created with the specific purpose of being a research tool (Flicker, Haans & Skinner, 2004). It is more common though for researchers to take an 'opportunistic' approach to the gathering of data from existing discussion groups (Whitehead, 2007) and it is this approach that is arguably more ethically challenging.

7.3.1.1 Public versus private space

Ethically it is accepted that the observation of behaviour for research purposes, when performed within a public place where "one would reasonably expect to be observed by strangers" (British Psychological Society Code of Ethics and Conduct, 2006: p.13) does not require the consent of those being observed. The ethical dilemma for those wishing to analyse messages posted in online discussion boards is whether the public accessibility of these posts constitutes being within the public domain and therefore available for use by researchers without consent (Sixsmith & Murray, 2001). This is a contentious debate. Some argue that communication within a publicly accessible forum constitutes the 'public domain' as defined by traditional ethical principles and as such gathering of information from these sources is not subject to consent (Finn & Lavitt, 1994; Sudweeks & Rafaeli, 1995). Consequently, there are a number of examples of studies that assume this attitude in the practice of data collection (Brewer, Van Raalte, & Cornelius, 2007; Coulson, Buchanan & Aubeeluck, 2007; Finn, 1999; Malik & Coulson, 2008b). However, others disagree with this approach, arguing that whilst

online messages may be publically accessible, posters never intended their messages to be used for research purposes (Waskul & Douglas, 1996).

The anonymity afforded to users of online discussions boards can help to facilitate honesty and unreserved expression in their online communications (Malik & Coulson, 2008b). Barnes (2004) argues that online communities can often create an illusion of privacy and that posters often forget that they are communicating within a public space. However, seeking permission to access the content of message boards can be problematic. Due to the fluctuating population of online communities it may not be possible to seek consent from all users and threads that are sampled for analysis may contain posts by users that are no longer active on the boards and by active members from whom there has been no response to the researcher's request. Furthermore, by seeking consent this may have an unforeseen impact and may change the dynamics of the group (Eysenbach & Till, 2001).

In the absence of any clear regulations for conducting research with online communities a number of guidelines have been recommended. In relation to the distinction between public and private space, King (1996) argues that any discussion group to which access requires registration confers a sense of 'perceived privacy'. Agreeing with this view, Bruckman (2002) suggests that any discussion board that is accessible without a password may be considered a public archive.

A report published by the British Psychological Society (Guidelines for ethical practice in psychological research online, 2007) suggests that when conducting research with online communities:

> *"any requirements for consent by participants obviously needs to be tempered by a consideration of the nature of the research, the intrusiveness and privacy implications of the data collected, analysed and reported, and possible harm caused by the research.....The researcher should be clear about the extent to which their own collection and reporting of data.....would pose additional threats to privacy over and above those that already exist" (p.3).*

There is an obligation to protect the privacy and anonymity of group members, therefore the British Psychological Society (2007) make a number of recommendations to safeguard against breaching participant anonymity: i) online pseudonyms should be treated with the same confidentiality as the individual's real name, ii) direct quotations

of posts should not be reported unless consent has been sought from the author and all identifying material should be removed, iii) in the absence of consent researchers should avoid using direct quotations that could be traced to the individual poster via a search engine (i.e. Google) and should instead consider the use of paraphrased quotes for illustrative purposes, iv) the web address of the discussion forum should not be published alongside any data or findings generated from the site.

7.3.1.2 Identity and anonymity

The anonymity afforded to participants recruited via the internet can mean a lack of control for the researcher in confirming the identities of participants. The nature of internet-mediated research is such that there is usually no face-to-face contact between participant and researcher and therefore it is difficult to verify the true identity of the research participant. Internet recruitment makes it easier for individuals to pose as 'research participants' and to falsify their true identity, a problem that is arguably greater for experimental or questionnaire based research (Hamilton & Bowers, 2006). It is not known how widespread identity deception is within internet-mediated research, however, Walther (2002) points out that online research is open to no more deception than mail-based surveys and telephone interviews. It is difficult to verify the identity of participants without incorporating checks of personal documentary identification (i.e. driving licence), and whilst not being foolproof this approach may also deter individuals from participating (British Psychological Society, 2007). Where verification of personal identity is not of importance to the study or cannot be obtained for practical reasons, it is suggested that knowledge of the areas being addressed can be used as a crude test of participant authenticity (Hamilton & Bowers, 2006). This is arguably more easily established from qualitative data such as e-mail interviews or narrative accounts. An associated problem is that of multiple submissions, whereby respondents participate on more than one occasion. Repeat responding can be of concern for the quality of data but is not thought to be a threat to reliability (Gosling, Vazire, Srivastava & John, 2004). Though repeat responding it is not thought to be a widespread problem (Birnbaum, 2004) it is an issue that should be addressed in internet-mediated study designs. Reips (2002) proposes a number of precautions that can be put in place to prevent repeat responding. These include, collecting personal information that allows identification, asking participants to indicate if they have participated in the study previously, checking the Internet protocol[28] (IP) addresses of submissions for

[28] A unique identifying number of a computer on a specific network, this can be used to identify location.

duplicates or redirecting subsequent requests from used IP addresses and implementing password dependent access.

7.3.1.3 Confidentiality and security

When collecting electronic data it is necessary to strike a balance between maintaining anonymity and confidentiality and obtaining enough identifying information to either prevent multiple submissions or to facilitate completion rates in repeated measures designs. The method through which data is collected on the internet presents different challenges for confidentiality. The contents of a discussion board post can contain identifying information and, as discussed in section 7.3.1.1, this information should be removed along with pseudonyms when the data is downloaded and before it is stored for analysis. E-mail is not a completely secure form of communication (Birnbaum, 2004), therefore Hamilton and Bowers (2006) provide a number of recommendations for dealing with e-mail data to maintain confidentially including, cutting and pasting the e-mail into a text file and removing all identifying information, deleting the e-mail and making sure that participants information is not saved in the address book. Indeed, Birnbaum (2004) advocates using similar precautions with personal data generated from the internet as that generated in the laboratory which include: i) avoiding storing names and addresses of participants, ii) storing data on a different server to the one that hosts the study and, iii) protecting servers and folders that contain data with passwords.

7.4 Methodological Issues in Internet-Mediated Research

7.4.1 Recruitment of Participants via the Internet

There are a number of techniques that can be used to recruit participants via the internet. The use of e-mail recruiting is one method that can be effective for qualitative and quantitative research, though it is considered poor netiquette[29] to send unsolicited e-mails to mailing lists without the co-operation of the list holders or administrators of member groups (Birnbaum, 2004). There are now a number of open access sites dedicated to hosting online psychology studies (e.g. Online Psychology Research UK at http://onlinepsychresearch.co.uk/) that are designed to help researchers recruit participants. Worldwide access to such sites means that internet study samples are often demographically and culturally diverse (Reips, 2002), providing cross-cultural and international research opportunities (Birnbaum, 2004). One very popular recruitment

[29] A set of social conventions for online behavioural standards recognised by online communities (Scheuermann & Taylor, 1997).

method, which is often utilised when access is needed to groups with specific characteristics, is to post research invitations or links to study sites on internet discussion boards (forums). Posting links and information about the study on discussion boards that are specific to the population of interest (e.g. individuals undergoing fertility treatment) is one of the most effective methods of accessing individuals who are hard to reach by traditional methods (Illingworth, 2001) and some discussion groups have specific message boards on which study information and invitations can be posted. Hamilton and Bowers (2006) argue that this 'opt in' method is not dissimilar to placing requests for participants within specific clinical settings (i.e. on notice boards within a clinic waiting room).

7.4.2 Sampling and Generalisability

It is argued that the recruitment of research participants via the internet is marred by sampling bias (Whitehead, 2007). A major concern with internet recruitment is whether internet users are representative of the general population (Gosling et al., 2004; Hamilton & Bowers, 2006). The findings from recent surveys in the UK and USA indicate that internet users are typically white, under the age of 30 years old and college educated (Office of National Statistics, 2008; Pew Internet and American Life Project, 2009). Additionally, individuals who do not have access to the appropriate computer equipment and internet technology, be that due to demographic status or technological naivety, are excluded for participation in online studies (Beddows, 2008). Gosling et al. (2004) compared the demographic profile of a web sample (n = 361,703) with that of traditional samples used in studies published over a twelve month period in the *Journal of Personality and Social Psychology* (*n* = 102,959). They found that the internet sample was generally more diverse than the traditional sample in terms of gender, age and socioeconomic status but were comparable in terms of race. Gosling et al. (2004) agree that internet samples are not a suitable alternative for true random samples but argue that few time and cost effective methods permit researchers access to truly representative samples. Indeed non-representative samples (e.g. volunteers or undergraduate students) are commonly used in psychological research. In many cases general population representativeness is not a priority. More important is that the sample used to obtain the data is representative of the population to which the findings are to be generalized (Gosling et al., 2004).

Studies that have compared demographic profiles of infertility patients who are users and non-users of the internet have found them to be similar (Haagen et al., 2003;

Rawal & Haddard, 2006). Weissman et al. (2000) found that infertile couples from all socioeconomic backgrounds actively used the internet to access fertility related information. For example, patients attending a public infertility clinic were significantly more likely to be unemployed, have a lower combined household income and lower levels of education compared with patients attending a private clinic, however, internet usage for fertility related issues was not significantly different between patient groups (38.5% at the public clinic and 46.3% at the private clinic; Weissman et al., 2000). While general usage internet statistics indicate that men (75%) are more likely to access the internet than women (66%; Office for National Statistics, 2008), female infertility patients are more likely to access the internet for fertility related issues than their male partners (Haagen et al., 2003; Weissman et al., 2000). This difference between men and women in fertility-related internet usage is not surprising as research indicates that women are in general the ones more likely to seek emotional support for their fertility related concerns and instigate medical tests and treatments (see Greil, 1997).

Self-selection can limit generalisability, consequently Reips (2000) recommends providing access to the online study via many different web sites as a method to reduce self-selection bias. Self-selection can also be interpreted as 'voluntariness' (Reips, 2000, 2002) which is the voluntary nature of an individual's motivation to participate. Reips (2002) argues that this can be advantageous since "voluntariness reduces effects of psychological reactance" (p.248) which include effects such as careless responding, providing deliberately false answers and dropout (Reips, 2002). However, research does suggest that individuals who volunteer to take part in psychological research tend to be more altruistic and self-disclosing than non-volunteers (Rosenthal & Rosnow, 1975) and that voluntariness is related to the personality factors openness to experience and agreeableness (Dollinger & Leong, 1993). Although self-selection bias will still remain via this method, it does mean that participants can be sampled from a number of related sources, thus widening out the inclusion of potential participants.

7.4.3 Computer Administration of Self-Report Questionnaires

Administering questionnaires via the internet offers a number of advantages over traditional pen-and-paper administration, such as reducing missing data (Fouladi, McCarthy & Moller, 2002), data entry costs and errors (Pasveer & Ellard, 1998) and immediacy of results (Booth-Kewley, Larson & Miyoshi, 2007). In addition to these

practical advantages there is also growing evidence that online administration may reduce social desirability effects (e.g. Richman, Kiesler, Weisband & Drasgow, 1999; Dwight & Feigelson, 2000) and elicit greater self-disclosure (e.g. Booth-Kewley et al., 2007; Feigelson & Dwight, 2000; Weisband & Kiesler, 1996).

7.4.3.1 Self-disclosure and social desirability effects

Some studies have found that individuals are more inclined to disclose sensitive behaviours such as substance use and sexual behaviour on computerized surveys than pen-and-paper based equivalents (Booth-Kewley et al., 2007; Wright, Aquilino & Supple, 1998), whilst others report no differential effect of mode of administration on self-disclosure of sensitive behaviours (Bates & Cox, 2008; Locke & Gilbert, 1995). In a meta-analysis of studies comparing mode of administration Feigelson and Dwight (2000) found a small but significant effect (d = .22), such that computer based assessment resulted in more candidness when responding to questions about sensitive behaviours. Weisband and Kiesler (1996) found similar disclosure effects for computer based administration. Additionally, they found that the effect size for online studies with patient samples was significantly larger than that of studies with student samples. Though Weisband and Kiesler (1996) hypothesised that effect sizes might be larger in patients samples due to an increased sense of privacy in a population that they suggest are more sensitive to the consequences of self-disclosure, the authors acknowledge that differences in experience with computers and psychological tests between the samples could also account for variation in effect size.

While self-report measures are subject to social desirability effects (Holtgraves, 2004) it is argued that this response distortion is less problematic when self-report measures are administered online (Martin & Nagao, 1989). A possible explanation for this effect on socially desirable responding is the perceived anonymity afforded by the faceless context of the online environment. Joinson (1999) found evidence for the importance of perceived anonymity in the administration of self-report measures. Participants were administered measures of social anxiety, social desirability and self-esteem via the internet or in the traditional pen-and-paper format and participants were assigned to anonymous or non-anonymous conditions. Joinson (1999) found that participants who responded online scored significantly lower on the measures of social anxiety and social desirability and higher on the measure of self-esteem than participants who responded using the traditional pen-and-paper format. Additionally, anonymous online respondents had lower social anxiety and social desirability scores overall, whereas non-anonymous pen-and-paper respondents had the highest scores on these two

measures. However, the findings of a meta-analysis examining social desirability responding on computer based questionnaires found the effect of computer administration to be small and that this effect has diminished over time (Dwight & Feigelson, 2000). Whilst perceptions of anonymity might lead to less social desirability responding Dwight and Feigelson (2000) suggest as individuals become more accustomed to using computer technology and aware of the capabilities of computers (i.e. that communications can be monitored) that social desirability responding might increase, likening this effect to the Big Brother Syndrome (Rosenfeld & Booth-Kewley, 1996).

7.4.3.2 Reliability and validity

The layout of the questionnaire online will often depend on the software used to generate the web-based display as well as the browser software and settings of the respondent. In addition to these aesthetic differences, concerns have been raised about the lack of control in online testing and potential for extraneous factors (e.g. environmental distractions, fatigue) to influence responding (Buchanan, 2002). Given the numerous potential differences between online and pen-and-paper measures a number of studies have sought to examine if these differing modes of administration are psychometrically comparable. Studies that have examined the reliability and validity of equivalent online and pen-and-paper measures assessing a number of dimensions, including personality (e.g. Buchanan & Smith, 1999), psychological and physical symptomology (e.g. Herrero & Menese, 2006; Ritter, Lorig, Laurent & Matthews, 2004; Vallejo, Jordán, Díaz, Comech & Ortega, 2007), attachment (Fouladi et al., 2002) and health behaviours (Denscombe, 2006), have in general found them to be psychometrically similar. Ritter et al. (2004) recruited an internet sample via advertisements on various health discussion boards, medical e-newsletters and online support groups. They assessed a total of 16 health-related measures relating to health distress, health care utilization, health behaviours and illness intrusiveness. The results of the study showed that there were few differences between the online and pen-and-paper measures, with internal consistency and test-retest reliability not differing significantly. However, there was a trend towards internet respondents reporting more health distress than their paper based counterparts.

Differences in score distribution between the two modes of administration have been reported in other studies, particularly in relation to measures of negative affect. For example, Peterson, Johannsson and Carlsson (1996) found that computerized scores on the Beck Depression Inventory (BDI; Beck, Ward & Mendelson, 1961) tended to be

higher for the computer administered version than the pen-and-paper version. Similarly, Davis (1999) found higher levels of self-rumination amongst students administered the internet version of the Ruminative Response Scale (RRS), a subscale of the Response Style Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991) which assesses how participants respond to their own symptoms of negative emotion. There are a number of possible reasons for these differences. Firstly, it has been suggested that internet users tend to be more depressed (Kraut et al., 1998), though in these instances this is unlikely to explain the differences as not all participants were recruited via the internet (e.g. students and hospital patients). Additionally, one would expect those who were internet users to have high scores on the pen-and-paper version also (Ritter et al., 2004). A second possible explanation relates to the potential for increased self-disclosure in online questionnaires (see section 7.4.3.1). It is possible that this tendency to be more candid when assessed online is represented in more honest, and consequently, higher scores on self-relevant measures (Joinson, 1999). A third, more problematic explanation is that computer anxiety may contribute to the non-equivalent scores found between the modes of administration (George, Lankford & Wilson, 1992; Schulenberg & Yutrzenka, 1999; Tseng, Tiplady, Macleod & Wright, 1998). George et al. (1992) found that BDI scores were higher in students who completed a computerized version of the scale when computer anxiety was high. This correlation was not found with the pen-and-paper administration, suggesting that increased depression scores reflected a negative reaction to testing rather than the actual construct being measured. Similarly, Tseng et al. (1998) found that computer anxiety was associated with more negative ratings of mood when measures were administered by computer. Arguably, the confounding effects of computer anxiety on mood ratings are less likely to be a problem with samples recruited via the internet.

Vallejo et al. (2007) found a modality effect contradictory to earlier research (e.g. Peterson et al., 1996). The authors administered the General Health Questionnaire-28 (GHQ-28; Goldberg & Hiller, 1979) and the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1992) to a sample of students. The test-retest design used involved completing the pen-and-paper version as the test and the online version as the re-test. Both online versions showed acceptable reliability and validity equivalent to the pen-and-paper versions. However, SCL-90-R scores on the pen-and-paper version were higher than the online scores. In fact the results suggested that for the Global Severity Index (GSI) 23.2 per cent of the variance could be explained by mode of administration. The authors suggest that mixed administration could be problematic especially for the assessment of repeated measures designs used to assess treatment

outcomes. The difference between modality is big enough to cover or reflect the effects of a treatment (Vallejo et al., 2007). In addition, even though the online version showed acceptable reliability and validity the variability in scores as an effect of mode of administration suggests that for the online version it may not be appropriate to use the normative data for the SCL-90-R which is derived from the pen-and-paper forms. Even if the psychometric properties of measures administered online are acceptable, the use of norms established from pen-and-paper assessments are not appropriate for use with online versions, in light of this Buchanan (2003) argues for the cautionary use of measures that rely on normative data, especially for clinical application.

Notwithstanding the potential variations in normative data across modalities a number of commentators would agree that the evidence to date demonstrates that the use of internet based questionnaires as a data collection method can provide a reliable equivalent to pen-and-paper based methods (e.g. Denscombe, 2006; Fouladi et al., 2002).

7.4.4 Response and Dropout Rates

Response rates to internet based surveys are calculated in a number ways, usually determined by the variation in recruitment methods (Whitehead, 2007). Response rates can be reported based on the number of responses of interest generated from an advertisement to the study (Illingworth, 2001) or the number of completed responses to e-mailed questionnaires or hyperlinks (Ritter et al., 2004). Studies that have compared response rates of unsolicited e-mail versus unsolicited postal questionnaires have found that e-mail response rates are lower (e.g. Leece et al., 2004). Higher response rates can be achieved when participants are recruited via online discussion boards (Ritter et al., 2004) or receive initial e-mail requests of participation prior to delivery of the study questionnaire (Metha & Sivadas, 1995). For example, in a study conducted by Illingworth (2001), of the 65 responses to an advert posted on an infertility discussion board, 70 per cent returned completed e-mail questionnaires.

Dropout can be problematic for internet-based studies (Reips, 2002). When studies are conducted within the laboratory, often in the presence of an experimenter, social pressure or possible embarrassment may deter participants from quitting half way through (Birnbaum, 2004). To quit a study online simply requires closing the open browser. The reported rates of dropout for online studies vary widely from between one per cent and 87 per cent (mean, 34%; Musch & Reips, 2000) and are dependent on a number of factors including complexity of procedures, financial incentives and

placement of questions asking for personal information (O'Neil, Penrod & Bornstein, 2003).

Reips (2002) recommends using what he terms the *high-hurdle* and *warm-up* techniques to reduced dropout. *High-hurdle* techniques include, informing participants of the seriousness of the research, providing realistic estimates of how long the study will take, asking for e-mail addresses and other personal data early on (if required) and pre-warning participants if the study involves anything of a sensitive nature. Dropout in within-participants or repeated measures designs can present a problem for the validity of the research (Reips, 2002). Findings from one longitudinal internet-mediated study are encouraging, whereby Hiskey and Troop (2002) recruited internet users exposed to trauma and reported a response rate of 68 per cent at 6 month follow-up (administration was repeated at 3 and 6 months after the initial recruitment phase). Considering the sensitive nature of the study, and the time between completion phases, the rates found within this study are promising.

7.5 Delivery of Psychological Interventions via the internet

In addition to providing researchers with the opportunity to access large and diverse samples, the internet also offers a new method of delivering health interventions. The last ten years has seen an increase in the development and availability of internet-based treatment interventions taking the form of structured therapy programs (e.g. Kenardy, McCaffery & Rosa, 2003), counselling via e-mail (e.g. Cohen & Kerr, 1998), therapist-assisted chat rooms (e.g. Barak & Bloch, 2006) and psycho-educational programmes (e.g. Winzelberg et al., 2000). There are a number of unique advantages to internet-delivered interventions such as increasing access to services for isolated, stigmatized or disabled groups, reducing costs to users and more widely to health services, providing 24 hour access and convenience to users (Griffiths, Lindenmeyer, Powell, Lowe & Thorogood, 2006; Lauder, Chester & Berk, 2007). The conditions targeted in these interventions have varied widely and include weight loss (e.g. Tate, Wing & Winett, 2001), smoking cessation (e.g. Schneider, Walter & O'Donnell, 1990), disordered eating (e.g. Luce, Winzelberg, zabinski & Osborne, 2003), depression (e.g. Christensen, Griffiths & Jorm, 2004), anxiety (e.g. Kenardy et al., 2003), panic disorder (e.g. Klein & Richards, 2001) and cancer (e.g. early stage breast cancer; Owen et al., 2005).

The effectiveness of internet-delivered interventions has been subject to a number of reviews (Cuijpers, van Straten & Andersson, 2008; Griffiths & Christensen, 2006;

Proudfoot, 2004; Ritterband et al., 2003). For example, Griffiths and Christensen (2006) conducted a systematic review of 15 randomised controlled trials of self-help internet-delivered interventions. These interventions targeted conditions such as depression, anxiety, stress and insomnia using a number of methods including Cognitive Behaviour Therapy (CBT), relaxation training and provision of psycho-educational material. All but two of the interventions reviewed reported at least one positive outcome. Cuijper et al. (2008) conducted a systematic review of twelve CBT based internet delivered studies for health problems. Findings indicated that interventions targeting pain and headaches showed comparable effects to that of face-to-face interventions. Overall, these reviews suggest that internet interventions are both feasible and effective. The conditions under which interventions are offered (either research or routine care) does not appear to moderate the efficacy (Proudfoot, 2004). These optimistic findings also demonstrate that some psychological treatments can be successfully adapted for use via the internet (Ritterband et al., 2003). The majority of interventions delivered via the internet have been CBT based protocols as this therapeutic method better lends itself to being adapted to a text format (Cuijpers et al., 2008). However, one research group have adapted a structured writing protocol, previously used in clinical practice (Lange, 1996; 1994), for delivery via the internet (Lange, van de Van, Schrieken, Bredeweg & Emmelkamp, 2000) called Interapy which has been shown to be effective in reducing a number of psychological symptoms.

7.5.1 Interapy

The Amsterdam Writing Group have developed a structured writing intervention based on the disclosure writing protocol of Pennebaker (e.g. Pennebaker & Beall, 1986) and adapted it to be administered through the internet via a web based programme called Interapy[30] (Lange et al., 2000). The intervention consists of ten, 45 minute structured writing sessions that emphasise self-confrontation, cognitive reappraisal, and social sharing of feelings. There is also the involvement of an Interapy therapist who provides feedback to the participant on their writing. Participants also receive psycho-educational information in order to stimulate self-confrontation (i.e. focus on the most painful images) and cognitive reappraisal of their writing. Results from trials of Interapy have been promising, with a pilot study carried out with undergraduate students finding significant post-treatment improvements in symptoms of avoidance, intrusion, anxiety, somatisation and depression in treatment group participants compared with waiting list controls (Lange et al., 2000). Comparable effects were seen with participants recruited

[30] Interapy can be accessed at www.interapy.com but is at present only open to Dutch-speaking clients.

via the Interapy website, with highly significant decreases in trauma related symptoms and general psychopathology observed in treatment group participants compared to waiting list controls, with large effects sizes (ranging from d =.95 to d =.1.66) (Lange, Schoutrop, Schrieken & van de Ven, 2002). Participants who were recruited from the general population accessed the Interapy website of their own accord, thus they were actively seeking therapy. The results of the trials conducted by Lange and colleagues are encouraging and would suggest that traditional paper based therapeutic interventions can be successfully applied to an online format.

7.6 Summary

The internet can offer researchers an alternative medium through which to recruit diverse and hard to reach populations of participants and deliver specially adapted therapeutic interventions. In particular, individuals with infertility regularly use the internet to access information and support, thus there is an opportunity to gain access to this population via this medium. The lack of face-to-face contact with participants recruited via the internet, and electronic storage and transmission of data can present ethical challenges, whilst methodological issues can have implications for the generalisability of findings and reliability of data generated through this medium, which will be addressed in the design and implementation of the study presented in Chapter 8. Notwithstanding these challenges internet-mediated interventions have been shown to be effective in a number of domains. Specifically, the findings of trials conducted by Lange and colleagues of an internet-mediated structured writing intervention provide support for the examining the efficacy of a web-based written emotional disclosure intervention. The development and testing of such an intervention for individuals with infertility is described in Chapter 8.

Chapter 8

Disclosure Writing: A Web-based Intervention for Individuals Experiencing Infertility.

8.1 Overview

The implementation of a disclosure writing intervention for individuals with infertility attending an assisted conception unit was found to be unfeasible (see Appendix A.2). As a consequence of low participant response and high attrition the study was terminated and an alternative context for recruitment of this population was sought. This chapter presents the findings of an internet-mediated written disclosure intervention for individuals with infertility recruited from online infertility support forums. This study will also address how possible expectancy and demand effects might account for the findings reported in Chapter 5 and Chapter 6.

8.2 Introduction

The studies presented in Chapter 5 and Chapter 6 showed that an adaptation of the 'standard' laboratory based disclosure protocol, to one that is computer-mediated, and delivered within the context of the home, did not have a negative impact on the longer-term outcome of the intervention. Taken together with encouraging results of online trials conducted by Lange and colleagues (2000, 2003), the findings of these studies provide support for the argument that the delivery of a written disclosure intervention using a web-based format, which will be accessed via the internet and therefore delivered within the context of the participants' homes, is a feasible alternative to the more traditional delivery format seen in previous studies (e.g. Pennebaker & Beall, 1986). Note however, that the finding that participants in Chapter 5 and Chapter 6 of this thesis reported improvements in symptoms of depression, anxiety and distress, irrespective of allocation to group (control versus disclosure), has highlighted methodological issues that will be addressed in the current study.

As discussed in detail in section 6.5.1, a possible explanation for the overall psychological improvements seen in study participants is that of the response

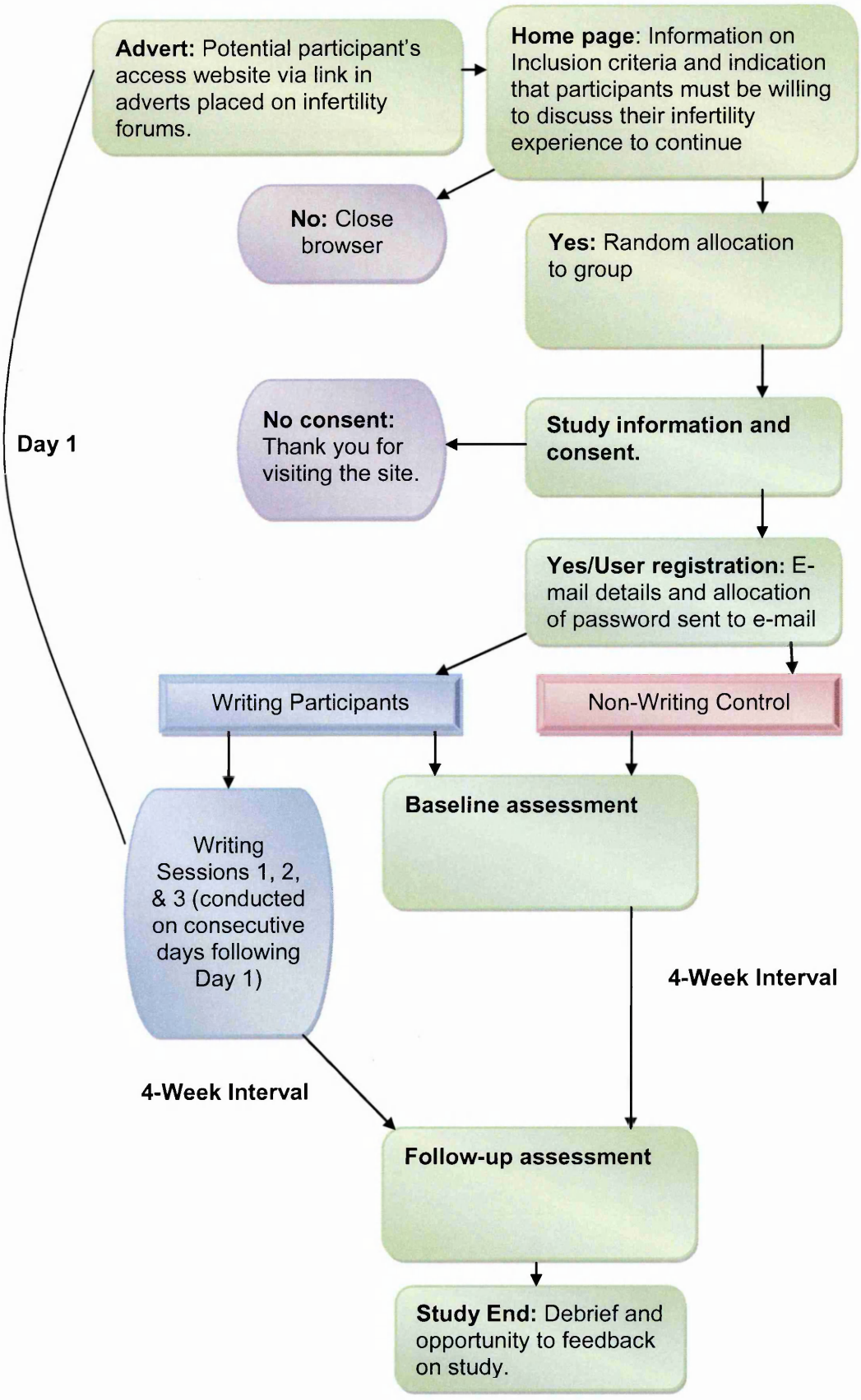
expectancy effect (Kirsch, 1985). Indeed, Langens and Schüler (2007) have suggested that having positive expectancies about the emotional effects of writing plays a role in the positive outcomes that are reported in the disclosure literature. The method by which Langens and Schüler (2007) examined positive expectancies in their study was to ask participants to rate their expectancies, post-intervention, of writing about an upsetting event. To examine directly the role of positive expectancies, and consistent with the method used by Patterson and Singer (2007-2008) the current study will provide information to one group of participants about the positive effects of disclosure writing prior to starting the intervention in order to compare them at follow-up with disclosure participants who have not been provided with this information.

Consistent with the design of studies in Chapter 5 and Chapter 6 the study reported in this chapter will also include a non-writing control group in addition to a writing control group. As discussed in section 3.3.4, writing control participants are typically asked to write about a trivial or neutral topic (i.e. plans for the day; Horneffer & Jamison, 2002). However, some studies that have examined the effects of disclosure writing in patient samples have utilised control writing instructions that are arguably more appropriate and relevant for individuals experiencing chronic or serious illness (e.g. renal cancer patients; de Moor et al., 2002). Following the more ethically appropriate method used by Stanton et al. (2002) in their study with breast cancer patients, whereby control participants were asked to write factually about their illness and treatment, the current study will ask participants assigned to the writing control group to write factually about their infertility with reference to their diagnosis and treatment history.

8.3 Aims

The principal aim of this study is to determine the efficacy of a web-based written emotional disclosure intervention for infertile individuals. Secondly, this study aims to establish if positive expectancies about the emotional effects of disclosure moderate both the immediate and longer-term effects of disclosure writing. This study will also examine the linguistic content of essays written by disclosure group participants to determine if changes in word use are predictive of the physical and psychological outcome of disclosure.

Figure 8.1 Flow diagram of study process and timescale of participation



8.4 Method

8.4.1 Design

The web-based study[31] used an experimental, repeated measures design. Participants were randomly allocated to one of four conditions: expectancy (disclosure writing with positive expectancies), disclosure (disclosure writing), writing control (infertility specific factual writing) or non-writing control. Random allocation occurred prior to receiving study information (see section 8.4.5, this chapter). Figure 8.1 shows the study design which comprised of a baseline assessment, three day intervention period of three 15 minute writing sessions (writing groups only) and a 4-week follow-up assessment. The dependant variables measured at baseline and follow-up assessments were depression, anxiety, general stress, fertility problem stress, physical symptoms, intrusion and avoidance.

8.4.2 Measures

This study utilised the following measures that were also used in the studies presented in Chapters 5 and 6; the Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979), the Essay Evaluations Questionnaire (EEQ; Greenberg & Stone, 1992), the Physical Symptoms Inventory (PSI; Spector & Jex, 1998)and the Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988). Content analysis of participants' narratives was conducted using the Linguistic Inquiry and Word Count Programme (LIWC: Pennebaker, Francis & Booth, 2001) which is described in Chapter 5.

In addition to the measures noted above, this study also included the following:

The Fertility Problem Inventory (FPI; Newton, Sherrard & Glavac, 1999).

The FPI is a 46-item measure of infertility stress. Participants are asked to indicate their agreement with each item on a six-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The FPI contains five separate subscales that represent domains of stress specific to infertility; these are social concerns, sexual concerns, relationship concerns, need for parenthood and rejection of childfree lifestyle. Each of the five scales has shown good internal reliability (all α>.80; Newton et al., 1999). Examples of items include; *"For me, being a parent is a more important goal than having a satisfying career"* (need for parenthood subscale) and *"I feel like I've failed at sex"* (sexual concerns subscale). All positively phrased items are reverse scored and a

[31] The company PersonalityScience.org designed the survey tool used to collect the data for this study.

composite score derived from summing the five subscales provides a global measure of infertility-related distress. Higher scores indicate increased infertility-related distress. Newton et al. (1999) interpret mean global FPI scores as follows; for females, a score of 97 or below represents low stress, scores of 98-132 represent average stress, scores of 133-167 represent moderately high stress and scores of 168 or greater represent very high stress. For males, scores of 87 or below represent low stress, scores of 88-113 represent average stress, scores of 114-146 represent moderately high stress and scores of 147 or greater represent very high stress. For the purpose of this study the global FPI score was used to assess infertility-related distress, the global FPI has demonstrated high internal reliability (α = .93) and good test-retest reliability in addition to demonstrating moderate discriminant and convergent validity (Newton et al. 1999).

The Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1992) was used in the studies presented in Chapters 5, 6 and Appendix A.2 to assess psychological well-being (depression, anxiety and distress), however, copyright restrictions prohibited the web-based administration of this measure. As an alternative the Depression Anxiety Stress Scales-21 (Lovibond & Lovibond, 1995) was used in the current study. The $DASS_{21}$ is within the public domain and therefore does not carry such restrictions on administration. The $DASS_{21}$ is a short form of the self-report 42-item DASS (Lovibond & Lovibond, 1995). The three subscales of the $DASS_{21}$ assess the core symptoms of depression (i.e. dysphoria), anxiety (i.e. autonomic arousal) and stress (i.e. difficulty relaxing) with each scale consisting of seven items. Respondents are asked to indicate on a four point severity scale (0-3) the extent to which they have experienced each state over the preceding week. Example items include *"I felt that I had nothing to look forward to"* (depression), *"I was aware of dryness in my mouth"* (anxiety) and *"I found it hard to wind down"* (stress). Sub-scales are calculated by summing the score for the relevant items and doubling this to derive a score that is directly equivalent to the 42-item measure (Loiviband & Loviband, 1995). In addition to the benefit of reducing response demands, the shorter $DASS_{21}$ has been shown to have a cleaner factor structure when compared with the 42-item DASS in both clinical (Clara, Cox & Enns, 2001) and non-clinical populations (Henry & Crawford, 2005). The sub-scales of the $DASS_{21}$ have demonstrated good internal reliability (α = .88 depression, α = .82 anxiety and α = .90 stress) and convergent and discriminant validity (Henry & Crawford, 2005).

Participants also completed questions relating to demographic information at baseline to determine such characteristics as age, gender, nationality and occupation. Additional

questions focused on fertility and treatment history and internet use (see Appendix A.13 for demographic questions).

8.4.3 Ethics

The study was conducted in accordance with the British Psychological Society guidelines for conducting research with human participants (Code of Conduct, Ethical Principles and Guidelines, 2004) and the British Psychological Society Guidelines for Ethical Practice in Psychological Research Online (2007). The study was subject to scrutiny by the researcher's Faculty Research Ethics Committee, and approval was granted (see Appendix A.14 for the Ethics Proforma and Letter of Approval). Obtaining informed consent in studies that are internet-mediated, and so do not involve any face-to-face contact between the participant and researcher, can present ethical challenges (Flicker, Haans & Skinner, 2004). Based on the recommendations of Flicker et al. (2004) and BPS guidelines (British Psychological Society, 2007) detailed information was given to participants based on the requirements of the condition they had been allocated to (see section 8.4.5), this was provided on entry to the study along with contact details of the researcher. Participants were encouraged to print this information so they could contact the researcher if they were adversely affected by their participation or wished to withdraw. In the absence of a signature a 'consent button' was used to signify participants consent as recommended by Birnbaum (2000). The protection of privacy and security of data was paramount for the study. The study was hosted on a secure server and participants were required to register a username, access at all stages was password dependent. In order to prevent repeat responding the web-site was set up to redirect attempts to re-register using the Internet protocol (IP) address as an identifier (see section 7.3.1.2. for a discussion on repeat responding).

8.4.4 Recruitment Strategy

To reduce self-selection bias a multiple site entry technique was used (see section 7.4.2; Reips, 2000). A search of the internet identified 17 English language infertility specific discussion forums that were currently active based in the UK, USA and South Africa. An e-mail was sent to the administrator of each forum asking permission to post an advert for research participants (see A.15 for e-mail). Six of the 17 forums gave permission for the advert to be placed on their site. The advert, entitled 'Coping with Infertility', included a brief description of the research, contact details of the researcher and a link to the study web-site (see Appendix A.16 for advert).

8.4.5 Procedure

Figure 8.1 illustrates the study process for participants. Upon accessing the study website, participants were directed to the study's home page which provided details of the inclusion criteria for the study. The guidelines produced by the National Institute for Clinical Excellence (NICE, 2004) state that individuals who have not conceived within one year of unprotected sexual intercourse should be offered clinical investigations to determine any underlying pathology. Based on these guidelines the criteria for inclusion stated that participants must have been trying to conceive for a period of no less than 12 months. Additional criteria asked that participants be able to read and write in English, be over the age of 18 years and be willing to answer questions about their physical and emotional health and write about their experiences. Upon agreeing to these criteria, participants were able to access the information and consent stage of the process, and it was at this stage in the recruitment process that the random allocation (a random assignment function written into the web-site software) to condition occurred. The information that participants received was specific to their group. In addition to allowing for informed consent to be given, providing group specific information allowed for the manipulation of expectancy. To determine if having positive expectancies about the emotional effects of writing had an effect on the outcome of the study the instructions given to participants allocated to the expectancy group included the following information:

'Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will investigate the stressful nature of infertility and how writing about the feelings and emotions associated with infertility can help people to better cope with their experience. This research will expand on previous research that has found writing to be effective in improving the way people feel'.

The study instructions given to participants allocated to the non-expectancy group were as follows:

'Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will

investigate these different experiences and how this is related to physical and psychological well-being'.

Group specific study information pages can be found in Appendix A.17.

Participants were given the options; "I consent to participate in the study", "I do not consent to participate in the study" or "I would like to ask the researcher a question". Participants who did not give consent were thanked for their interest, and participants who chose to consent were asked to create a username and provide an e-mail address to begin the registration process. Nobody chose the option of asking the researcher a question. After registration, a password was sent the participant's e-mail address, and this email contained a link from where they could log in to the website and begin the study.

Participants completed questions relating to demographic information, internet usage and fertility history, followed by baseline assessments of physical symptoms and psychological well-being. Upon completion of this background information the non-writing control participants were informed that they would receive an e-mail in four weeks time providing them with a link to the study site and asking them to log in to continue with the study. All writing participants were directed to the first writing session of the study. Whereas writing session in studies one and two were conducted at fortnightly intervals to coincide with scheduled classes, for the purpose of the current study the writing sessions were conducted over three consecutive days. Although the time between writing is not thought to moderate the effect of written disclosure (Frattaroli, 2006), Pennebaker (1994) advises this timeframe for writing, suggesting that participants report finding larger intervals between sessions unfavourable for re-entering the mind set for writing.

8.4.5.1 Writing instructions

The writing instructions given to participants were adapted from a study with breast cancer patients (Stanton et al., 2002) which follow the instructions of Pennebaker (1994). On day one the disclosure and expectancy group participants were given the following instructions:

'*Over the three writing sessions in this study I would like you to write about your deepest thoughts and feelings concerning your experience of difficulties in having a child. I realize that people who encounter such difficulties experience a full range of*

emotions, and I want you to focus on any and all of them. In your writing I want you to really let go and explore your deepest emotions and thoughts. You might think about all the various feelings and changes that you experienced before being diagnosed, after diagnosis and relating to any medical investigations and treatments you have undergone. Whatever aspect you choose to write about, it is critical that you focus on your deepest thoughts and feelings. You might also tie your thoughts and feelings about your difficulties in having a child to other parts of your life - people you love, who you are, or who you want to be and your future. Again the most important part of your writing is that you really focus on your deepest emotions and thoughts. The only rule we have is that you keep writing for the entire 15 minutes. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Just write.'

Day one writing instructions for writing control participants were as follows:

"Over the three writing sessions in this study I would like you to write a detailed account of the facts surrounding your attempts to have a child and any treatments you have undergone. I realize that people who encounter such difficulties experience a full range of emotions when faced with the prospect of involuntary childlessness but in your writing I want you to concentrate only on the facts. I am interested in the specific facts surrounding your or your partners' diagnosis (if you have one) and treatment options in order to understand different people's experiences. Your writing can include details of doctors appointments, the information you have been given, treatments you have been offered or have considered as well as those you have undergone. You can also write about any future treatments or appointments you have or may be considering and what these will involve. Again, the most important part of your writing is that you concentrate only on the facts and write in as much detail as possible. The only rule we have is that you keep writing for the entire 15 minutes. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Just write".

Prior to starting writing participants completed the PANAS and were then instructed to write continuously for 15 minutes at which time the page would close automatically. At the end of the writing sessions participants again completed the PANAS in addition to the EEQ. On the second and third day of the study automated e-mails were sent to participants with a link to the web-site asking them to log back in to the website to complete the writing sessions.

Four weeks after completion of the baseline measures, all participants received an automated e-mail to ask them to log back into the study site to complete the follow-up questionnaires. Upon completion of these measures participants were directed to a debriefing page (see Appendix A.18 for study debrief) and thanked for their continued participation. Participants were given the option to provide feedback for the study if they so wished, but none did so.

8.5 Results

8.5.1 Preparation of Data

Data was downloaded from the web server and transferred into SPSS. Writing files were converted into text files and 'cleaned' in preparation for analysis with the LIWC software as described in section 5.4.3. One participant had only written two words for day three's writing task, suggesting that they had not attempted to write for the full 15 minutes. Whilst the main outcome data for this participant (i.e. fertility stress) is retained in the analysis, the writing data was not included in any subsequent analysis due to the non-compliance with the study protocol[32].

8.5.1.1 Uptake and attrition

One hundred and sixty eight potential participants registered on the website of which 111 participants logged in to begin the study (26 disclosure; 31 expectancy; 26 writing-control; 28 non-writing control). Fourteen participants withdrew before completing all of the baseline assessment. Of the 70 participants allocated to writing groups, 28 participants did not complete the first 15 minute writing session or return after writing session one, 12 did not complete the second 15 minute writing session or return after writing session two and one further participant did not complete the final writing session. Of the remaining 56 participants 17 did not return to the site to complete the 4-week follow-up assessment. Overall 39 participants completed the study (5 disclosure; 10 expectancy; 8 writing control; 16 non-writing control). A comparison of baseline scores for those with complete baseline data (n = 97) using independent samples T-tests (two-tailed) showed that completers and non-completers did not differ on levels of depression ($t_{(95)}$ = -.57, p = .567), anxiety ($t_{(95)}$ = .23, p = .823), stress ($t_{(95)}$ = -.76, p = .449) or fertility problem stress ($t_{(95)}$ = 1.51, p = .135). A 2 x 4 χ^2 showed that there was a significant relationship between allocation to group and attrition (χ^2 = 9.17, DF = 3, p = .027). Examination of the observed and expected frequencies indicated that this

[32] Removing this participant's data from the main analysis did not alter the results.

association is mainly attributable to the finding that attrition was lower in the non-writing control group.

8.5.1.2 Checking assumptions

Data for all variables were examined to determine suitability for parametric analysis. The grouped data did not contain any univariate outliers based on the criterion,≥3 standard deviations from the mean (Stevens, 2002) and was found to be normally distributed (skewness statistic not greater than 2.58 or -2.58; Clark-Carter, 2004).

8.5.1.3 Statistical analysis and sample size considerations

Consistent with the analysis techniques employed in Chapters 5 and 6 analysis of the immediate (positive affect and negative affect), longer-term (depression, anxiety, GSI, physical symptoms, intrusion and avoidance) and narrative (negative emotion words, positive emotion words and cognitive mechanism words) effects of written disclosure were examined using a series of factorial analysis of variance (ANOVA). Hierarchical linear regressions were employed in the analysis of language change across writing sessions as a predictor of outcome. Change scores were calculated for each of the word categories by subtracting the total percentage of words used at the first writing session from the total percentage of words used at the final writing session as in Chapters 5 and 6.

For the present study *a priori* power analysis conducted using Gpower 3.0.10 (Erdfelder, Lang & Buchner, 2007) indicated that a total sample size of 136 (α = .05, power = .80, Critical f = (3, 132) = 2.68) would be required to detect between–group main effects, a total sample size of 54 (α = .05, power = .80, Critical f = (1, 53) = 4.02) would be required to detect within-group main effects and a total sample size of 48 (α = .05, power = .80, Critical f = (3, 44) = 2.82) would be required to detect interaction effects in the analysis of the short-term and longer-term effects of disclosure. Additionally, for the analysis of language use in disclosure a total sample size of 86 (α = .05, power = .80, Critical f = (1, 84) = 3.95) would be required to detect between–group main effects, a total sample size of 43 (α = .05, power = .80, Critical f = (2, 84) = 3.11) would be required to detect within-group main effects and a total sample size of 28 (α = .05, power = .80, Critical f = (2, 52) = 3.18) would be required to detect interaction effects. The achieved total sample size for the present study (n=39) is again somewhat smaller than that which was determined to be adequate from *a priori* power calculations. Consistent with method employed in Chapter 5 the effect sizes

(reported as partial eta squared) for all non-significant main and interaction effects are included for comparison.

As already noted in Chapters 5 and 6, calculation of sample size requirements for hierarchical linear regression indicates a required sample size of 85 (α = .05, power = .80, Critical f = (4, 80) = 2.49) to detect effects in a design with four predictor variables. The size of the sample to be included in this analysis (n = 14) is somewhat smaller than recommended. The results of this analysis should therefore be considered as tentative.

8.5.2 Sample Characteristics and Baseline Data

8.5.2.1 Demographic profile

All of the 39 participants who completed the study were female. The mean age of participants was 32.08 years (SD = 4.18 yrs) and the age of participants ranged from 24 to 42 years. Eighty-seven per cent (34) of participants were married; the remaining 13 per cent (5) were cohabiting with their partner. Thirty eight participants identified themselves as white, and one as Asian. The majority of participants identified their nationality as British (n = 25), but the sample also included participants of South African (n = 11), American (n = 2) and Finnish (n = 1) nationality. In terms of occupational status, participants were in full-time paid work (n = 25), in part-time paid work (n = 6), looking after the home (n = 4) or in full-time education (n = 3). One participant did not indicate their current occupational status. Two participants reported that they were currently using psychotropic medication and seven participants were receiving counselling[33].

A minimum period of 12 months trying to conceive was indicated as inclusion criteria for study eligibility. However, one participant who completed the study indicated that they had been trying to conceive for a period of only seven months. Examination of the demographic information showed that this participant had received a diagnosis and was currently undergoing ART treatment following a diagnosis of infertility during trying to conceive her first child. This suggested that the participant did represent the target population of this study and so the participant's data was retained. Time trying to conceive for the whole sample ranged from seven to 135 months (mean months = 37.33, SD = 24.79) and 90 per cent (n = 35) of the sample had received a diagnosis from a medical professional.

[33] Removing participants receiving counselling or psychotropic medication from the analysis did not alter the overall findings of the study relating to intervention efficacy see section 8.5.6.2.

Figure 8.2 Location of infertility diagnosis for web-based study sample.

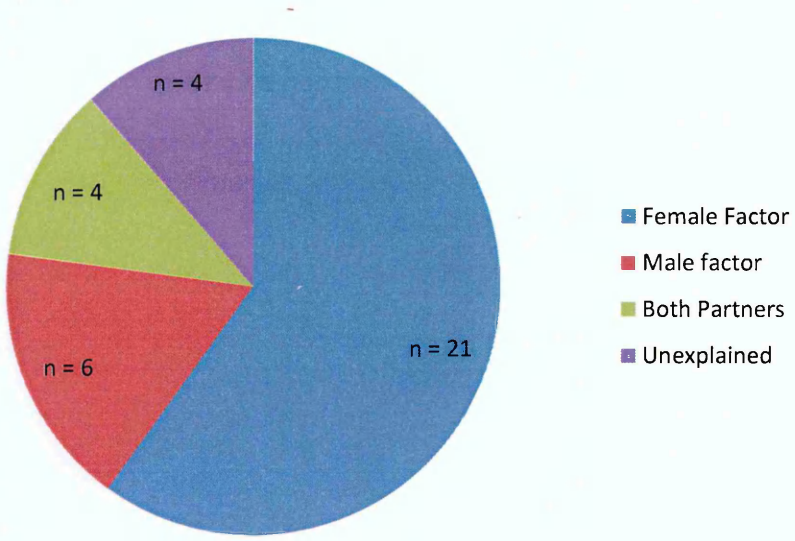


Figure 8.2 illustrates the location of infertility diagnosis for the sample, showing that the majority of participants were experiencing female factor diagnoses. The causes of female infertility were identified as ovulatory dysfunction (n = 12), tubal factors (n = 4), uterine factors (n = 3), multiple factors (i.e. ovulatory and uterine; n = 5) and recurrent miscarriage (n = 1). Male factor diagnoses were identified as low sperm count or morphology (n = 9) and azoospermia (n = 1). Of the 39 participants, 70 per cent (n = 27) indicated that they were currently undergoing or seeking infertility treatment. The majority of the sample was undergoing ART (n = 14) and were either waiting for treatment to start or were in between cycles (n = 3). The remaining ten participants were either receiving drug or surgical interventions (n = 8). One participant was awaiting referral to discuss treatment options and one was trying alternative therapies. Four participants indicated that they already had children, the number of children ranged from one to three.

8.5.2.2 Internet usage

Information collected on internet usage showed that the time spent on the internet daily varied a great deal across the sample, ranging from 20 minutes a day to 640 minutes a day (mean = 108.72, SD = 113.75). The number of infertility specific forums used ranged from one to five (mean = 1.54, SD = .90). In terms of frequency of use, over 50 per cent of the sample reported that they accessed infertility specific forums more than

four times a week (n = 20), of the remaining participants, five used the forums 3-4 times a week, eight used the forums 1-2 times a week and six participants less than once a week. Although all participants indicated that they accessed infertility forums only 23 actually posted messages on the forums, the remaining 16 participants read the posts but were not active users. Estimates of post counts for active forum users ranged from one to 2000 (mean = 250.86, SD = 449.53) with users posting between one to 30 messages a week (mean = 4.90, SD = 6.47). Active users were also asked to indicate if they expressed any emotion in the messages, all users indicated that they did. Estimates of the percentage of weekly posts that included some emotional expression ranged between 20 per cent and 100 per cent (mean = 53.7, SD = 30.16).

8.5.2.3 Psychological and physical well-being at baseline

Descriptive information for all well-being measures at baseline is presented in Table 8.1. Physical symptom reporting was higher in this sample than that of published norms (Spector & Jex, 1998) as were levels of depression, anxiety and stress (Henry & Crawford, 2005).

Table 8.1 Means, standard deviations and range of scores for well-being measures at study entry.

Measures	*N*	*Mean*	*SD*	*Range*
Physical Symptoms Inventory	39	6.33	3.19	0-13
Fertility Problem Stress	39	146.08	35.11	64-230
$DASS_{21}$ Variables	39			
Depression		13.95	10.31	0-42
Anxiety		8.67	7.93	0-26
Stress		16.31	9.50	0-36
Impact of Event Subscales	39			
Intrusion		22.26	9.27	0-35
Avoidance		17.54	7.36	0-30

This sample also reported higher levels of fertility problem stress compared to normative data of infertility treatment seeking females (Newton et al., 1999) and those undergoing IVF treatment (Peterson, Newton, Rosen & Schulman, 2006). The mean IES scores for intrusion and avoidance were higher than those reported by Miller et al. (1998) in a sample of women undergoing infertility treatment. Indeed, scores were similar to that of a sample of female psychiatric outpatients reported in the same study.

8.5.3 Checking Group Differences

To determine if there were any existing differences between the groups at study entry a series of one-way analysis of variance (ANOVA) with *condition* (disclosure, expectancy, writing control and non-writing control) entered as the independent variable were conducted. The analysis showed that the study groups did not differ in terms of age ($F_{(3,35)}$ = .48, p = .700), time trying to conceive (TTC) ($F_{(3,35)}$ = 1.32, p = .284), physical symptoms ($F_{(3,35)}$ = .80, p = .502), fertility stress ($F_{(3,35)}$ = 2.06, p = .123), depression ($F_{(3,35)}$ = .40,p = .752), anxiety ($F_{(4,86)}$ = .69, p = .563) and general stress ($F_{(3,35)}$ = .82,p = .491).

Table 8.2 Means and standard deviations for age, time trying to conceive and well-being measures at study entry by group.

	Group			
	Disclosure	Expectancy	Writing Control	Non-Writing
	(n = 5)	*(n = 10)*	*(n = 8)*	*(n = 16)*
Age (years)	30.20 (3.56)	32.90 (3.38)	32.50 (5.35)	31.94 (4.36)
TTC (months)	31.60 (13.01)	48.90 (37.86)	40.50 (19.97)	30.31 (17.52)
PSI	4.80 (3.03)	7.40 (2.63)	5.88 (3.68)	6.38 (3.34)
Fertility Stress	159.00 (31.19)	123.60 (31.81)	150.25 (41.62)	154.00 (31.29)
Depression	18.00 (15.17)	15.00 (12.66)	12.25 (8.24)	12.88 (8.42)
Anxiety	8.00 (7.62)	8.20 (6.83)	12.25 (8.71)	7.37 (8.44)
Stress	20.80 (14.74)	16.00 (9.29)	12.50 (10.24)	17.00 (7.41)
Intrusion	22.00 (6.16)	26.90 (6.69)	19.25 (11.39)	20.94 (9.96)
Avoidance	21.00 (5.70)	18.00 (5.14)	13.00 (8.38)	18.44 (7.98)

Standard deviations are presented in parentheses.

Groups also did not differ in terms of intrusive ($F_{(3,35)}$ = 1.25, p = .307) and avoidant ($F_{(3,35)}$ = 1.54, p = .221) symptoms relating to their infertility (means and standard deviations are presented in Table 8.2).

8.5.4 Instruction Adherence and Content of Essays

Between-group differences on post-writing scores of the EEQ (Greenberg & Stone, 1992) were examined using a series of one-way ANOVA to determine if writing participants had adhered to their group specific writing instructions. Scores for each EEQ item were averaged across the three writing sessions. All writing groups rated their essays as equally personal ($F_{(2.\ 10.65)}$ = 0.83, p = .462) and meaningful ($F_{(2,\ 19)}$ = 0.47, p = .631). Groups did not differ on how much they had wanted to talk to others about the event ($F_{(2,\ 19)}$ = 1.46, p = .258) or had held back from talking about the event ($F_{(2,\ 19)}$ = 1.02, p = .381). A significant difference was found between groups on ratings of how revealing of their emotions their writing was ($F_{(2,\ 12.17)}$ = 6.01, p = .015). Post hoc[34] comparisons confirmed that participants in the disclosure group (p = .006, d = 1.69) and expectancy group (p = .037, d = .97) revealed their emotions more than writing controls suggesting adherence to the instructions.

As further validation of participants' adherence to writing instructions, comparisons of emotional content of narratives using LIWC text analysis was conducted. Consistent with the procedure used in Chapter 5 and Chapter 6, the percentage of positive and negative emotion word content and cognitive word content was averaged across the three writing sessions and between-groups differences were examined using one-way ANOVA. The negative emotion word content of narratives was found to differ across groups ($F_{(2,\ 19)}$ = 13.20, p<.001). As per instructions post hoc comparisons indicated that both the disclosure (p<.001, d = 2.70) and expectancy group (p = .001, d = 2.22) participants used significantly more negative emotion words than writing control participants in their narratives. Groups did not differ in their use of positive emotion words ($F_{(2,\ 19)}$ = 1.83, p = .187). Cognitive word use differed as a function of writing group ($F_{2,\ 19)}$ = 3.94, p = .037). Post hoc comparisons showed that this difference was due to disclosure (p = .03, d = 1.52) and expectancy group (p = .024, d = .94) participants using more cognitive mechanism words in their essays than writing control participants. This pattern of results suggests that participants adhered to the writing instructions.

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[34] All post-hoc procedures are conducted using least-significant difference (LSD) pairwise comparisons.

8.5.5 Pre and Post-Writing Arousal

Two separate 3 x 2 x 3 mixed design ANOVA's were performed to assess the effect of *writing group* (disclosure, expectancy and writing control), *time* (pre-writing and post-post writing) and *session* (writing session 1, session 2, and session 3) on affective arousal as measured by negative affect (NA) and positive affect (PA). Means and standard deviations between-groups and across writing sessions are presented in Table 8.3. For NA, the main effect of writing group was marginally significant ($F_{(2, 19)}$ = 3.31, p = .059, η^2 = .26)[35]. Although the p-value was above .05, η^2 indicates a large effect, it is likely that the small sample size caused a lack of power in this analysis.

Table 8.3 Means and standard deviations for negative and positive affect pre and post writing session.

		Group					
		Disclosure (*n* = 5)		Expectancy (*n* = 9)		Writing Control (*n* = 8)	
		Pre	Post	Pre	Post	Pre	Post
Negative Affect (NA)							
WS1	*M*	22.00	25.40	24.89	33.78	19.13	17.13
	SD	12.10	9.40	10.43	10.86	7.12	3.98
WS 2	*M*	25.00	26.00	20.00	24.78	16.13	15.25
	SD	10.46	6.36	8.19	12.84	4.29	3.15
WS 3	*M*	20.20	22.60	16.67	24.11	14.00	13.00
	SD	9.88	11.84	7.00	11.21	4.54	4.47
Overall means	*M*	22.40	24.67	20.52	27.56	16.43	15.13
	SD	10.52	8.98	7.93	9.96	4.56	2.81
Positive Affect (PA)							
WS 1	*M*	22.60	19.80	23.89	22.33	23.50	24.38
	SD	12.20	10.33	9.53	8.83	8.86	12.41
WS 2	*M*	21.20	18.20	22.89	22.89	23.50	25.63
	SD	5.89	7.33	9.58	9.58	10.31	12.61
WS 3	*M*	22.00	20.20	23.89	22.33	20.88	21.88
	SD	9.77	10.55	7.98	9.21	8.79	10.99
Overall means	*M*	21.93	19.40	23.56	22.51	22.63	23.96
	SD	9.14	9.32	8.49	8.69	7.36	10.62

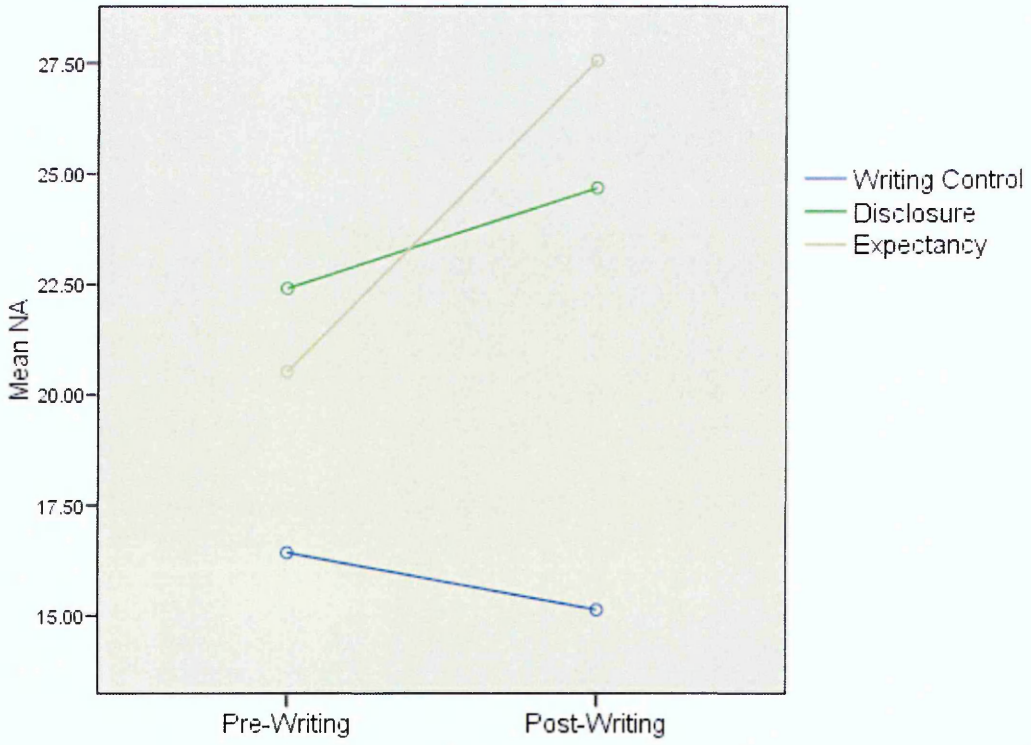
WS = Writing session

[35] Reported effect sizes (η^2) represent *partial* eta squared.

Examination of the overall means suggests that disclosure and expectancy group participants reported higher levels of NA overall (M = 23.53, SD = 9.68 and M = 24.04, SD = 7.92, respectively) than the writing control group (M = 15.77, SD = 3.41), however post hoc pairwise comparisons showed only the difference between the expectancy and writing control groups was significant (p = .027, d = 1.36).

A significant main effect of writing session ($F_{(2, 38)} = 8.31$, p = .001. $\eta^2 = .30$) followed up with pairwise comparisons suggested that there was an overall reduction in NA between writing sessions one and three (p = .001, d = .67; mean = 23.98, SD = 9.48 and mean = 18.11, SD = 8.12 respectively) and writing sessions two and three (p = .40, d = .31; mean = 20.66, SD = 8.20 and mean = 18.11, SD = 8.12 respectively). The interaction between writing group and writing session was not statistically significant ($F_{(4, 38)} = 2.07$, p = .104, $\eta^2 = .18$) but η^2 indicates a large effect, again suggesting that this analysis is underpowered. The main effect for time was marginally significant ($F_{(1, 19)} = 4.06$, p = .058, $\eta^2 = .18$) such that NA was higher after writing than before writing overall (means 22.45 and 19.78, respectively). This was followed by a significant interaction between time and writing group ($F_{(2, 19)} = 4.09$, p = .033, $\eta^2 = .30$).

Figure 8.3 Interaction between time and writing group for NA.



As illustrated in Figure 8.3, independent T-tests (two-tailed) confirmed that participants in the expectancy group reported higher levels of NA at post writing than in the writing control group ($t_{(9.42)}$ = -3.59, p = .005, d = 1.70), the difference in post-writing NA between the disclosure group and writing control group approached significance suggesting a trend ($t_{(4.49)}$ = -2.31, p =.075, d = 1.43)[36] which is further supported by the large effect size. Paired t-tests (two-tailed) showed that the expectancy group reported a significant increase in NA from pre-writing to post-writing overall ($t_{(8)}$ = -2.47, p = .039, d = 0.78) a finding that was not reflected in the disclosure ($t_{(4)}$ = -1.86, p = .136) or control writing groups ($t_{(7)}$ = 1.12, p = .301). There was no significant interaction effect for writing session by time ($F_{(3, 38)}$ = 0.85, p = .436, η^2 = .04) or writing sessions by time by writing group ($F_{(4, 38)}$ = 0.71, p = .592, η^2 = .07).

For PA there was no significant between-participants main effect of group ($F_{(2, 19)}$ = 0.16, p = .854, η^2 = .02) and no within-participants main effect for writing session ($F_{(2, 38)}$ = 0.19, p = .826, η^2 = .01) or time ($F_{(1, 19)}$ = 0.75, p = .397, η^2 = .04). None of the interaction effects were significant; group by writing session by ($F_{(4, 38)}$ = 0.49, p = .743, η^2 = .05), group by time ($F_{(2, 19)}$ = 1.64, p = .220, η^2 = .15), writing session by time ($F_{(2, 38)}$ = 0.19, p = .827, η^2 = .01) and group by writing session by time ($F_{(4, 38)}$ = 0.16, p = .956, η^2 = .02).

8.5.6 Longer-Term Effects of Writing

To examine for any changes in well-being as a function of group assignment a two-way mixed ANOVA was conducted with *group* (disclosure, expectancy, writing control and non-writing control) as the between-participant variable and *assessment period* (baseline and 4-week follow-up) as the within-participant variable, separately for PSI, fertility stress, depression, anxiety, stress, avoidance and intrusion. The means and standard deviations for the physical and psychological outcome measures for group by assessment period are presented in Table 8.4.

8.5.6.1 Physical symptoms

Analysis of PSI scores showed no significant main effects for group ($F_{(3, 35)}$ = 0.53, p = .662, η^2 = .04) or assessment period ($F_{(1, 35)}$ = 0.44, p = .509, η^2 = .01) and there was no interaction between group and assessment period ($F_{(3, 35)}$ = 1.22, p = .318, η^2 = .09).

[36] Due to Levene's Test for Equality of variance being significant (p = .034) this is reported using the equal variances not assumed test statistics, the test statistics for equal variance assumed was however significant ($t_{(11)}$ = -2.86, p = .016).

Table 8.4 Means and standard deviations for physical and psychological symptoms for all groups at baseline and 4-week follow-up.

		Disclosure		Expectancy		Writing Control		Non-Writing Control	
		Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
		(n = 5)		(n = 10)		(n = 8)		(n = 16)	
Physical Symptoms									
PSI	*M*	4.80	5.80	7.40	6.70	5.88	5.75	6.38	5.00
	SD	3.03	3.42	2.63	3.30	3.68	3.96	3.34	3.37
Fertility Related Distress									
FPI	*M*	159.00	145.60	123.60	125.90	150.25	151.13	154.00	158.13
	SD	31.19	31.91	31.81	30.23	41.62	39.30	31.29	40.69
DASS Variables									
Depression	*M*	18.00	16.00	15.00	17.80	12.25	13.00	12.88	10.88
	SD	15.17	9.90	12.66	15.24	8.24	11.16	8.42	9.03
Anxiety	*M*	8.00	5.60	8.20	9.40	12.25	6.75	7.38	6.88
	SD	7.62	3.29	6.83	12.58	8.71	6.92	8.44	6.61
Stress	*M*	20.80	20.40	16.00	19.80	12.50	13.20	17.00	15.25
	SD	14.74	5.55	9.29	11.79	10.24	10.57	7.41	9.57
Impact of Event Scale Dimensions									
Intrusion	*M*	22.00	25.60	26.90	25.60	19.25	20.38	20.94	19.31
	SD	6.16	5.73	6.69	7.38	11.39	10.89	9.96	9.96
Avoidance	*M*	21.00	18.60	18.00	19.30	13.00	16.00	18.44	16.81
	SD	5.70	8.85	5.14	7.82	8.38	7.03	7.98	8.98

8.5.6.2 Psychological distress

FPI scores did not differ between groups ($F_{(3, 35)}$ = 1.84, p = .159, η^2 = .14) or assessment period ($F_{(1, 35)}$ = 0.26, p = .613, η^2 = .01) and there was no interaction between groups and assessment period on this measure ($F_{(3, 35)}$ = 1.37, p = .268, η^2 = .11).

Analysis of the $DASS_{21}$ subscales found no main effect of groups for depression ($F_{(3, 35)}$ = 0.58, p = .633, η^2 = .05), anxiety ($F_{(3, 35)}$ = 0.28, p = .841, η^2 = .02) or stress ($F_{(3, 35)}$ = 0.87, p = .467, η^2 = .07). There was no main effect of assessment period for depression ($F_{(1, 35)}$ = 0.01, p = .927, η^2 = .00), anxiety ($F_{(1, 35)}$ = 1.81, p = .187, η^2 = .05)[37] or stress ($F_{(1, 35)}$ = 0.20, p = .656, η^2 =.01). The interaction effects between group and assessment period were also non-significant for the subscales; depression ($F_{(3, 35)}$ = 1.13, p = .350, η^2 = .01), anxiety ($F_{(3, 35)}$ = 1.25, p = .307, η^2 = .10) and stress ($F_{(3, 35)}$ = 0.92, p = .444, η^2 = .07). Overall, results indicate that physical and psychological well-being of participants did not change over the study period, however, the effect size of non-significant findings range from small (.01) to large (.10) which could indicate that that due to the small sample size the study was underpowered.

8.5.6.4 Symptoms of intrusion and avoidance

Symptoms of intrusion and avoidance did not differ between groups [intrusion ($F_{(3, 35)}$ = 1.34, p = .276, η^2 = .10), avoidance ($F_{(3, 35)}$ = 0.80, p = .505, η^2 = .06)] or assessment period [intrusion ($F_{(1, 35)}$ = 0.14, p = .711, η^2 = .004) avoidance ($F_{(1, 35)}$ = 0.003., p = .958, η^2 = .000)] and no significant interaction effect emerged [intrusion ($F_{(3, 35)}$ = 0.91, p = .446, η^2 = .07), avoidance ($F_{(3, 35)}$ = 0.98, p = .412, η^2 = .08)]. This indicates that overall participants did not experience a change in the subjective impact of their infertility over the study period. Again, effect sizes in this analysis could indicate that these findings are due to the small sample size in the study.

8.5.7 Language analysis

In order to determine the pattern of language use in participants' narratives and any possible differences between the groups in relation to the manipulation of expectancy, an analysis of the number of words produced and the percentage of positive emotion, negative emotion and cognitive words within the disclosure and expectancy narratives was conducted using a 2-way mixed ANOVA with *group* (disclosure and expectancy)

[37] For anxiety, the main effect of assessment period was significant when analysis was conducted removing participants receiving counselling and/or psychotropic medication ($F_{(1, 28)}$ = 5.28, p = .029, η^2 = .20) suggesting a reduction in anxiety at follow-up for all participants.

as the between-group variable and *writing session* (session 1, session 2 and session 3) as the within-group variable. Writing control narratives were not included for analysis in view of the findings that control narratives could be differentiated from disclosure/expectancy narratives in terms of content, confirming adherence to writing instructions (see section 8.5.4).

The means and standard deviations for the linguistic indices are presented in Table 8.5. In terms of word count, the number of words produced by participants in their narratives did not differ between groups ($F_{(1,12)} = 0.43$, $p = .525$, $\eta^2 = .04$). A significant main effect for writing session ($F_{(1.91, 22.88)} = 5.00$, $p = .017$, $\eta^2 = .29$) suggested that there was a significant difference in the number of words produced across writing sessions overall. Pairwise comparisons confirmed that participants produced fewer words at the third writing session than the first ($p = .032$, $d = 0.22$), similarly fewer words were produced at the final writing session than the second ($p = .01$, $d = 0.27$). There was no significant interaction between group and writing session ($F_{(1.91, 22.88)} = 1.78$, $p = .192$, $\eta^2 = .13$).

The percentage of positive emotion words in participants' narratives was not different between groups ($F_{(1,12)} = 0.84$, $p = .377$, $\eta^2 = .07$) and did not fluctuate across the writing sessions ($F_{(2, 24)} = 0.22$, $p = .805$, $\eta^2 = .02$). There was no significant interaction between group and writing session ($F_{(2, 24)} = .41$, $p = .670$, $\eta^2 = .03$). Equally, the use of negative emotion words did not differ between groups ($F_{(1, 12)} = 1.14$, $p = .308$, $\eta^2 = .09$) or writing sessions ($F_{(2, 24)} = 1.61$, $p = .220$, $\eta^2 = .12$) and there was no interaction effect between group and writing session ($F_{(2, 24)} = 0.23$, $p = .794$, $\eta^2 = .02$).

Table 8.5 Means and standard deviations for word count and total percentage of positive emotion, negative emotion and cognitive process words of disclosure and expectancy group narratives.

	Groups					
	Disclosure		Expectancy		*Overall*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Word Count						
WS1	522.20	167.68	628.22	286.35	*590.36*	*248.78*
WS2	582.40	148.87	619.57	325.77	*606.36*	*269.21*
WS3	441.80	160.17	585.00	310.67	*533.86*	*268.99*
Pos. emotion words (%)						
WS1	2.06	0.82	1.87	0.78	*1.94*	*0.77*
WS2	2.32	0.90	1.69	1.12	*1.91*	*1.06*
WS3	2.21	1.05	2.12	0.65	*2.15*	*0.77*
Neg. emotion words (%)						
WS1	3.64	1.21	3.44	1.15	*3.51*	*1.13*
WS2	3.12	0.92	2.45	1.07	*2.69*	*1.04*
WS3	3.61	1.24	2.88	1.66	*3.14*	*1.52*
Cognitive Words (%)						
WS1	8.47	0.55	8.01	1.59	*8.17*	*1.30*
WS2	8.61	1.04	9.32	1.94	*9.07*	*1.66*
WS3	10.35	3.81	9.55	1.49	*9.84*	*2.45*

WS = Writing session

Finally, the use of cognitive mechanism words did not differ between groups ($F_{(1,12)}$ = 0.05, p = .825, η^2 = .004). The main effect for writing session was marginally significant ($F_{(1.23, 14.72)}$ = 3.99, p = .058, η^2 = .25)[38]. Pairwise comparisons showed that this was due to a significant increase in the use of cognitive mechanism words from writing session one to writing session three (p = .012, d = 0.85). There was no significant interaction between session and group ($F_{(1.23, 14.72)}$ = .85, p = .393, η^2 = .07).

8.5.7.1 Language use as a predictor of outcome

Hierarchical linear regressions were conducted for each of the outcome variables (PSI, FPI, depression, anxiety, stress, intrusion and avoidance) to determine is changes in

[38] Due to Mauchly's Test of Sphericity being significant (p = .004) this is reported using the Greenhouse-Geisser correct test statistics, the test statistics for spehricity assumed was however significant ($F_{(2,24)}$ = 3.99, p = .032, η^2 = .25).

word content across the writing session for disclosure participants (disclosure and expectancy groups were combined since changes in word use across the study were not differentiated by group, see section 8.5.7) were predictive of any change in well-being at follow-up after controlling for baseline values. Following the procedure used in Chapters 5 and 6, the baseline value of the dependent variable was entered in the first step of the regression as a control. The change scores for the word categories negative emotion, positive emotion and cognitive mechanisms were then entered together at the second step as in Chapter 5.

Results from the hierarchical regression analyses are summarized in Tables 8.6 and 7.7. The analysis showed that a change in the use of negative emotion words (β = -.26, t = -2.29, p = .048) significantly predicted depression scores after controlling for baseline values, such that the use of fewer negative emotion words at writing session three compared to writing session one was predictive of an increase in depressive symptoms at follow-up. An increase in the use of cognitive mechanism words across the writing sessions predicted a reduction in symptoms of anxiety (β = -.57, t = -2.38, p = .041) after controlling for baseline values. Changes in word use did not predict scores on any other outcome (PSI, FPI, stress, intrusion and avoidance) measures at follow-up[39]. Non-significant findings are not reported here, SPSS outputs for all hierarchical regressions can be found in Appendix A.19.

[39] Analysis of the writing-control group data did not find these patterns of change.

Table 8.6 Summary of Hierarchical Regression Analyses for PSI, FPI, depression, anxiety and stress at 4-week follow-up (N = 14).

		Step1			Step 2		
Variable	Predictors	*B*	*SE B*	*β*	*B*	*SE B*	*β*
PSI	PSI (baseline)	0.82	0.22	**.74****	0.77	0.23	**.69****
	Neg. Emotion Change				0.05	0.43	.02
	Pos. Emotion Change				-0.96	0.75	-.28
	Cognitive Change				0.15	0.36	.09
	R^2		0.55			0.65	
	ΔR^2		-			0.10	
FPI	FPI (baseline)	0.80	0.11	**.90****	0.74	0.13	**.83****
	Neg. Emotion Change				0.02	2.67	.001
	Pos. Emotion Change				-5.16	4.65	-.16
	Cognitive Change				1.24	2.45	.08
	R^2		0.82			0.85	
	ΔR^2		-			0.03	
Depression	Depression (baseline)	0.92	0.13	**.89****	0.80	0.12	**.78****
	Neg. Emotion Change				-2.17	0.95	**-.26***
	Pos. Emotion Change				-2.25	1.57	-.17
	Cognitive Change				-1.09	0.77	-.17
	R^2		0.35			0.40	
	ΔR^2		-			0.05	
Anxiety	Anxiety (baseline)	0.99	0.35	**.63***	1.42	0.37	**.90****
	Neg. Emotion Change				-0.96	1.39	-.15
	Pos. Emotion Change				-1.93	2.36	-.18
	Cognitive Change				-3.03	1.27	**-.57***
	R^2		0.40			0.64	
	ΔR^2		-			0.24	
Stress	Stress (baseline)	0.64	0.16	**.76****	0.62	0.18	**.74****
	Neg. Emotion Change				1.39	1.12	.25
	Pos. Emotion Change				-1.60	1.95	-.17
	Cognitive Change				-0.15	0.99	-.03
	R^2		0.43			0.47	
	ΔR^2		-			0.05	

*p < .05. **p < .01.

Table 8.7 Summary of Hierarchical Regression Analyses for intrusion and avoidance at 4-week follow-up (N = 14).

		Step1			Step 2		
Variable	Predictors	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Intrusion	Intrusion (baseline)	0.26	0.23	.31	0.10	0.33	.13
	Neg. Emotion Change				-0.74	1.08	-.21
	Pos. Emotion Change				0.35	2.09	.01
	Cognitive Change				-0.92	1.03	-.32
	R^2		0.09			0.20	
	ΔR^2		-			0.11	
Avoidance	Avoidance (baseline)	0.71	0.42	.44	0.84	0.45	.52
	Neg. Emotion Change				1.83	1.39	.36
	Pos. Emotion Change				-1.95	2.51	-.23
	Cognitive Change				-0.74	1.17	-.18
	R^2		0.19			0.35	
	ΔR^2		-			0.16	

*p < .05. **p < .01.

8.6 Discussion

Contrary to previous research that has demonstrated the beneficial effect that writing about traumatic or stressful events can have for physical and psychological wellbeing (e.g. see Chapter 2, section 2.2), this study found no significant improvements at follow-up in physical symptoms, fertility problem stress, depression, anxiety or general stress in infertile women who wrote about the experience of infertility compared to controls. No significant changes in symptoms of intrusion or avoidance over the study period emerged in any of the groups. Furthermore, positive expectancies about the emotional impact of writing did not appear to have any impact on the reporting of physical or psychological symptoms at follow-up.

Assessment of pre and post-writing mood indicated that both the disclosure and expectancy group participants experienced more negative affect immediately after writing than the group who wrote factually about their infertility. This pattern of findings is consistent with previous research (e.g. Francis & Pennebaker, 1992) and the findings of Chapters 5 and 6. These findings correspond to the highly personal and emotional nature of infertility that participants were disclosing. Although writing control participants were asked to write about their infertility, and did indeed rate their narratives as equally personal and meaningful (compared with disclosure groups),

disclosure groups reported that their writing was more revealing of their emotions than participants in the writing control group. Furthermore, examination of the linguistic content of essays confirmed that disclosure group essays contained more negative emotion words than writing control group essays, which confirms the manipulation of writing instructions as having been successful.

Several possibilities may account for the lack of intervention effects in this study. Firstly, analysis of the linguistic content of disclosure essays suggested that the percentage of negative and positive emotion words remained relatively stable across the writing sessions. Previous research has found that participants were more likely to benefit from disclosure writing if they used a high number of positive emotion words compared to a moderate number of negative emotion words (Pennebaker & Francis, 1996; Pennebaker, Mayne & Francis, 1997). Indeed, in the study presented in Chapter 5 of the current thesis the percentage of negative emotion words in the trauma narratives reduced at each writing session and the positive emotion words significantly increased by the third writing session (although only the change in negative emotion word use was related to outcome). Unexpectedly, analysis of the relationship between negative word change and outcome showed that an increase in the use of negative emotion words from writing session one to writing session three was associated with a reduction in depressive symptoms in this sample, a pattern that is contrary to earlier findings (Chapters 5 and 6) and those reported in the literature (e.g. Pennebaker et al., 1997) i.e. that a reduction in negative word use across writing sessions is beneficial, at least in student populations. These findings do need to be interpreted with caution given the very small sample size used in the analysis. However, this inconsistency is indicative of how the mechanisms through which written disclosure exerts its effects might be dependent on the population in which it is implemented. For example, in a study of adolescents with asthma, Warner et al. (2006) found that a greater use of negative emotion words was associated with lower asthma related functional disability scores in this population. The authors suggested that those who became more reflective, self-aware and serious over the writing period showed later health benefits. For some infertile individuals, the anonymity afforded by an internet-mediated disclosure intervention may have provided an opportunity to express their negative feelings about their infertility that they may not have the opportunity to express in their everyday social interactions and this may have proved beneficial. A trend towards an increase in cognitive word use across writing sessions in this study was noted in disclosure participants. Indeed, analysis of the change in word use across the study indicated that an increase in the use of cognitive mechanism words was predictive of a

reduction in symptoms of anxiety for those in the disclosure groups. This is consistent with the findings of the study presented in Chapter 5 and previous research that has found changes in cognitive word use in disclosure narratives to be associated with the beneficial changes in physical health (Pennebaker et al., 1997; Pennebaker & Francis, 1996), positive growth, (Ullrich & Lutgendorf, 2002) and mood (van Middendorp & Geenen, 2008) for participants.

Secondly, some characteristics of the sample may have influenced the current findings; for example, the women in this sample reported particularly high levels of psychological and physical symptoms. Comparisons with published norms for the FPI suggested that the women in this study, who would be classified within the moderately high range for fertility problem stress, were experiencing higher levels of infertility-related stress than the average woman seen for infertility treatment (Newton et al., 1999). Scores on the $DASS_{21}$ subscales (anxiety, depression and stress) for this sample where similarly high, being more comparable to a clinical sample of obsessive-compulsive disorder (OCD) patients (Antony, Bieling, Cox, Enns & Swinson, 1998) than non-clinical adult norms (Henry & Crawford, 2005). One explanation for these findings is that when self-relevant measures (i.e. those measuring psychological functioning) are completed online there is a tendency for increased self-disclosure, honesty, and consequently, higher scores on such measures (Joinson, 1999; Peterson, Johannsson & Carlsson, 1996; see section 7.2.7.1 for a detailed discussion). The high levels of fertility problem stress (FPI) reported in a recent study which examined the efficacy of a web-based psycho-educational infertility source for female infertility patients (Cousineau et al., 2008) provides some support for this explanation. The patients in Cousineau et al.'s web-based study were of a similar profile to those in Peterson et al.'s (2006) study (i.e. treatment seeking, recruited from a fertility clinic, of similar age) yet had higher FPI scores; one difference was that the participants in Peterson et al.'s study completed the paper-based FPI. Notwithstanding the potential impact of online administration of measures, it is possible that the higher levels of symptom reporting in this sample of infertile women are associated with them being recruited from the internet. More specifically, this sample was recruited from infertility forums. Whilst there is no evidence to suggest that users of infertility forums have poorer psychological well-being in general, there is evidence to suggest that being a member of an online infertility community may encourage some infertile women to withdraw from real-world interactions which is associated with higher levels of depression and perceptions of fertility as being more stressful (Epstein, Rosenberg, Venet Grant & Hemenway, 2002).

The fact that this particular sample of infertile women was heterogeneous may have been problematic for finding any intervention effect. As discussed in section 2.2.5 the stage of treatment at which an individual finds themselves can influence their psychological state, with fluctuations in levels of stress across the treatment cycle (Boivin & Takefman, 1995). While those embarking on treatment might be optimistic about achieving success (Visser, Haan, Zalmstra & Wouters, 1994), for those who do not achieve a pregnancy, treatment failure is highly distressing (Slade, emery & Lieberman, 1997; Verhaak, Smeenk, van Minnen, Kremer, & Kraaimaat, 2005). Indeed, examination of the baseline descriptive data for the sample shows that standard deviations are large (see Table 8.1) indicating that there is a great deal of variation in scores particularly on the $DASS_{21}$. This is not surprising given the variation in years TTC and number and type of treatments and stage of treatment of the women in this sample. Infertility specific intervention studies in general recruit samples that share some characteristics beyond that of being infertile, for example, McNaugton-Cassill, Bostwick, Arthur, Robinson and Neal, (2002) recruited couples entering an IVF cycle and evaluated a support group intervention delivered over the treatment cycle. Similarly, Facchinetti, Tarabusi and Volpe (2004) recruited patients on a waiting list for IVF-ET to receive a 16 week course of CBT treatment. Others have included strict exclusion criteria to maintain as much homogeneity in the sample as possible (e.g. Hosaka, Matsubayashi, Sugiyama, Izumi & Makino, 2002). For example, Domar et al. (2000) recruited women into a group based CBT programme who had been trying to conceive for between one to two years, women with clinical levels of depression were excluded from the study.

Given the above, it is arguable that disclosure writing may only be beneficial for a sub-sample of infertile women (i.e. new referral IVF patients, women with a specific diagnosis). Alternatively, it is possible that written disclosure provides little benefit for forum users because they are already expressing their thoughts and feelings about their infertility on the forums of which they are members. The anonymity afforded by online communities provides an opportunity for individuals experiencing infertility to freely express their thoughts and emotions without the fear of stigmatization and embarrassment that face-to-face communications can entail (Malik & Coulson, 2008a). Of the 39 participants in the sample 23 were active members of infertility forums. Although there was a great deal of variation in the number of forums that individuals used and how prolific these active forum members were in posting messages on the discussion boards, all active users indicated that they expressed their emotions in their posts. This could also explain the stability of emotional language use across the writing

sessions, for this sample of participants the writing sessions may not have provided the novel opportunity to express thoughts and feelings that it does for others who do not have this outlet. Interestingly a comparison of the content of posts from a breast cancer support forum with content of essays from multiple disclosure studies (see Pennebaker, Francis & Booth, 2001 for normative data) suggested that the percentage of negative and positive emotion words used by forum members in their messages was similar to that of the pattern seen in the emotional writing groups of disclosure studies (Alpers et al., 2005). The possibility that infertility forum users are expressing their thoughts and feelings in a similar way to that seen in disclosure writing research, warrants further investigation.

It could be argued that the 4-week follow-up period was insufficient to detect longer-term effects of disclosure. Indeed, some studies that have utilized multiple follow-up periods have found that improvements in well-being are not evident until many months following disclosure. Gortner, Rude and Pennebaker (2006) found that disclosure writing in depression vulnerable students was associated with a reduction in depressive symptoms at 6-month follow-up but not at 5-week follow-up. Similarly, studies examining the benefits of written disclosure in fibromyalgia patients (Gillis et al., 2006), rheumatoid arthritis patients (Smyth, Stone, Hurewitz & Kaell, 1999) and breast cancer patients (Stanton et al., 2002) have found that the physical benefits of disclosure often do not appear until at least 3-4 months after the intervention. Therefore it is possible that any benefits of disclosure in this sample of women with infertility may not have become apparent until after the follow-up period of 4-weeks used in this study. However given the considerable drop-out experienced in this study it seems likely that a longer follow-up period would have resulted in unacceptably low sample sizes.

Finally, for some populations, disclosure writing appears to provide little or no benefit. This has been shown to be particularly so for individuals experiencing bereavement (e.g. Stroebe, Stroebe, Schut, Zech & van den Bout, 2002; see section 2.3.7.2 for a discussion). Infertility constitutes a major loss, the emotional reaction to which is grief (Covington, 1988). As identified by Menning (1980) the grief associated with infertility is often not recognized by others and is "socially unspeakable" (p. 317). As expressed by a woman with infertility:

"A lot of people don't understand that infertility is very much like having a child die. You grieve for the baby who wasn't conceived this month, and for all the babies you'll never have (Lasker & Borg, 1987 p. 20).

Whilst it is possible that the characteristics of loss and grief in individuals with infertility might explain the lack of an intervention effect in this study, the evidence suggests that disclosure writing does appear to provide some positive benefits for individuals experiencing complicated grief (Kovac & Range, 2000). The term complicated grief is used to refer to a grief reaction that shows a marked deviation from the normal pattern and is maladaptive (Stroebe et al., 2005). Bergart (2000) likened the grief associated with infertility to that of 'disenfranchised grief' which refers to the experience of loss for which there is no opportunity to publicly mourn. Covington (1988) suggests that a distinction can be made between couples who are unable to conceive and those who are able to achieve a pregnancy but never carry to term (experiencing miscarriage or stillbirth), such that whilst the symptoms of grief might be the same, the mourning process will not. For, example the loss of pregnancy is an acute, recognizable event, whilst the losses associated with the inability conceive (i.e. the loss of fertility, the loss of never experiencing a pregnancy) constitute an unrecognizable, chronic situation. For some couples both of these situations can arise (Covington, 1988). Within this context the losses associated with the inability to conceive could be likened to that of complicated grief, therefore disclosure writing may only be beneficial for those individuals with infertility who are experiencing a grief reaction similar to that of complicated grief. From the personal information available it is not possible to establish the nature of loss experienced by the participants within this study, however, considering different diagnoses and treatment characteristics of the sample it is likely that experience of loss within this sample will be varied.

There are a number of limitations that should be considered when interpreting the results of this study. Of the 111 participants who logged into the study web-site only 39 actually completed the study. Though high attrition rates are not unusual in the disclosure literature (e.g. Ullrich & Lutgendorf, 2002) this level of attrition might suggest that the writing intervention was not well received in this sample. The possibility is supported by the findings that allocation to group was associated with drop out; more specifically that attrition was lower in the non-writing control group. A consequence of this level of attrition is that the final sample size of this study was relatively small, to address the issue of Type II error, effect sizes were included for all non-significant findings. A number of medium to large effects, that did not achieve statistical significance, are noted in the analysis of the short-term and longer-term effects of disclosure that could indicate the study was underpowered. However, it also possible that these effects were due to chance, therefore replication of this study with a larger

sample is needed before any clear conclusions can be drawn. Another implication of the sample size in this study is that the opportunity to examine potential within group moderators was limited. There was a great deal of heterogeneity in this sample in relation to location of diagnoses, duration of infertility, current treatment and stage of treatment. The potential failure to find any intervention effects may be due to the fact that written disclosure may only provide benefits for a select few.

8.7 Summary

The aim of this study was to examine the efficacy of an internet-mediated written emotional disclosure intervention for individuals with infertility. Additionally, this study sought to examine the possible moderating effect of positive expectancies on the outcome of written emotional disclosure. The findings are mixed. This study found no significant improvements in the physical or psychological well-being of participants who disclosed their thoughts and feelings about their infertility compared to those who wrote factually about their infertility, or non-writing controls. Furthermore, positive expectancies did not moderate the outcome of disclosure at 4-week follow-up. Analysis of the linguistic content did find that for participants assigned to the disclosure groups an increase in the use of negative emotion words from the first writing session to the final writing session was associated with a reduction in depressive symptoms at follow-up. This is an unexpected finding that is likely related to the unique characteristics of the sample. Similarly an increase in the use of cognitive words across the writing sessions was associated with a reduction in symptoms of anxiety: a finding that is consistent with previous research (e.g. van Middendorp & Geenen, 2008). These findings suggest that written emotional disclosure did provide some, albeit limited, positive psychological benefits for individuals with infertility, more specifically for those who produced this pattern of increasing cognitive word use in their narratives.

Notwithstanding these positive findings, possible explanations for the lack of a main intervention effect in this study include the heterogeneity of the sample (years TTC, location of diagnosis and current treatment status), the distinction between individuals in their grief reaction to their infertility, the time at which follow-up measures were completed and the method of recruitment used in the study. The fact that a large proportion of participants, who were recruited via infertility discussion forums, were active forum users and reported expressing their emotions in the messages they posted might account for the overall null effects in this study. The possibility that infertility forum users are expressing their thoughts and feelings in a similar way to that seen in disclosure writing will be examined in Chapter 9.

Chapter 9

Text Analysis of an Online Infertility Support Forum: Emotional and Cognitive Content.

9.1 Overview

The findings presented in Chapter 8 suggest that disclosing thoughts and feelings about infertility via an internet-mediated writing intervention does not provide any physical or psychological benefits for a sample of women with infertility. One of the possible explanations for these null findings is that this group of women, who were recruited from infertility discussion forums, are already expressing their thoughts and feelings about their infertility on the forums of which they are members. The purpose of this study is to examine the emotional and cognitive content of messages posted to an infertility specific discussion board using the Linguistic Inquiry and Word Count Programme (LIWC: Pennebaker, Francis & Booth, 2001) and to make comparisons with the linguistic content of the disclosure narratives produced by participants in Chapter 8. In addition, the linguistic content of Chapter 8 participant narratives will be compared descriptively with that of published normative data (Pennebaker et al., 2001).

9.2 Introduction

The growth of internet resources over the last decade has provided a domain through which individuals who are experiencing fertility problems can access information about diagnosis and treatment, receive support and share their stories (Epstein, Rosenberg, Venet Grant & Hemenway, 2002). The use of the internet for fertility related issues is particularly high amongst treatment seeking individuals (see section 7.2.1; Haagen et al., 2003; Rawal & Haddard, 2006; Weissman et al., 2000). One of the most often cited motivations for fertility related internet use is to gain a better understanding of the fertility problem the individual is facing (Haagen et al., 2003). In a survey of internet use in patients (couples) awaiting the start of IVF and ICSI treatment conducted by Haagen et al. (2003), patients indicated that the most commonly searched for topics on the

internet were 'causes', 'treatment options', 'success percentages of treatments' and 'patient organizations'. This is consistent with other studies that have found information seeking to be the most common motivation for internet use in infertility patients (Rawal & Haddard, 2006; Weissman et al. 2000). Haagen et al. (2003) found that 41 per cent of couples also used the internet to seek emotional support for their infertility problems. This is in contrast to the findings of a survey of UK fertility patients which found that only 10 per cent of the 58 patients surveyed used the internet to seek emotional support (Rawal & Haddad, 2006). The finding that the female partner more predominantly used the internet for fertility related issues in Haagen et al.'s (2003) study is one possible explanation for this discrepancy. Research has shown that women show a preference for groups that offer emotional support for health issues whereas men show a preference for information-oriented groups (Mo, Malik & Coulson, 2009). Indeed, in a survey of 589 users of an infertility discussion/support forum run by an international fertility organisation, Epstein et al. (2002) found that 99.1 per cent of respondents were female.

Infertility discussion forums are one unique domain through which individuals can seek information and support. Indeed, as discussed in section 7.2.1, infertility specific discussion forums can provide a number of benefits for users (e.g. reducing feelings of isolation). One particular benefit noted by participants in a study by Malik and Coulson (2008) is that the anonymity of the discussion forums provides an environment in which painful and negative emotions can be disclosed. It is possible therefore that those who use infertility specific discussion forums are disclosing thoughts and feelings in a similar way to that encouraged in a written disclosure intervention, as implemented in Chapter 8. Indeed, in an examination of the linguistic content of a breast cancer discussion forum using the LIWC, Alpers et al. (2005) found that the pattern (in terms of percentages) of emotional and cognitive words used by participants in their messages was similar to that of the pattern seen in the emotional writing conditions of multiple disclosure studies (Pennebaker et al., 2001). In light of these similar patterns it is suggested that verbalising thoughts and feelings through online discussion forums may serve to facilitate coping and reduce emotional distress in much the same way as written emotional disclosure does (Caplan & Turner, 2007).

9.3 Aims

The principal aim of this study was to examine the emotional and cognitive content of messages posted to an online discussion forum used by individuals with infertility and make comparisons with the text samples taken from the disclosure study in Chapter 8

and that of previous disclosure studies. In addition, this study examined the motivations for posting messages on infertility forums (i.e. advice regarding treatment, symptoms or emotional support) using a content analysis approach.

9.4 Method

9.4.1 Ethical Considerations

The study was conducted in accordance with the British Psychological Society Guidelines for Ethical Practice in Psychological Research Online (2002). Ethical approval for the study was obtained from the Faculty Research Ethics Committee (see Appendix A.20 for Ethics Proforma and Letter of Approval). The debate relating to conducting research on online communities and access to the content of message boards is discussed in detail in section 7.3.1. The infertility discussion forum from which messages were downloaded is a publically accessible site that requires no registration in order to read or download messages contained on the site. An e-mail was sent to the moderators of the site to inform them of the researcher's intentions and aims of the study. In consideration of the 'public' nature of the discussion board consent was not sought from individual members. In accordance with BPS guidelines direct quotations of posts analysed in this study are not included as exemplars in order to maintain anonymity. In order to maintain confidentiality the name of the forum, sub-forums and pseudonyms used by contributors to the message boards are also excluded.

9.4.2 Data Collection and Sampling

Chosen because of its public accessibility and message download facility, the data for this study was obtained from a popular public fertility and parenting forum with over 3000 members. The forum is organised into a number of boards relating to fertility and parenting. Within the general fertility board are a number of infertility related sub-forums through which members can seek support and advice specific to their diagnosis and fertility treatment. Although the majority of these sub-forums are publicly displayed some sub-forums are only accessible to registered members.

Messages posted to the publicly accessible infertility specific sub-forums of the site within the preceding month (November-December 2008) were identified and downloaded. Because the study was interested in examining if infertility forum users are expressing their thoughts and feelings in a similar way to that which is encouraged in disclosure writing interventions the LIWC profile of only the opening (original) post of each thread was examined. All replies were removed from the thread before analysis.

This technique of sampling was used so as to capture the cognitive and emotional content of messages that are unsolicited, rather than those which are responses to the requests of others. Using this method allowed the coding of each message into a category to provide information on overall message content (see section 9.4.3). Messages which were posted by moderators and board administrator's for the purpose of providing information about the site or upcoming events and which included content cut and pasted from the internet or other sources were removed from the downloaded data. This sampling method resulted in a total of 259 opening posts generated by 148 users.

9.4.3 Coding

Posts were coded into categories. Categories were developed based on a post-hoc content analysis. Each message was read and the main topic of the post was summarized. Whilst many of the opening posts could be placed within multiple categories, posts were categorised based on the primary focus of the message contained to examine the motivation for posting on the forum. The posts were then grouped based on their similarities into four main categories; seeking *advice, seeking support, offering support/advice* and *status update*. *Seeking advice* was defined as those messages which directly asked questions or requested information from the users of the forum. This category was further subdivided according to the nature of the advice sought resulting in the seven subcategories listed in Table 9.1.

Seeking support was defined as those messages which explicitly requested emotional or practical support in dealing with their infertility problem or treatment. The category *offering support/advice* was defined as messages which offered unsolicited advice or information to other users. The final category of *status update* was defined as those messages in which users provided an update on their infertility diagnosis or treatment journey. This category also included messages in which new users introduced themselves to the community. Table 9.1 shows that the majority of messages were seeking advice (72%). The number of messages seeking support only accounted for 10 per cent of the total.

Using the defined categories, a second independent rater categorized the messages and an inter-rater reliability analysis was performed using the Kappa statistic to determine consistently between the two independent ratings. Agreement between the raters across the categories and subcategories was moderate, Kappa = 0.59 ($p < .001$).

When calculated across the four categories (with the advice subcategories collapsed into one) agreement was substantial, Kappa = 0.77 ($p<.001$).

Table 9.1 Message category codes and frequencies.

Category	Subcategory	Frequency (%)	Examples
Seeking Advice	*Diagnoses or general fertility*	25 (10)	Recurrent miscarriage, irregular menstrual cycles, ejaculatory problems. Diagnostic procedures and interpretation of test results.
	Symptoms of treatment or diagnoses	52 (20)	Symptoms of specific disorders i.e. endometriosis. Bleeding, nausea, vomiting and changes in mood during treatment. . Early pregnancy symptoms following treatment.
	Impact of health behaviours	14 (5)	Potential negative or positive impact of alternative therapies, cold and flu medication and vitamins on treatment and outcome.
	Treatment options	20 (8)	Adoption process, egg sharing, hospital waiting lists, funding and specialist consultants.
	Treatment process	60 (23)	Common practices and treatment guidelines for ART procedures (i.e. the use of pessaries).Comparisons between treatments and pregnancy testing dates.
	Relationships/work/life	6 (2)	Impact of infertility and treatment on relationships and life goals. Work and time off when undergoing ART.
	Non-fertility or miscellaneous	10 (4)	Current affairs and shopping.
	Total Advice	187 (72)	
Seeking Support		27 (10)	Worries about the outcome of treatment. Seeking a buddy who is in the same situation/having the same treatment.
Offering support/advice		7 (3)	Motivational stories and poems. Support groups and organizations.
Status update		38 (15)	Treatment outcome and test results. Introductions by new members.

9.4.4 Sample Characteristics

Due to the anonymous nature of the message boards, the demographic information of users is limited to those who chose to include these details. The demographic information contained in the member profile, which is located in the margin of the posted message, includes information on the post count and location of the poster (i.e. country/city). There is the option to include information on current or past treatments. Additionally, some members include information on their age, partner's age, diagnosis, treatments and number of ART cycles in their signatures[40] or in the content of the message. This information was noted when present. The gender of the poster was inferred from the message content; this was possible because of the level of detail (primarily regarding symptoms and treatment) in the posts.

Of the 148 users who posted messages in the period sampled, 98.6 per cent (n = 146) were female. The number of posts made to the message boards by users since registration to the site (including both opening posts and responses to other member's messages) ranged from 1 to 4700. As indicated in Figure 9.1 the majority of users in this sample identified their location as England, though most users were living in Europe the sample also consisted of users from Australia, New Zealand, India and the USA, one user did not disclose their location.

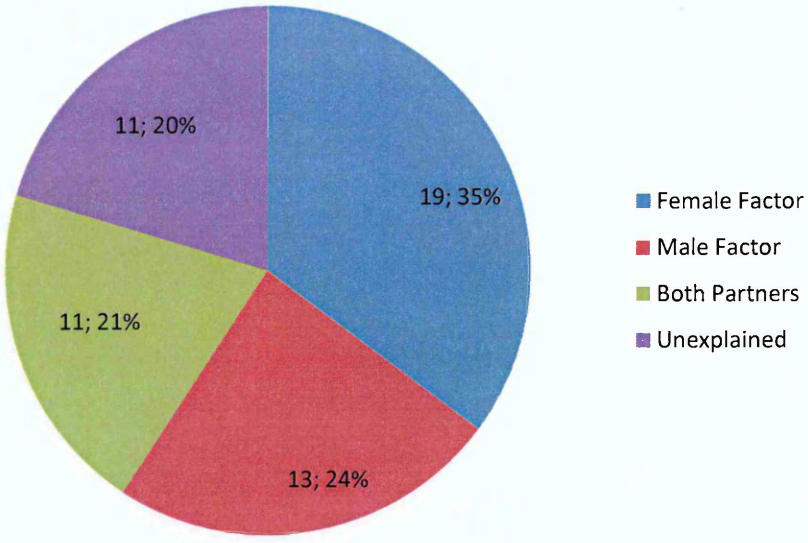
Figure 9.1 Country of residence of sampled forum users.

[40] Text or graphics appended to the bottom of an e-mail or post that contains information about the author.

A large number of the messages did not include demographic information. Of the 148 users 47 users disclosed their age which ranged from 24 to 40 years (M = 32.23 years, SD = 4.07 years) and 40 users disclosed the age of their partner which ranged from 23 to 48 years (M = 33.48 years, SD = 5.73 years). Of the 55 users who disclosed their marital status 81 per cent (n = 48) were in heterosexual marital relationships, 15 per cent (n = 9) were engaged or co-habiting, one user was in a lesbian relationship and one user was single. The length of time trying to conceive was disclosed by 41 users, this ranged from 10 months to 132 months (M = 43.05 months, SD = 27.19 months).

Figure 9.2 illustrates the location of infertility diagnosis of the 36 per cent of users who disclosed diagnosis information in their posts. The causes of female infertility were identified as ovulatory dysfunction (17; 41%), tubal factors (11; 27%), uterine factors (2; 5%) and unexplained infertility (11; 27%). Male factor diagnoses were identified as low sperm count or morphology (13; 37%), azoospermia (5; 14%), failed vasectomy reversal (5; 14%), ejaculatory failure (1; 3%) and unexplained infertility (11; 27%).

Figure 9.2 Location of infertility diagnosis of sampled forum users.



Of the 129 users who disclosed their current treatment status, 44 per cent (n = 57) of the users were undergoing ART treatment at the time of posting and 23 per cent (n =

30) were waiting for treatment to start, were in between cycles or were having a break from treatment. The remaining 32 users who indicated treatment status were either undergoing fertility tests (8; 6%), trying to conceive naturally (9; 7%), receiving drug or surgical interventions (18; 14%; i.e. clomid, ovarian drilling), had adopted or were seeking adoption (4; 3%) or were pregnant (3; 2%). Of those who had undergone ART treatment the number of cycles they had undergone ranged from 1 to 10 (M = 1.4, SD = 1.79).

9.4.5 Analysis software

The text analysis programme Linguistic Inquiry and Word Count (LIWC, Pennebaker, Francis & Booth, 2001) previously described in section 5.4.3 was used to analyse the content of the opening posts. In addition to the standard word categories (negative emotions, positive emotions, cognitive mechanisms) included for analysis in Chapters 5 and 6, the word categories optimism, anxiety, anger and sadness were also included in the content analysis of the infertility forum data as these categories are representative of the emotional reactions to infertility frequently reported in the literature (Domar, 1993; see section 2.2.4).

9.5 Results

9.5.1 Preparation of Data

Downloaded messages were 'cleaned' in preparation for analysis with the LIWC software according to guidelines (Pennebaker et al., 2001); spelling errors were corrected, shortened words and colloquialisms were replaced. Hyphenated words and time markers (e.g. 6.00 am should be 6.00 a.m. or 6.00am) were formatted appropriately for analysis (see section 5.4.3).

9.5.2 Descriptive Statistics and Comparison of LIWC Categories disclosure study texts

Presented in Table 9.2 are the mean and standard deviations for the percentage of total word use (per word category) of the LIWC categories for the narratives produced by disclosure (expectancy and disclosure) and writing control participants in Chapter 8 (herein referred to as infertility disclosure writing and infertility control writing). Presented alongside these are the means provided by Pennebaker et al. (2001) of disclosure writing (20 studies) and control writing (15 studies) text samples taken from disclosure studies. Comparison of the means between the infertility sample and disclosure study norms suggests that there are parallels in the pattern of emotional and

cognitive content produced in the respective writing conditions. The mean percentage of positive emotion, optimism, anxiety and anger words in the infertility disclosure writing text are similar to those in the normative disclosure writing text, as are the means between the infertility control writing and normative control writing texts.

Table 9.2 Means and standard deviations (in parentheses) of the percentage of words per category produced across writing studies

	Infertility Disclosure Writing	Infertility Control Writing	Disclosure Writing Norms	Control Writing Norms
Text files analysed	52	24	2,028	1,473
Writers/speakers	14	8	768	469
LIWC Categories				
Positive Emotions	2.04	1.54	2.7	1.7
	(0.56)	(0.64)		
Optimism	0.54	0.64	0.5	0.4
	(0.26)	(0.22)		
Negative Emotions	3.10	1.34	2.6	0.6
	(0.91)	(0.58)		
Anxiety	0.52	0.37	0.6	0.2
	(0.57)	(0.22)		
Anger	0.73	0.14	0.7	0.2
	(0.38)	(0.18)		
Sadness	1.07	0.39	0.7	0.2
	(0.36)	(0.27)		
Cognitive Mechanisms	8.82	7.49	7.8	4.1
	(1.19)	(0.81)		

Comparison of the means for negative emotion, sadness and cognitive words shows that there is at least one percentage point of a difference between the disclosure texts, such that there is a higher percentage of negative emotion, sadness and cognitive words used in the infertility disclosure writing than in the normative disclosure data. Additionally, the mean percentage of cognitive words produced in the infertility control writing is higher than that of the normative control writing data.

9.5.3 Comparison of Infertility Forum Posts with Infertility Disclosure Study Data

Presented in Table 9.3 are the mean and standard deviations for the percentage of total word use (per word category) of the LIWC categories for the messages sampled

from the infertility forum and from the narratives produced by disclosure (expectancy and disclosure) and writing control participants in Chapter 8. The mean percentage of positive emotion, optimism, anxiety and cognitive words in online messages are similar to those produced in the infertility disclosure writing narratives.

Table 9.3 Means and standard deviations (in parentheses) of the percentage of words per LIWC category for the infertility forum text and Infertility disclosure study texts

	Infertility Forum Posts	Infertility Disclosure Writing	Infertility Control Writing
Text files analysed	259	52	24
Writers/speakers	148	14	8
LIWC Categories			
Positive Emotions	2.06	2.04	1.54
	(1.67)	(0.56)	(0.64)
Optimism	0.47	0.54	0.64
	(0.76)	(0.26)	(0.22)
Negative Emotions	1.97	3.10	1.34
	(1.94)	(0.91)	(0.58)
Anxiety	0.47	0.52	0.37
	(0.82)	(0.57)	(0.22)
Anger	0.23	0.73	0.14
	(0.79)	(0.38)	(0.18)
Sadness	0.57	1.07	0.39
	(1.20)	(0.36)	(0.27)
Cognitive Mechanisms	8.41	8.82	7.49
	(3.93)	(1.19)	(0.81)

The mean percentage of negative emotion and sadness words are higher in the infertility disclosure narratives than the infertility forum posts, indeed the pattern of negative emotion and sadness word use in the infertility forum posts is much closer to that produced by the infertility control writing participants.

To further examine the differences between the infertility texts, 95 per cent confidence intervals were calculated for the infertility forum posts and narratives (disclosure and control) from study three for each of the LIWC categories. It was not possible to calculate confidence intervals for the normative data (Pennebaker et al., 2001) as only the means are provided by the authors.

Confidence intervals for the infertility forum posts and infertility disclosure study narratives were calculated using the formula provide by Field (2009):

$$\text{Lower boundary of confidence interval} = \overline{X} - (1.96 \times SE)$$

$$\text{Upper boundary of confidence interval} = \overline{X} + (1.96 \times SE)$$

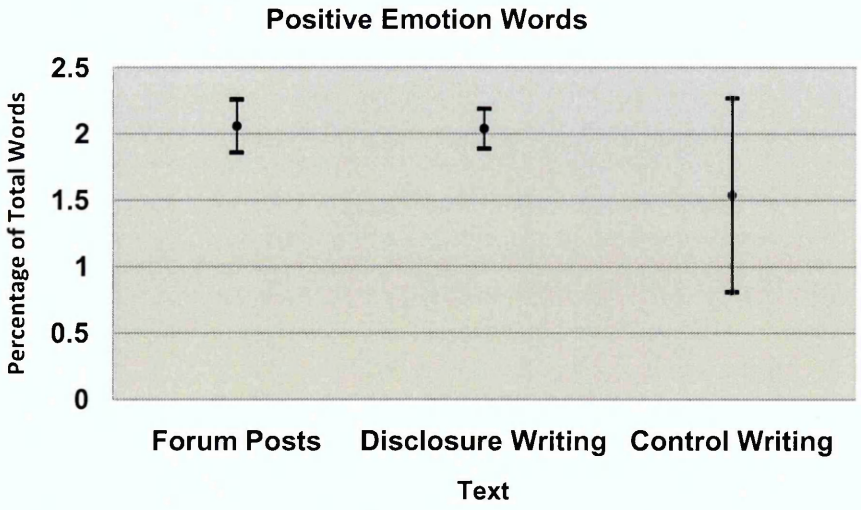
Field (2009) advises using an alternative method for calculating confidence intervals when *n* is small. Therefore the confidence intervals for the writing control narratives (n = 24) were calculated using the formula:

$$\text{Lower boundary of confidence interval} = \overline{X} - (t_{n-1} \times SE)$$

$$\text{Upper boundary of confidence interval} = \overline{X} + (t_{n-1} \times SE)$$

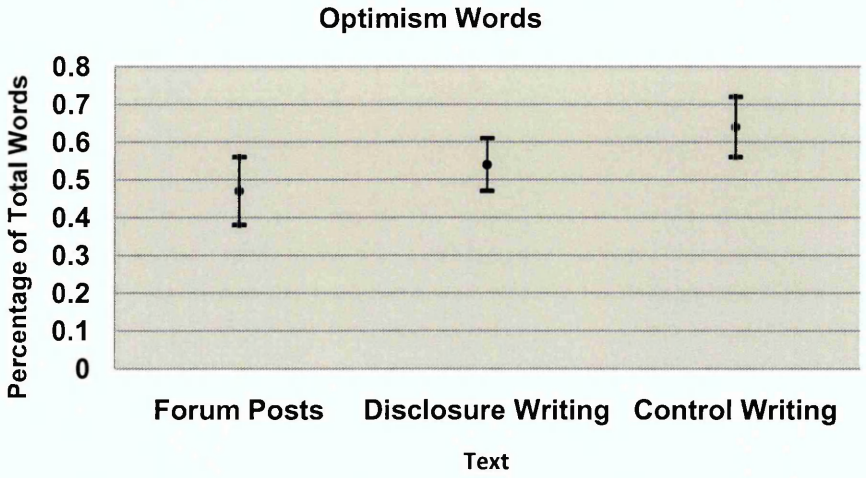
For ease of interpretation confidence intervals for each of the LIWC word categories are graphically illustrated in Figures 9.3 - 9.9.

Figure 9.3 Confidence intervals across texts for positive emotion words.



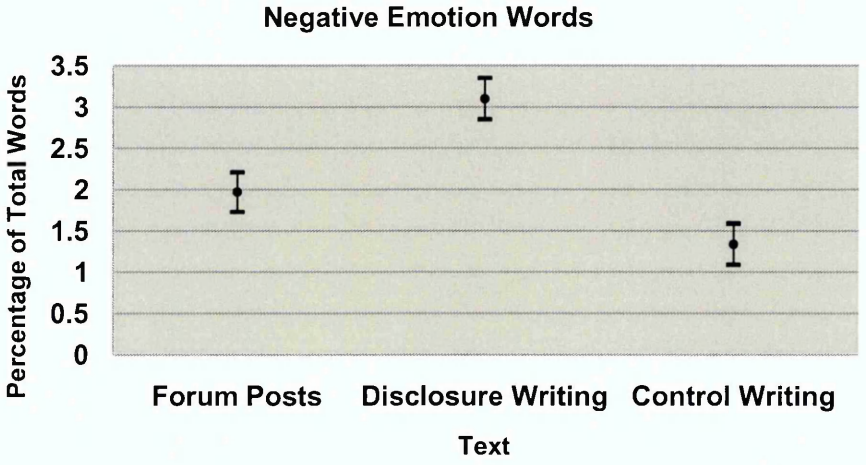
Exaimantion of the confidence intervals for positive emotion words illustrated in Figure 9.3 indicate a substantial overlap between the confidence intervals for each of the texts analysed suggesting that there is no difference between the texts in terms of the percentage of positive words produced.

Figure 9.4 Confidence intervals across texts for optimism words.



For optimsim words (see Figure 9.4) there is some overlap between the confidence intervals for the infertility forum posts and infertility disclosure writing, therefore we cannot with any real confidence say if there is likley to be a difference between these texts in percentage of optimism words. The fact that the confidence intervals for the infertilty control writing and forum posts do not overlap suggets that there is a difference between these texts, such that the infertility control writing text contains a higher percentage of optimism words than the infertility forum text.

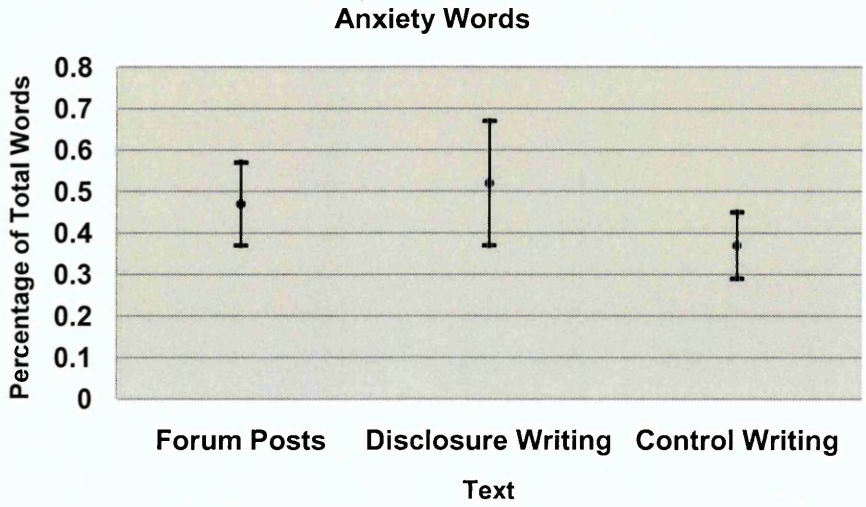
Figure 9.5 Confidence intervals across texts for negative emotion words.



As illustrated in Figure 9.5 for negative emotion words the percentage of negative emotion words produced by infertlity disclsoure writing participants is higher than that

produced in the infertlity forum posts and the infertility control writing which suggests a difference in the pattern of negative emotion word used across the texts.

Figure 9.6 Confidence intervals across texts for anxiety words.



For anxiety words there appears to be little if any difference between the infertility forum posts and infertrility disclosure writing narratives (see Figure 9.6). Whereas the confidence intervals shown in Figure 9.7 for anger words sugget that the percentage of anger words in the infertility discloure writing narratives is higher than in the infertility forum and infertility control writing texts.

Figure 9.7 Confidence intervals across texts for anger words.

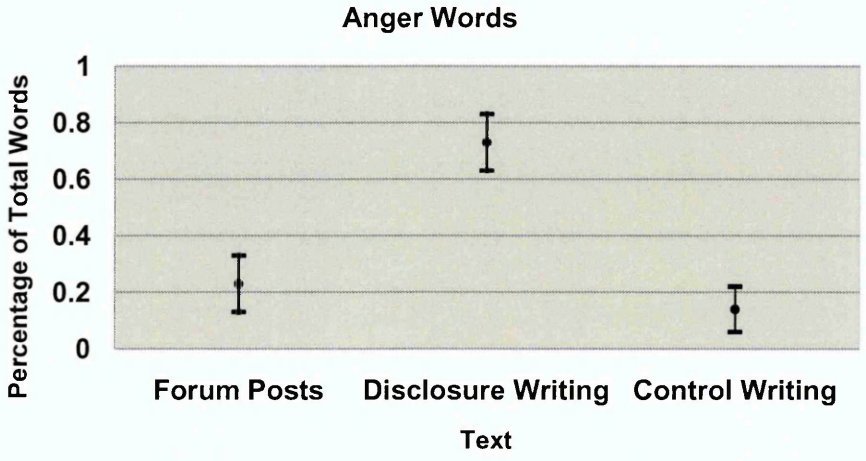
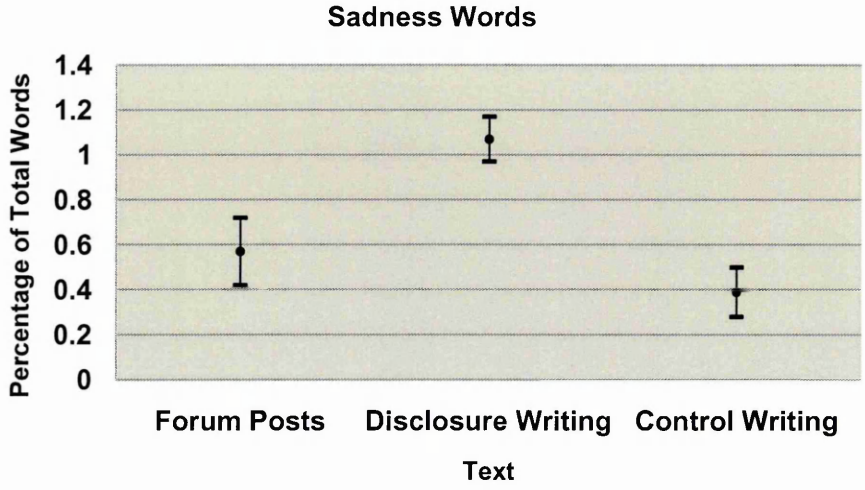
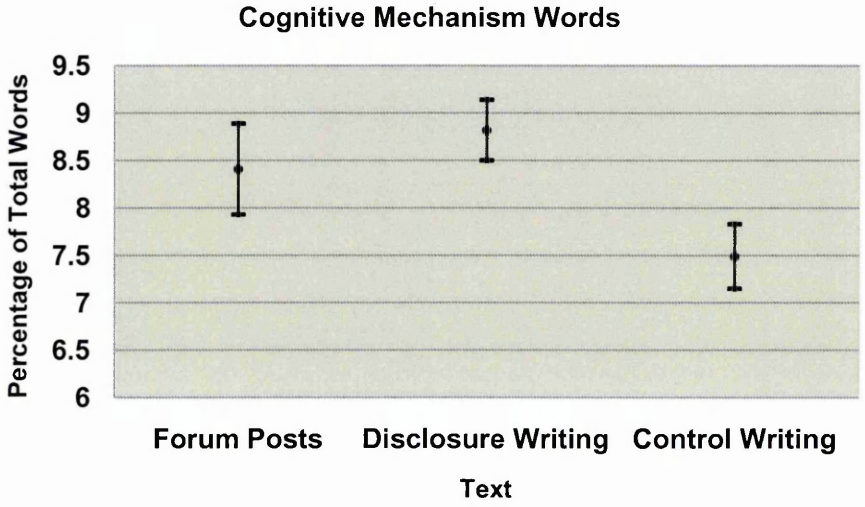


Figure 9.8 Confidence intervals across texts for sadness words.



As illustrated in Figure 9.8 the percentage of sadness words produced by infertlity disclsoure writing participants is higher than that produced in the infertlity forum posts and the infertility control writing. For cognitive mechanism words, the confidence intrevals for the control writing text suggest the percentage of cognitive mechanism words in this text is lower than that produced in the fourm and disclosure texts (see Figure 9.9).

Figure 9.9 Confidence intervals across texts for cognitive mechanism words.



Overall, these findings suggest that there are some differences between the texts in the pattern of linguistic content.

9.6 Discussion

Examination of the content of messages posted to an infertility forum compared to the content of narratives produced by individuals with infertility in a web-based disclosure study identified differences in the percentage of emotion and cognitive words produced in these two settings. More specifically, the percentage of negative emotion words, anger words and sadness words is higher in the infertility disclosure narratives than the infertility forum posts. The pattern of positive emotion, optimism and cognitive word use does not appear to differ between the infertility forum and infertility disclosure writing texts. The use of cognitive mechanism words and negative emotion words does appear to be lower in control writing narratives than in both the forum text and infertility disclsoure narratives.

The majority of messages sampled from the infertility forum were posted by females, this is consistent with other studies that have found fertility related internet use to be a predominantly female activity (Epstein et al., 2002; Haagen et al., 2003). Though based in the UK the site attracted a number of users from overseas. Examination of the content of messages from users residing outside the UK indicated that these members appeared to be British users who had relocated abroad, all users were English speaking. Where possible other demographic characteristics (e.g. age, diagnosis, treatment status) of forum users were noted, because a large number of the users chose not to include this information it is not possible to provide a complete demographic profile of this sample of infertility forum users. However, the information that is available suggests that female forum users are comparable in age to the women who took part in the infertility disclosure study and are also comparable to the female fertility patients surveyed by Haagen et al. (2003) and the forum sample of Epstein et al. (2002). Consistent with the treatment characteristics of the infertility disclosure study participants, the available treatment information indicated that the majority of forum users were either currently undergoing ART treatment, were waiting for treatment to start or were in-between cycles. From the available diagnostic information the main indications of infertility were female factor problems and time trying to conceive was over three years. This profile is characteristic of the samples used in empirical studies that are obtained from fertility clinics (e.g. Klonoff-Cohen, Chu, Natarajan & Sieber, 2001). The similarity in characteristics of the individuals posting messages to the

infertility forum and the women who participated in the online disclosure study makes the comparison of language use across these samples valid.

Nearly three quarters of messages were posted with the aim of seeking advice. The emphasis being on the process and symptoms of treatment, this is not surprising considering the majority of users, for whom information was available, were undergoing ART or seeking treatment. Only ten per cent of posts were categorized as explicitly seeking support which corresponds with the findings of Weissman et al. (2000) and Rawal and Haddad (2006) that fertility related internet use in fertility patients is predominantly focussed on accessing information and advice. Similarly, a survey of internet forum users also indicated that a large proportion of the users found the boards extremely valuable for sharing information about their own treatment (Epstein et al., 2002). This was more important for users who had no other outlet through which to talk about their infertility experiences. Whilst the data sampled here indicates that fewer messages were focused on actively seeking support this is not to say that users who asked for advice and information relating to their treatment and symptoms did not find the responses they received supportive and that these users have not at some time posted messages explicitly seeking support. What this data reflects is a motivation of forum users to better understand their treatment. Indeed, Rawal and Haddad (2006) suggest that the use of the internet to seek advice not only helps to improve their knowledge and awareness of the medical aspects of infertility but also gives them a sense of control which can be an important factor in the psychological adjustment to infertility (see section 2.2.4).

Interpretation of the any difference in the means between the disclosure study texts is limited by the fact that the data was not subject to inferential statistical analysis. Comparison of the means for emotional and cognitive content of the infertility study narratives and the normative writing data provided by Pennebaker et al. (2001) show that the pattern of word use in the respective disclosure writing groups are comparable in terms of positive emotion, optimism, anxiety and anger word content. However, the means suggest that the use of negative emotion and sadness words is higher in the infertility disclosure writing narratives than the normative disclosure writing data. Previous research has found that participants were more likely to benefit from disclosure writing if they use a high number of positive emotion words compared to a moderate number of negative emotion words (Pennebaker & Francis, 1996; Pennebaker, Mayne & Francis, 1997). Indeed, an increase in the use of negative emotion words across the disclosure writing sessions has been shown to be associated

with an increase in symptoms (Pennebaker & Francis, 1996; Pennebaker et al;, 1997). Based on previous findings a possible explanation for the failure to find any beneficial intervention effects in the infertility disclosure participants is the disproportionate expression of negative emotion words in their writing. Problematic for this explanation is the fact that in the study presented in Chapter 8, the analysis of linguistic changes across writing sessions in the infertility disclosure narratives showed that an increase in the use of negative emotion words from the first to the last writing session was predictive of a reduction in depressive symptoms (see section 8.6). Arguably, the higher rate of negative emotion and sadness words within the disclosure narratives of the infertility sample is likely to represent the negative emotional reaction to infertility and infertility treatment that is well documented in the literature (e.g. Dunkel-Schetter & Lobel 1991; see section 2.2.4), the expression of which, in the context of a writing study, is associated with psychological benefits.

One possible explanation for the lack of an intervention effect in Chapter 8 was that the participants, who were recruited from infertility forums, were already expressing their thoughts and feelings in the messages they posted to the forums, in much the same way as is done in disclosure writing. Comparison of the emotional and cognitive content of messages posted to a forum with that of the disclosure narratives of infertility disclosure participants suggest that whilst the expression of positive emotions (positive emotion and optimism words) in the infertility forum posts do not appear to differ greatly from the level expressed in the disclosure narratives there are differences between the texts in the level of expression of negative emotions. The mean percentage of negative emotion, anger and sadness words in the infertility forum messages is lower than in the disclosure narratives. Indeed, in terms of percentage of anger and sadness words, the infertility forum data appears to have a similar pattern of word use to the infertility control writing narratives. The cognitive content of the infertility forum messages and infertility disclosure narratives were similar and contained a higher percentage of cognitive words than the infertility control narratives. Whilst an increase in the use of cognitive words has been shown to be associated with health improvements in disclosure studies (Pennebaker et al., 1997) and indeed was shown in Chapter 8 to predict a reduction in symptoms of anxiety, within the context of the infertility forum messages the high percentage of cognitive words most likely represents the questioning nature of opening posts (i.e. Why is this? Do you think? Is this because?) rather than cognitive assimilation of the users infertility experience. Because the level of analysis in this study was across messages and not across individual users it is not possible to determine if word content changes over time for these forum users. Yet

overall, it would seem that there are quantitative differences in the expression of emotions in messages posted to an infertility discussion forum and the expression of emotions in the disclosure narratives of participants recruited from such forums.

There are a number of possible explanations for the elevated negative emotional content of the disclosure narratives compared with the negative emotional content of messages posted to an infertility forum. Firstly, as indicated by the high standard deviations for the negative emotion and sadness words in the infertility forum data, there is a great deal of variation in the negative content across messages, this is not surprising given the different types of message posted to the forums (see Table 9.1) the emotional tone of which would be dependent on the focus of the messages (i.e. a message relaying details of a failed treatment cycle would likely be more negative in tone than one relaying details of a successful treatment cycle). Whereas, in the disclosure task participants are instructed to write specifically about their thoughts and feelings relating to their infertility and how this has affected their lives, therefore the emotional tone of all the disclosure narratives is arguably more likely to be consistent across the individual narratives.

An alternative explanation to that suggested above is that the high level of negative emotion expressed in the infertility disclosure narratives might be specific to this sample (i.e. infertile women who are forum users) rather than being characteristic of written disclosure in individuals with infertility. Just over half of those in the disclosure writing groups indicated that they were active users (i.e. posted messages as opposed to just reading messages) of the infertility forums which they visited. All active forum users indicated that they expressed some emotion in their messages posted to the forums and therefore were accustomed to disclosing their emotions through writing in an online context. Although Malik and Coulson (2008) found the anonymity afforded by an online infertility discussion forum to be beneficial for allowing individuals to express their feelings more fully, their study also indicated that at times participants felt highly sensitive to the remarks of other members, and stories of grief often left them with overwhelming feelings of sadness. It is possible therefore that at times infertility forum users might feel the need to temper the expression of negative emotions in their messages to spare the feelings of other members. The disclosure writing context may have provided forum users with the opportunity to be more honest about their negative feelings relating to their infertility, their treatment and how this has affected their relationships. Within the disclosure writing context feelings of sadness and anger could be expressed without repercussions from or for others. This explanation is plausible

considering the previously mentioned findings that increased negative emotion word use was associated with reduced depression at follow-up in the infertility disclosure participants.

A final yet related point is that there may have been an element of self-selection bias in the infertility disclosure study sample. Potential participants were provided with condition specific information prior to consent, that is, those in the writing groups were aware before agreeing to participate that they would be required to write about their experiences. Indeed, attrition rates were associated with allocation to condition such that attrition was lower in the non-writing control group (see section 8.5.1.1). It is possible therefore, that those who chose to take part in the study were those who relished the opportunity to write about their experiences outside of the forum environment. Epstein et al. (2002) found women who reported the internet as their only outlet for talking[41] about their infertility to have a poorer psychological profile than those who indicated that they had alternate outlets to talk about their infertility. The use of the internet as the only outlet was associated with higher levels of depression and perceptions of fertility as being more stressful. The elevated psychological symptoms and fertility related distress reported in the infertility disclosure study sample combined with the elevated levels of negative emotional content of disclosure narratives could suggest that the sub-sample of forum users who agreed to participate in the Chapter 8 study are characteristic of those identified by Epstein et al. (2002).

9.7 Summary

A comparison of the pattern of emotional and cognitive word content in the disclosure narratives of individuals with infertility and the normative data generated from previous disclosure studies (Pennebaker et al., 2001) show that positive emotion, optimism, anxiety, anger and cognitive word content of the texts appear relatively similar, whereas the negative emotion and sadness word content of infertility disclosure texts appears to be higher than in the normative disclosure data. Similarly, the use of negative emotion, sadness and anger words in the narratives produced by disclosure participants with infertility is higher than in the messages posted to an infertility discussion forum, while the level of positive emotion and cognitive content is relatively similar. Therefore these findings appear to suggest that there are distinct differences

[41] This group also included women who did not actively post or respond to messages in the infertility forums but did read the messages. Participants were assigned to the only outlet (OO) group and the alternate outlet (AO) group based on their response to the question "The internet is the only outlet for talking about infertility" (Epstein et al., 2002).

between the level of emotional expression in messages posted to an infertility forum and those expressed in the disclosure narratives produced by users of infertility forums.

It is possible that the high level of negative emotional content produced in the disclosure narratives is unique to the characteristics of this sample of infertility forum users, who have elevated levels of psychological symptoms. The findings presented in this chapter, combined with the finding in Chapter 8 that an increase in the use of negative emotion words in the disclosure narratives is associated with a reduction in depressive symptoms at follow-up, would suggest that the failure to find an intervention effect is unlikely to be due to the fact that participants were already expressing their emotions in the messages posted to the infertility forums, of which they were members, in the same way that emotions are expressed in written emotional disclosure.

Chapter 10

General Discussion

10.1 Aims of the Thesis

The main aim of this thesis was to examine the efficacy of a written emotional disclosure intervention for individuals with infertility. The potential moderating effects of adapting the traditional laboratory based writing intervention to a computer-mediated intervention, delivered outside of the controlled laboratory environment was also examined. The delivery of a home-based disclosure intervention for individuals with infertility recruited from an assisted conception unit and undergoing In Vitro Fertilization (IVF) treatment for the first time proved to be unfeasible. In order to achieve the primary aim of the thesis participants were recruited from online infertility support forums and the written disclosure intervention was adapted to be delivered via the internet. The findings of each of the studies have been discussed in detail in their respective chapters. The purpose of this chapter is to provide a summary of the main findings of this thesis and to consider the implications of these findings within the broader context of the written disclosure literature. The implications of these findings and future directions for research are discussed.

10.2 Testing Methodologies

There has been a great deal of inconsistency in the findings of studies that have examined the effects of emotional disclosure interventions in various populations (see section 2.3). The methodological variation across these studies is a likely contributory factor in some of the inconsistencies reported (see Chapter 3). In order to overcome some of the potential barriers to participation in psychosocial interventions that individuals with infertility face, the adaptation of the traditional laboratory based writing intervention to one delivered within the context of the home was required. To allow for additional flexibility, the intervention protocol was also adapted to provide participants with the option to complete the writing intervention via computer, a departure from the standard pen-and-paper format that is used in the majority of studies. However, if such

departures in methodology influence the outcome of disclosure, these effects would need to be considered when interpreting the findings of a home-based (and potentially computer-mediated) intervention and became of particular importance for the subsequent adaptation of the disclosure intervention to an internet-mediated format. Therefore, examination of the moderating effects of modality (writing versus typing) and context (lab-based versus home-based) of administration of a disclosure intervention were examined in Chapter 5 and Chapter 6, respectively.

Chapter 5 showed there to be no effect of modality on the short-term or longer-term outcome of a disclosure intervention. The finding that there was no difference in language use between the modalities, in terms of the percentage of emotion and cognitive words contained in the essays, and none of the improvements seen in the groups were differentiated by the modality of disclosure, was encouraging for the adaption of the written disclosure intervention to a computer-mediated format.

The findings of Chapter 6 showed that improvements in psychological well-being at follow-up were not differentiated by the context in which the written emotional disclosure intervention was delivered. The fact that home-based participants produced fewer words in their essays than their lab-based counterparts is probably due to a lack of adherence to the 15 minute writing period. The lack of experimenter control in home-based studies can be problematic and has previously been overcome by contacting participants via telephone as a means of controlling the timing of the writing session (e.g. Vedhara et al., 2007). Using this means of control is arguably more feasible in studies where participants are recruited face-to-face and agreed times of contact can be arranged. Imposing specific writing times on participants removes the element of flexibility which was one of the rationales for delivering the intervention within the context of the home (and subsequently via the internet) in individuals with infertility. The computer software used to deliver the internet-mediated intervention presented in Chapter 8 allowed for writing sessions to be timed. This provided participants with a timing counter and restricted them from moving on to the next page before the time was up and this provided some control of the timing of writing sessions. The conclusion drawn from the combined findings of the studies presented in Chapters 5 and 6 was that the adaptation of the standard lab-based written protocol to one that is delivered via a computer or within the context of the home is feasible, providing support for the adaptation of the writing task to a home-based, computer-mediated format used in Chapter 8. This is an important finding given the increasing use of computers to deliver psychosocial interventions (see section 7.5). The finding that the effectiveness of a

written emotional disclosure intervention is not moderated by a home-based, computer-mediated delivery adds to the recent literature supporting the adaptation of therapeutic techniques to an internet-mediated format (Cuijpers, van Straten & Andersson, 2008).

One of the additional aims of Chapters 5 and 6 was to replicate previous research that has found the written expression of thoughts and feelings relating to traumatic events to be beneficial for improving psychological (e.g. Epstein, Sloan & Marx, 2005) and physical well-being (e.g. Pennebaker & Beall, 1986). Symptoms of anxiety and psychological distress (GSI) decreased for all participants in the disclosure, writing control and non-writing control groups in Chapter 5. Depressive symptoms reduced in the disclosure and writing control groups but not the non-writing control group. In Chapter 6 improvements in anxiety, depression and psychological distress were found in all groups. These findings are not unique to the two studies presented here; previous research has also noted improvements across groups irrespective of group assignment (Horneffer & Jamison, 2002; Marlo & Wagner, 1999) and has suggested that the time management instructions given to participants in the control groups might improve well-being by providing participants with the opportunity to organize and reflect on their responsibilities (Horneffer & Jamison, 2002). While this explanation is in part plausible for the findings of Chapter 5, the improvements found in non-writing controls in Chapter 6 must have arisen from a different process. One possibility is that the improvements noted in these studies represent a gradual adjustment to university in these students who are first year undergraduates. Alternatively, it is suggested, that the overall improvements seen across control groups (writing and non-writing) in the studies presented here may be due to a combination of expectancy (e.g. Langens & Schüler, 2005) and demand effects. In order to investigate this possibility, two experimental conditions were incorporated into the study design in Chapter 8. In the first condition participants were told that they could expect the writing to be therapeutic, whilst in the second condition participants were not told of the likely effects of writing. Expectancy was not found to moderate the outcome of disclosure in this study. However, this finding does not refute the possible role of expectancy in the improvements seen in the earlier studies. The conditions under which the intervention was presented in the studies of Chapters 5 and 6 are somewhat different to that of the internet-mediated study in Chapter 8. The introduction and delivery of study information in both studies (Chapter 5 and Chapter 6) was presented to participants face-to-face by the investigator, within the classroom, this could arguably have provided a sense of legitimate authority that is inherent to the more traditional laboratory setting of written disclosure (Smyth & Catley, 2002; see section 3.6.1), the positive effects of which may

be experienced irrespective of the context in which the writing intervention is administered. It is possible therefore that the physical presence of a legitimate authority within the study process (i.e. researcher, clinician) is a necessary (or sufficient) condition of positive expectancy. Further research is needed to determine under what conditions (if any) positive expectancy effects are likely to occur.

If the improvements in psychological well-being reported by control participants in the studies of Chapter 5 and Chapter 6 are a consequence of positive expectancies, the question of whether this is also applicable to the psychological improvements reported by disclosure participants arises. While it is possible that the improvements seen in psychological well-being could in part be attributed to positive expectancies in the experimental groups, there is evidence that the experimental manipulation was effective. Manipulation checks revealed that disclosure participants evaluated their writing as more personal, more meaningful and more revealing of their emotions than writing control participants. Additionally, disclosure essays contained significantly more negative emotion, positive emotion and cognitive words than control essays. This pattern of findings, in terms of both the subjective rating of essay content and the more objective computerised content analysis of essays, is consistent with that of studies where written emotional disclosure has been shown to improve the well-being of participants compared to controls (e.g. Epstein et al., 2005). More importantly, analysis of the pattern of word use across the studies indicated that an increase in the use of cognitive words and a reduction in the use of negative emotion words were predictive of various improvements in psychological symptoms at each of the follow-up periods in the disclosure group. The relationship between psychological improvements and word use was not found in the control writing narratives. This provides further support for the effective manipulation of experimental disclosure in these studies and suggests that the improvements seen in disclosure group participants represent the effects of written emotional disclosure.

10.3 Written Emotional Disclosure for Individuals with Infertility

10.3.1 Implementation of a Home-based Emotional Disclosure Intervention for New Referral IVF Patients.

The development and implementation of a home-based written emotional disclosure intervention for individuals with infertility, more specifically, new referral IVF patients is described in Appendix A.2. Recruitment into the study began in January 2007, however, due to there being fewer patients attending the clinic than had been

anticipated, combined with a low response rate and high attrition, the study was terminated in May 2007. The main factor in the decision to terminate the study prematurely was that the number of clinic attendees who were eligible to participate in the study was small and the study protocol (or at least the timing of it in relation to the cycle of IVF treatment) seemed unacceptable to potential participants. Difficulties in obtaining ethical approval to extend the study protocol to include repeat cycle IVF patients meant that there was little opportunity to try and increases recruitment numbers. The result being that the implementation of written emotional disclosure intervention was considered unfeasible under these circumstances.

10.3.2 Internet-mediated Written Emotional Disclosure

Chapter 8 presents the findings of an internet-mediated written disclosure intervention for individuals with infertility. Individuals who wrote about their thoughts and feelings relating to their infertility and infertility treatments did not report any improvements in physical (PSI) or psychological well-being (fertility problems stress, depression, anxiety and stress) at 4-week follow-up compared to those who wrote factually about their infertility or a non-writing control group. Although there was no main effect of disclosure, further analysis revealed that changes in word use from writing session one to writing session three predicted improvements in psychological well-being at 4-week follow-up. More specifically, an increase in the use of cognitive mechanism words across the writing sessions was predictive of a reduction in symptoms of anxiety and an increase in the use of negative emotion words was predictive of a reduction in the symptoms of depression. The relationship between language use across the writing sessions and improvements in psychological well-being was not evident in the analysis of the linguistic content of writing control narratives in individuals with infertility. As a result of the small sample size used in the study these findings should not be considered as definitive. However, we can tentatively suggest that the benefits of disclosure in this population might be dependent on the approach used when disclosing their thoughts and feelings relating to their infertility and associated treatment, an approach that appears to be at odds with the disclosure literature (i.e. an increase in negative emotion word use is often associated with poorer health outcomes; e.g. Pennebaker & Francis, 1996). As previously suggested (see section 8.6), for some infertile individuals, the anonymity afforded by an internet-mediated disclosure intervention may have provided an opportunity to express their negative feelings about their infertility that they may not have the opportunity to express in their everyday social interactions. Further research is needed to determine if this relationship between negative emotion word use and improved well-being is replicated

in this population, if so it may be that directing individuals with infertility to express their negative emotions in their writing will enhance the effects of disclosure for this group of people.

One possible explanation for the findings in this study was that individuals with infertility recruited from online infertility support forums were already expressing their thoughts and feelings in messages posted to the infertility forum discussion boards in a similar way to that which is seen in disclosure writing. As nearly 60 per cent of the sample reported that they were active users of infertility forums and that they all, to some degree, expressed their emotions in the messages they posted to the discussion boards, a comparison of the emotional and cognitive content of messages posted to an infertility forum with that of the essays written by the participants in Chapter 8 was conducted. The findings, reported in Chapter 9, showed that there were a number of differences in the content of narratives produced by disclosure participants and that of the content of messages posted to an infertility forum. Whilst the percentage of positive emotion words and cognitive process words were similar across the two domains, the use of negative emotion, sadness and anger words in the narratives produced by individuals with infertility in the disclosure intervention was higher than that of the messages posted to the infertility forum discussion boards. This finding suggests that there are quantitative differences in the type of disclosure which occurs within the context of a disclosure intervention and that of an infertility support forum.

The high attrition rate of the study reported in Chapter 8 indicated that there was little motivation amongst infertility forum users to participate in the online disclosure study (see section 10.3.4). Conversely, the demand for and use of infertility forums is apparently great. A search of the World Wide Web shows that there are a large number of online support/discussion forums available for individuals with infertility. Indeed one of the larger international forums has in excess of 49,000 registered members and contains over 649,000 posts. Therefore a large number of individuals with infertility are accustomed to and comfortable using infertility forums to disclose their thoughts and feelings about their infertility. It may be that intervening within the context of the infertility forum may be a more feasible option for these individuals. It is possible that directing participants to write down their thoughts and feelings about their infertility, in a manner that encourages them to increase their use of cognitive words and negative emotion words over the course of their writing (as was shown to be predictive of improvements in anxiety and depression participants in Chapter 8), within the forum environment may be beneficial. One caveat to this proposal is that forum users may be

inclined to censor the expression of negative emotions within their messages posted to the discussion boards (see section 9.6). Therefore an alternative approach, when conducting disclosure interventions using an online format, may be to have participants disclose through weblogs or blogs (as they are more commonly known) which authors have the option to keep private or make accessible to others. Future research would need to examine if blogs could be used as a feasible alternative format through which individuals with infertility, and indeed other populations, could be encouraged to disclose their thoughts and feelings about stressful life events.

One possibility for the null findings in this study is that due to the small sample size there was insufficient power to detect significant intervention effects. Alternatively, the 4-week follow-up period used in Chapter 8 may have been too short a duration to find any effects. A number of studies have noted that the physical and psychological effects of disclosure can be delayed until up to three months after the intervention period in clinical populations (Gillis, Lumley, Mosley-Williams, Leisen & Roehrs, 2006; Graham, Lobel & Lokshina, 2008; Smyth, Stone, Hurewitz & Kaell, 1999; Stanton, Danoff-Burg & Sworowski, 2002). Therefore it would seem prudent to include follow-up periods beyond that of the 4-week interval used in Chapter 8.

10.3.3 Heterogeneity

An interesting aspect of the study in Chapter 8 which requires further investigation relates to the heterogeneity of the sample, which is largely attributable to the recruitment methods utilised within the study (see section 7.4.2). The sample, though all female, varied in term of the number of years they had been trying to conceive, the type and number of treatments that they had undergone and the stage of treatment which they were at whilst taking part in the study. As discussed earlier in section 2.2.5 and reiterated in Chapter 8, each of these factors can influence the psychological state of the individual, and studies that have examined the therapeutic effects of various interventions for individuals with infertility have often included strict inclusion and exclusion criteria as a means of maintaining as much homogeneity in the sample as possible (e.g. Facchinetti, Tarabusi & Volpe, 2004; McNaughton-Cassill, Bostwick, Arthur, Robinson & Neal, 2002).

With random assignment to condition it is assumed that the characteristics on which individuals differ will be represented across conditions, however when sample sizes are small and potential confounds are numerous this is problematic. One possible solution is to match participants across conditions. Matching on pre-test scores and fertility

characteristics (i.e. years TTC, diagnoses, treatment) before assignment to condition, could arguably have increased homogeneity in the Chapter 8 study. Alternatively, post-hoc analysis can provide some indication of the effectiveness of the intervention in sub-samples of the population under investigation. Unfortunately, the small sample size within this study precluded analysis of the moderating effects of these factors.

10.3.4 Attrition

Attrition was a potential issue in the Chapter 8 study. Of the 168 individuals who registered to the study website 66 per cent started the study, but only 35 per cent of these actually completed the study (a 23% completion rate overall). Attrition was related to group allocation, such that those in the non-writing control group were more likely to complete the study. This is not surprising given that the requirements of participants in the non-writing condition (completing measures at two time points) were somewhat less onerous than was required of participants assigned to the writing conditions (completing three, 15 minutes writing sessions in addition to the measures). Although, the high attrition rate within this population could indicate that there was little motivation to take part in the intervention. This coupled with the unwillingness of IVF patients (see Appendix A.2) to take part in a writing intervention study questions the feasibility of such an intervention in this population.

10.3.5 Infertility Forum Users

One of the unexpected findings in this thesis was the elevated level of psychological symptoms in the infertility sample. The level of infertility-related stress reported by the women in this sample was higher than that of the average female infertility patient (Newton, Sherrard & Clavac, 1999). Scores on the $DASS_{21}$ subscales were similarly high (anxiety, depression and stress), being more comparable with the levels reported by a clinical sample of obsessive-compulsive disorder (OCD) patients than adult non-patient norms (Antony, Bieling, Cox, Enns & Swinson, 1998; Henry & Crawford, 2005). It is possible that the level of symptom reporting by participants in Chapter 8 is a consequence of the online administration of the measures (Joinson, 1999; see Chapter 7 for a discussion). Alternatively, these findings could be a true reflection of the psychological profile of this sample of infertility forum users. This raises the question of why these women have such high levels of fertility stress, depression, anxiety and stress.

Participation in online support groups is reported to provide a number of psychosocial benefits for individuals experiencing health related problems (White & Dorman, 2001; Winzelberg et al., 2003). For some individuals with infertility online support forums are a valuable source of emotional support (Haagen et al., 2003; Rawal & Haddard, 2006; Weissman et al., 2000). However, there is evidence to suggest that being a member of an online infertility support group may encourage some infertile women to withdraw from real-world interactions and this has been shown to be associated with higher levels of depression and perceptions of fertility as being more stressful (Epstein, Rosenberg, Venet, Grant & Hemenway, 2002). Epstein et al. (2002) found that women who considered the internet to be their only outlet for talking about their infertility had higher levels of depression and found their infertility more stressful than women who had alternative outlets. Unsurprisingly, women who used the internet as their only outlet also reported receiving less emotional support from partners, parents, friends and other infertile couples. It is not possible to determine the level or quality of social support that the women who participated in the online disclosure study (Chapter 8) had available to them so it is not known if this was a factor in the elevated psychological symptoms reported by these women. Any benefits that these women were receiving from their use of the infertility forums did not appear to translate into enhanced well-being. This assumption is speculative at this stage as it is entirely possible that the women in this sample may have had even higher levels of distress prior to using the infertility support forums of which they were members. However, based on the findings of a systematic review of 38 studies of health related online support forums, which concluded that there was no robust evidence for an effect of online communities on such outcomes as depression and perceived social support (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004), this scenario seems to be less likely. Considering the remarkably high levels of distress reported in this sample, future research is needed to examine what factors may mediate the relationship between internet forum use and psychological well-being in individuals with infertility.

10.4 The Writing Cure: Disclosure Writing

The findings of this thesis contribute to a growing body of literature that has examined the utility of disclosure writing as a therapeutic intervention for individuals experiencing chronic health-related conditions. The major contribution of this thesis is to extend this literature to include the application of a written emotional disclosure intervention in individuals with infertility. The implications of these findings for application and theory will be considered next.

10.4.1 Does Written Emotional Disclosure Work?

Since the first published study by Pennebaker and Beall (1986) reported that writing for 15 minutes on four consecutive days about a personally upsetting event was associated with a reduction in health problems in students there have been over 150 studies published examining the effects of written emotional disclosure on physical and psychological well-being. Much of the empirical evidence for the positive effects of disclosure have been found in studies with healthy student populations (see Chapter 2, section 2.3). A move to examine the utility of written emotional disclosure in clinical populations has found mixed results (see section 2.3.7). The results of this thesis contribute to the research that has shown written emotional disclosure to be of potentially limited utility in some populations. The conclusion to be reached from the available evidence and the findings of this thesis is that disclosure writing can provide benefits for some but not everyone.

Given the inconsistencies in the findings with clinical populations identification of the active ingredients of a disclosure writing intervention is necessary. A number of possible explanations have been suggested for there being no main effect of disclosure in this study of individuals with infertility including issues of heterogeneity and method of recruitment (see section 10.3). However, the overriding conclusion seems to point towards the effects of this intervention being heavily moderated. Research that has examined the influence of individual differences on the efficacy of written emotional disclosure have found evidence for the moderating effect of a number of variables including personality (e.g. alexithymia; Paez, Velasco & González, 1999), preferred coping style (i.e. emotional approach coping; Kraft, Lumley, D'Souza & Dooley, 2008) and event-related characteristics (i.e. cancer-related avoidance; Stanton et al., 2002). Foremost it is plausible that only people who want to express their emotions and feel comfortable doing so will find any benefit (Kennedy-Moore & Watson, 2001). It seems that the reported reluctance of infertile individuals to engage in counselling (e.g. Cousineau & Domar, 2007) might also extend to expressing emotions. Perhaps infertility is such a private concept that there is reluctance by individuals to engage in any type of intervention.

The accumulating evidence that suggests the effects of disclosure are greatly moderated by methodological variation and participant characteristics is problematic for the clinical utility of written emotional disclosure, as it seem that only a select few may benefit from this type of intervention under certain conditions. If it is necessary to screen each individual to determine suitability for treatment using this technique then

this limits the clinical application of such an intervention. A number of commentators have expressed their apprehension about the clinical utility of written emotional disclosure as a bona fide therapeutic intervention (Baikie & Wilhelm, 2005; Bootzin, 1997; Sloan & Marx, 2004a). As Kacewicz, Slatcher and Pennebaker (2008) point out "expressive writing is not a panacea.....it is still uncertain for whom it works best, when it should be used, or when other techniques should be used in its place" (p. 18). Indeed, Baikie and Wilhelm (2005) caution against replacing appropriate psychological treatment in clinical populations with disclosure writing and recommend disclosure writing as an adjunct to tried and tested treatments. Certainly, from the findings of this thesis it would not be prudent to recommend written emotional disclosure as an alternative to the psychosocial treatments currently available for individuals with infertility. Nevertheless, disclosure writing could still be usefully recommended as a therapeutic tool (as an adjunct rather than an alternative) for this population based on its cost-effectiveness (requires a pen and paper at the minimum) and potential to provide benefit to some.

10.4.2 Mechanisms of Change

The mechanisms by which written emotional disclosure is thought to produce its effects are discussed in section 2.3.6. It is widely acknowledged that there is unlikely to be a single theoretical explanation for the beneficial effects that writing can produce (Pennebaker, 2004; Sloan & Marx, 2004a) and it may be that the mediating processes of disclosure are determined by a combination of the event being disclosed and participant characteristics. The paradoxical findings of the relationship between changes in language use and subsequent changes in psychological symptoms in the studies of this thesis point towards the complexity of generating a clear theoretical explanation for how disclosure writing works.

Although this thesis did not directly examine the potential mediating processes of disclosure, examination of the linguistic changes across the writing sessions provided some indication of the important processes that may contribute to improvements in well-being. In Chapter 5 a reduction in negative emotion words across the writing sessions was predictive of a reduction in symptoms of avoidance at 2-week follow-up and a reduction in anxiety at 6-week follow-up for disclosure participants. This decrease in the use of negative emotion words and subsequent changes in avoidant symptoms and anxiety are consistent with the habituation explanation of disclosure (see section 2.3.6.2). In Chapter 6, an increase in the use of cognitive words across the writing sessions predicted a reduction in the symptoms of depression, anxiety and

psychological distress, in addition to a reduction in intrusion at 2-week follow-up. The only association between cognitive word change and well-being to remain consistent at 6-week follow-up was for anxiety. The relative importance of cognitive word change in this study would indicate some support for the cognitive change hypothesis of disclosure writing (e.g. Esterling, L'Abate, Murray & Pennebaker, 1999; see section 2.3.6.3).

Contrary to the divergent findings reported in Chapters 5 and 6, the pattern of findings in Chapter 8 indicated the importance of both emotional and cognitive processing in written emotional disclosure. Previous research has cautioned against a focus on the expression of negative emotions in disclosure writing (Pennebaker et al., 1997) yet in Chapter 8 an increase in the use of negative emotion words across the writing sessions was predictive of a reduction in symptoms of depression, whereas as an increase in cognitive word use was predictive of a reduction in symptoms of anxiety.

It would not be unexpected to find that the process or processes by which improvements in clinical samples are produced differ from that which is found for healthy student samples. However, the inconsistency in the two studies in this thesis which utilised identical writing instructions in student samples drawn from the same population demonstrates why there is real incongruity within the literature. The findings of this thesis do provide some hints about an answer to the question of how disclosure works. The findings that change in emotion and cognitive processing words appear to be linked to changes in subsequent mental health needs to be systematically examined, indeed as future studies explore the efficacy of written emotional disclosure in other populations additional mediators and moderators are likely to be discovered adding further complexity to the debate. Sloan and Marx (2004a) suggest that future research should focus its attention on identifying the underlying mechanism of written emotional disclosure. However, Pennebaker (2004) disagrees and instead argues that attention should be given to finding out who does and who does not benefit from written emotional disclosure rather than focusing on the why. It would seem that as we are no closer to providing any definitive answers to these empirical questions that both the 'who'? and the 'why'? should be examined concurrently. As is indicated in the discrepancy in the findings between the studies of Chapters 5, 6 and 8 it is plausible that the mechanism through which writing exerts its effects in infertility patients is, say for example, different to that of healthy students or indeed, other clinical populations (i.e. cancer patients). A much more systematic assessment is needed of the potential utility of disclosure writing specific to the population of interest, under what

circumstances does it work best in this population and how does it work in this population.

10.5 Future Directions

This thesis has identified a number of issues that need to be addressed with further research, including the impact of positive expectancies on the effects of disclosure writing, factors that mediate the relationship between forum membership or activity and psychological well-being in individuals with infertility, and the possible feasibility and efficacy of using weblogs as an alternative format for emotional disclosure in infertility forum users. The potential for written emotional disclosure to be a useful intervention for individuals with infertility needs to be examined in more homogenous samples of this population, recruited from a variety of sources and delivered in different contexts. For example, those who are yet to undergo treatment or are newly diagnosed via GP's surgeries, family planning clinics or hospital outpatient departments.

In terms of methodology, the feasibility of an internet-mediated intervention in patients recruited outside of this context is likely to be limited (i.e. requires access to the internet, competency in accessing and using the features of the site) therefore alternative formats of intervention delivery should be further examined (i.e. within the home, within the clinic). If the effects of disclosure take time to manifest (see section 10.3.2) then future research would need to examine well-being at various intervals (i.e. 1-month, 3-months) to determine if the effects of written emotional disclosure in individuals with infertility are indeed delayed. Until further research has examined the feasibility and efficacy of written emotional disclosure in wider and larger samples of individuals with infertility and under different conditions the real value of disclosure writing in this population will not be known.

10.6 Summary and Conclusion

The main aim of this thesis was to examine the efficacy of a written emotional disclosure intervention for individuals with infertility. In doing so the thesis also investigated the moderating effects of adapting the traditional laboratory based writing intervention to one that was computer-mediated and delivered outside of the controlled laboratory environment. The modality (computer versus pen-and-paper) and context (lab versus home) of written emotional disclosure was not found to moderate the short-term or longer-term effects of disclosure on physical and psychological well-being. Positive expectancy and demand effects were possible explanations for the

improvements in psychological well-being that were noted across all groups (disclosure, writing control and non-writing control).

The recruitment of new referral IVF patients from an assisted conception clinic proved to be problematic because of limited patient numbers and the unpopularity of the protocol alongside IVF treatment demands. As a result the implementation of the intervention within this context became unfeasible. The subsequent adaptation to an Internet-mediated written emotional disclosure intervention showed that this type of intervention provided limited benefit for individuals with infertility. The results of this thesis suggest that disclosure writing may be of utility to specific individuals, particularly those who use more negative emotion and cognitive mechanism words in their writing. Further examination of the efficacy of this type of intervention in individuals with infertility recruited from alternative sources and under different conditions is required before any clear conclusions can be offered about the overall utility of such an intervention in this population.

In conclusion, this thesis has shown that the modalities and contexts in which writing occurs produce equivalent outcomes. Writing about thoughts and feelings relating to the experience of infertility and its associated treatments was beneficial for individuals who wrote with an increasing use of negative emotion words and cognitive mechanism words across the intervention session. This thesis has shown that how disclosure writing works in healthy students does not appear to be how it works in individuals with infertility. The contribution of this thesis has been to directly test the potential moderating effects of methodological variation in intervention delivery and examine the utility of a written emotional disclosure intervention for individuals with infertility, in doing so the findings of this thesis contribute to the expanding literature.

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Appendices

A.1 Publications and Conference Presentations

A.1.1 Abstracts

Cutts, K. J., Hurst, K. M., Arden, M. A., and Reidy, J.(2007). Emotional disclosure through writing and well-being: an analysis of modality [Abstract]. *Health Psychology Review,* 1 (Supplement 1), p 310.

Cutts, K. J., Arden, M. A., Hurst, K. M., and Reidy, J. (2006). Written emotional expression and the role of context in study outcome [Abstract]. *Proceedings of the British Psychological Society*. Available online from, http://www.bps.org.uk/conferences-and-events/proceedings/proceedings_home.cfm?&ResultsType=Abstracts&ConferenceID=1286&localAction=details.

A.1.2 Conference Presentations

Cutts, K. J., Arden, M. A., Hurst, K. M., & Reidy, J. (2006) *Written Emotional Disclosure and the Role of context in Study Outcome.* Division of Health Psychology Annual Conference, University of Essex, 14th September 2006.

Cutts, K. J., Hurst, K. M., Arden, M. A., & Reidy, J. (2005) *Emotional Disclosure Through Writing and Well-being: an analysis of modality.* European Health Psychology Society Annual Conference, University of Ireland, Galway. 1st September, 2005.

Cutts, K. J., Hurst, K. M., Arden, M. A., & Reidy, J. (2005) *Development and Evaluation of a Written Emotional Disclosure Intervention in Infertile Individuals.* North West Consortium for Postgraduates Annual Conference, University of Leeds. 13th May, 2005.

A.2 The Development and Implementation of a Disclosure Writing Intervention in Couples Attending an Assisted Conception Unit.

A.2.1 Overview to the Study

The literature presented in Section 2.1 of this thesis identifies the stressful nature of infertility and infertility treatments, and their resultant negative psychological sequelae. Psychosocial interventions have been shown to have some beneficial effects on well-being in this population of individuals (Boivin, 2003; see section 2.2.7), yet the evidence would suggest that infertile individuals, in particular those seeking or undergoing infertility treatment perceive there to be constraints associated with face-to-face and group based psychosocial interventions that prevent them from engaging in these treatment programmes (McNaughton-Cassill, Bostwick, Arthur, Robinson & Neal, 2002; Schmidt, Tjørnhøj-Thomsen, Boivin & Andersen, 2005). To overcome the barriers to participation that infertile individuals encounter with face-to-face psychological therapies (i.e. time constraints, difficulty in scheduling session) McNaughton-Cassill et al. (2002) have suggested that written disclosure may be an appropriate alternative intervention for this population. Based on the empirical findings presented in Section 2.2 that has shown written disclosure to be effective in reducing psychological symptoms in clinical populations (e.g. women with breast cancer, Stanton et al., 2002) the aim of this study was to examine the efficacy of a home-based written emotional disclosure intervention for individuals with infertility attending an Assisted Conception Unit (ACU).

The findings of the studies presented in Chapters 5 and 6 of this thesis showed that an adaptation of the 'standard' laboratory based disclosure protocol, to one that is computer-mediated, and delivered within the context of the home, was equivalent in terms of the longer-term outcome of the intervention. Taken together the findings of these studies provide support for the argument that a written disclosure intervention delivered within the context of the participants' home via a computer is a feasible alternative to the more traditional delivery format seen in previous studies (e.g. Pennebaker & Beall, 1986). This chapter outlines the design, procedure and implementation of a home-based disclosure writing intervention in patients recruited from the ACU of a large city hospital.

A.2.2 Method

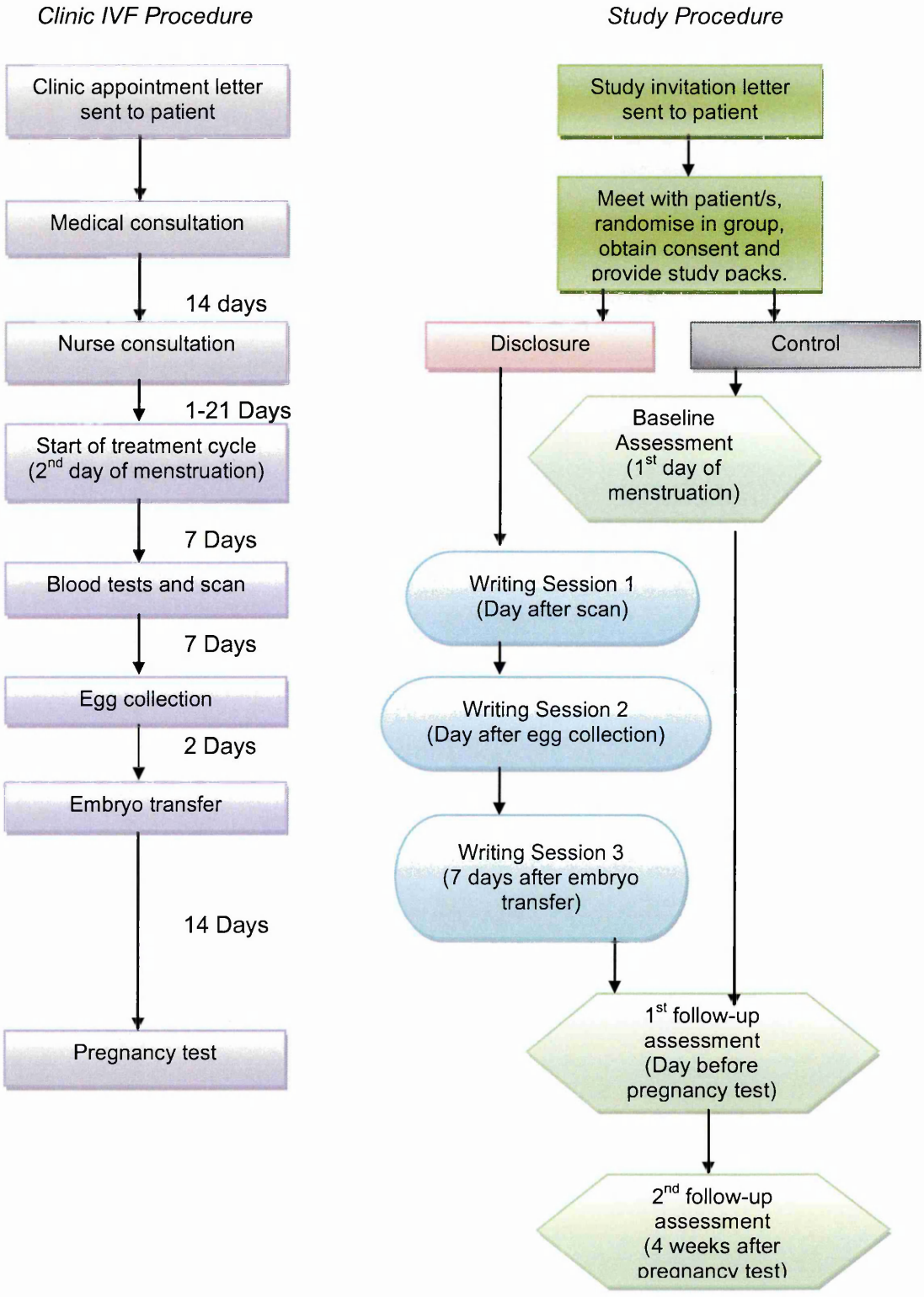
A.2.2.1 Design

The study used a quasi-experimental, repeated measures design. At recruitment participants were randomly allocated to one of two conditions; disclosure writing or non-writing control[42]. To maintain equal participant numbers across the two groups block randomisation was used to allocate participants to condition (Altman & Bland, 1999). Randomisation was also conducted on a couple by couple basis (i.e. the couple presenting for In Vitro Fertilization (IVF) treatment were randomised into the same condition, see section A.2.2.4 of this appendix).

Figure A.2.1 shows the study design which ran parallel to the IVF treatment cycle of the participant (see section A.2.2.5 of this appendix); this comprised a baseline assessment completed the day before the start of the treatment cycle, an intervention period in which disclosure group participants completed three 15 minute writing sessions at specific intervals within the treatment cycle, the first session to be conducted the day after the scan, the second the day after egg collection and the third seven days after embryo transfer. Two follow-up assessments, the first being the day before the pregnancy test (approximately 3-4 weeks after the start of treatment) and the second 4-weeks after the pregnancy test were completed by all participants. In addition, daily stress monitoring was conducted using a daily assessment questionnaire each evening throughout the treatment cycle. The dependant variables measured at baseline and follow-up assessment were depression, anxiety, psychological distress, fertility problem stress, physical symptoms, intrusion and avoidance.

[42] The studies presented in Chapters 4 and 5 included both a writing control group and a non-writing control group. Due to the anticipated challenge of obtaining ethical approval to ask patients to engage in a control based writing task that would potentially offer little if any benefit to the patient the decision was taken to only include a non-writing control.

Figure A.2.1 Flow diagram of study process in relation to IVF procedure.



A.2.2.2 Measures

This study utilised the same measures as Chapter 5 and Chapter 6 (see section 5.4.3 of this thesis) which were; the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1992), the Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979), the Essay Evaluations Questionnaire (EEQ; Greenberg & Stone, 1992), the Physical Symptoms Inventory (PSI; Spector & Jex, 1998) and the Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegan, 1988). In the studies in Chapter 5 and 6 the immediate version of the PANAS was used to evaluate participants' moods immediately following each writing session. Differences between groups were observed in levels of negative affect immediately after writing with home-based disclosure participants reporting higher levels of NA than lab-based disclosure participants in Chapter 5; unfortunately interpretation of this finding was limited because pre-writing mood was not assessed in these studies. For the purpose of the current study the immediate version of the PANAS is used to evaluate participants' moods immediately before and following each writing session.

In addition to the measures noted above, this study also included the following:

<u>The Fertility Problem Inventory (FPI; Newton, Sherrard & Glavac, 1999).</u>

The FPI is a 46-item measure of infertility stress. Participants are asked to indicate their agreement with each item on a six-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The FPI contains five separate subscales that represent domains of stress specific to infertility; these are social concerns, sexual concerns, relationship concerns, need for parenthood and rejection of childfree lifestyle. Each of the five scales has shown good internal reliability (all α>.80; Newton et al., 1999). Examples of items include; *"For me, being a parent is a more important goal than having a satisfying career"* (need for parenthood subscale) and *"I feel like I've failed at sex"* (sexual concerns subscale). All positively phrased items are reverse scored and a composite score derived from summing the five subscales provides a global measure of infertility-related distress. Higher scores indicate increased infertility-related distress. Newton et al. (1999) interpret mean global FPI scores as follows; for females, a score of 97 or below represents low stress, scores of 98-132 represent average stress, scores of 133-167 represent moderately high stress and scores of 168 or greater represent very high stress. For males, scores of 87 or below represent low stress, scores of 88-113 represent average stress, scores of 114-146 represent moderately high stress and scores of 147 or greater represent very high stress. For the purpose of this study the global FPI score was used to assess infertility-related distress, the global

FPI has demonstrated high internal reliability (α = .93) and good test-retest reliability in addition to demonstrating moderate discriminant and convergent validity (Newton et al. 1999).

The Ways of Coping Questionnaire (WOC: Folkman & Lazarus, 1988)

The WOC is a 66-item process measure of coping that assesses thoughts and actions that individuals use to cope with stressful encounters. Individuals are asked to respond to each item on a 4-point Likert scale, indicating the frequency with which each strategy is used. The WOC contains eight empirically derived scales: confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem solving and positive reappraisal. In a sample of married couples internal consistency of the eight WOC scales is reported to range from α = .61 to α = .79 and are higher than alphas reported for most other measures of coping processes (Folkman & Lazarus, 1988). The authors also suggest that the WOC can be adapted by the researcher to suit the study context making the WOC a valid measure for use in IVF patients.

The Daily Stress Inventory (DSI; Brantley, Waggoner, Jones & Rappaport, 1987). The DSI is a 58-item inventory that requires respondents to endorse events experienced in the last 24 hours and to rate the perceived stressfulness of the events on a Likert scale ranging from (1) occurred but was not stressful to (7) caused me to panic, this provides and impact rating of the event. Three daily scores are derived for each individual that relate to 1) if the event occurred, this a frequency score (FREQ), 2) the sum of the impact rating of the events, which provides a total daily impact score (SUM), and 3) the average impact rating of the events which is calculated by diving the total impact score by the frequency score (AIR = SUM divided by FREQ). Good internal consistency for FREQ and SUM (α = .83 and α = .87 respectively) and concurrent validity with the Daily Hassles Scale are reported for the scale. Further to this convergent validity is reported with endocrine measures of stress providing support for the validity of the DSI as a measure of daily minor stress (Bradley et al., 1988).

Content analysis of participant's narratives was conducted using the Linguistic Inquiry and Word Count Programme (LIWC: Pennebaker, Francis & Booth, 2001) which is described in section 5.4.3. In addition to the above measures a demographic information questionnaire was also included in the questionnaire booklet (see A.2.5.1 of this appendix for demographic information questionnaire).

A.2.2.3 Ethics

The process of obtaining ethical approval for the study began in Spring 2005. Following independent scientific review the study was subject to scrutiny by the Local Research Ethics Committee (LREC) and approval was granted in May 2006 (See A.2.5.2 - A.2.5.3 of this appendix for Research Ethics Application Form and Letters of Ethical Opinion). Authorisation of the project by the NHS Foundation Trust was not granted in full until November 2006 (see section A.2.3.3 of this appendix for a detailed discussion).

A.2.2.4 Recruitment

The principal inclusion criterion for participation in the study was that individuals were new referral patients to the ACU and had not previously undergone IVF treatment (this includes patients undergoing Intracytoplasmic Sperm Injection (ICSI; see section 2.2.3.2 for a description of this procedure). Individuals react differently to repeat IVF attempts (Beaurepaire, Jones, Thiering, Saunders & Tennant, 1994: Eugster & Vingerhoets, 1999; Thiering, Beaurepaire, Jones, Saunders & Tennant, 1993). Therefore couples who had undergone previous attempts at IVF were excluded from taking part in the study; these exclusion criteria also increased homogeneity across the sample. To eliminate the confounding effects of other psychosocial interventions on study outcome, patients who were currently receiving psychological treatment (including those who had opted to use the clinic counselling services) were excluded from the study. Participants who could not read and write, or read and write in English were also excluded from the study. The focus of the study was to improve the general well-being of patients with infertility, regardless of demographic or diagnosis factors, therefore no other exclusion criteria were imposed.

Invitation letters were sent to patients with their clinic appointment letter (see A.2.5.4 of this appendix for study invitation letter). On the day of their pre-arranged appointment and prior to their medical consultation couples were approached and invited to talk about being involved in the study. In the privacy of a consultation room they were given a verbal introduction to the study. Couples were informed that it was not compulsory for both of them to take part in the study and if one partner wished to be involved in the study the other was not obliged to participate if they did not wish to. Those who were interested were asked to make themselves available after their medical consultation to be given more detailed information on the study, to give consent and to receive the study questionnaire packs (and writing materials if they were allocated to the disclosure group) to take home with them. At this stage participants were advised of their right to

refuse and that this would not affect their medical treatment. Patients were also informed of confidentiality and anonymity throughout the study.

Patients who agreed to participate were given a more detailed verbal briefing (taking approximately 20-30 minutes) after their medical consultation. Participants were told that the study was concerned with investigating the experience of assisted reproduction but were not informed of randomisation of patients into different condition so as not to bias their responses to questionnaires. Partners within a couple were randomised into the same group to prevent participants becoming aware that there were different conditions within the study and thus maintaining experimental control. All participants were asked to read the participant information sheet and sign the consent form before taking away the study packs (see A.2.5.5 of this appendix for study information sheet and A.2.5.6 for consent form).

The study packs contained the baseline assessment questionnaire, daily stress monitoring questionnaires, three writing booklets with instructions (or three floppy disks containing a Rich Text Format RTF document with writing instructions for those who opted to complete the writing session by computer[43]) and two follow-up questionnaire booklets. Stamped addressed envelopes were included for participants to return the study materials in.

A.2.2.5 Study Procedure

The study procedure is outlined in Figure A.2.1 and was designed to run parallel to the IVF treatment cycle. The IVF protocol requires that patients start their treatment on the second day of the female's menstrual period. On informing the clinic of the start of menstruation patients were contacted by telephone and instructed to complete the baseline questionnaire pack and to return the completed questionnaire in the pre-paid envelope provided. It is at this stage that participants also began completing the daily stress inventory, each evening before going to bed.

The first of the three writing sessions was completed on the day following the patient's appointment to take blood samples and have an ultrasound scan (approximately eight days after the start of treatment). The second writing session was scheduled for the day after egg collection (approximately eight days after the first writing session) and the final writing session was to be conducted seven days after embryo transfer (between 8

[43] None of the participants chose this option.

and nine days after the second writing session). Spacing writing sessions over the course of the treatment cycle (as opposed to over three consecutive days) provided participants with the opportunity to write about their thoughts and feelings relating to different aspects of the treatment cycle, stages at which stress levels can fluctuate significantly (Boivin & Takefman, 1995). Stamped addressed envelopes were included for the return of the writing booklets/floppy disks.

The writing instructions given to participants were adapted from a study with breast cancer patients (Stanton et al., 2002) which follow the instructions of Pennebaker (1994). On day one disclosure group participants were given the following instructions:

'Over the three writing sessions in this study I would like you to write about your deepest thoughts and feelings concerning your experience of difficulties in having a child, and the treatment process you are going through at the moment. I realise that people who encounter such difficulties experience a full range of emotions, and I want you to focus on any and all of them. In your writing I want you to really let go and explore your deepest emotions and thoughts. You might think about all the various feelings and changes that you experienced before being diagnosed, after diagnosis, up to starting IVF treatment as well as now, during the treatment itself. Whatever aspect you choose to write about, it is critical that you focus on your deepest thoughts and feelings. You might also tie your thoughts and feelings about your difficulties in having a child and your current treatment to other parts of your life - people you love, who you are, or who you want to be. Again the most important part of your writing is that you really focus on your deepest emotions and thoughts. The only rule we have is that you keep writing for the entire ***15 minutes****. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Don't worry about erasing or crossing things out. Just write.'*

Prior to beginning the writing task participants were asked to complete the immediate version of the PANAS. At the end of the 15 minute writing session participants were asked to complete the PANAS and EEQ. Participants were to be contacted by telephone to remind them to complete their writing sessions (see A.2.5.7 of this appendix for writing instructions for all sessions).

The first follow-up assessment of physical symptoms and psychological well-being was completed the day before the pregnancy test and the second follow-up assessment

was completed 4-weeks later. A debriefing letter outlining the background to the study, its aims and expected outcomes was mailed to participants upon receipt of the completed study materials (see A.2.5.8 of this appendix for debriefing information letter).

A.2.3 Study Outcome

A.2.3.1 Sample Size

In order to determine the sample size required to achieve adequate power in the final analysis Gpower (Erdfelder, Faul & Buchner, 1996) was used to calculate *a priori* the sample size required to obtain an effect size equivalent to those observed in previous diary writing studies. For example in the meta-analysis conducted by Smyth (1998) an effect size of d = .66 was calculated for psychological well-being and d = .42 for self-reported physical health. These medium effect sizes (Cohen, 1977) are similar to those produced by other psychological interventions (Smyth 1998). Using these previously published effect sizes as a guide, power calculations indicated that a total sample size of 48 (α = .05, power = .80, Critical f = (1, 46) = 4.05, Lambda = 8.47) would be required to obtain a comparable effect size for psychological well-being and 22 (α = .05, power = .80, Critical f = (1, 20) = 4.35, Lambda = 9.58) for self-reported physical health. Thus a final sample size of 48 was considered adequate for the study.

A.2.3.2 Uptake and Attrition

Recruitment of participants to the study began in January 2007. Initially the clinic was provided with 40 letters of invitation and these were sent out with letters of appointment to new referral patients. Clinical appointments were made for 19 couples for the period January 2007 to July 2007. Ten couples registered an interest in the study and were seen from January 2007 to May 2007. Of these 10 couples, three were referred for other treatment and therefore no longer eligible to take part in the study and one couple failed to attend their appointment. Of the remaining six couples (12 potential participants), nine participants (four couples and the female from one couple) agreed to take part in the study. One participant withdrew due to spontaneous pregnancy (single female) and two (a couple) withdrew because they decided not to proceed with the IVF treatment. The remaining six participants (three couples) withdrew on day one of the study (the start of IVF treatment).

A.2.3.3 Amending the protocol

In initial correspondence with the clinic the number of new referral patients attending the clinic for IVF treatment was approximated to be 100 couples over a 12 month

period. In the first month of the study it became apparent that the number of new referral IVF patients was somewhat lower than had been anticipated. In February 2007 a Notice of Substantial Amendment (see A.2.5.1 of this appendix) was submitted to LREC to expand the inclusion criteria of the study to include patients who were undergoing repeat cycles of IVF and Intra Uterine Insemination (IUI) in order to increase the available pool of potential participants. Unfortunately the ethics committee would not approve the inclusion of repeat cycle IVF patients in the study as they believed it would put them under more unnecessary stress. Approval was given for the inclusion of IUI patients in April 2007 (see A.2.5.10 of this appendix for Letters of Ethical Opinion relating to this amendment). By May 2007 it was apparent that the number of patients attending the clinic who were eligible to take part in the study would not be sufficient to meet the sample size required. Furthermore, the attrition rate for the study was 100 per cent.

In consideration of the limited number of potential participants, attrition rate and time scale remaining of the research programme the decision was taken to terminate the study.

A.2.4 Discussion

The main aim of the study was to examine the efficacy of a written disclosure intervention for individuals with infertility. Recruitment of individuals attending the ACU for IVF treatment began in the January of 2007. Based on the inclusion criteria for the study (IVF new referral patients and subsequently IUI referrals) the number of patients referred to the clinic was somewhat lower than had been anticipated based on earlier estimates provided by the ACU. The refusal of the LREC to allow the inclusion of repeat cycle IVF patients into the study meant that that there was no opportunity to increase the potential number of participants available. Subsequently, low uptake into the study and the 100 per cent attrition rate from the study between January 2007 and May 2007 suggested that continuation of the study was unfeasible and the study was terminated.

In studies examining the psychological effects of infertility/treatment and interventions with patients undergoing IVF treatment response rates are often low (de Klerk et al., 2005; McNaughton-Cassill et al., 2002) and attrition rates can be high (de Klerk et al., 2005; Boivin et al., 1998). For example, de Klerk et al. (2005) reported a response rate of 32 per cent in a study which examined the effectiveness of psychosocial counselling

in new referral IVF patients, the most common reason for non-participation was the time commitment involved (three, one hour counselling sessions over the course if the IVF cycle). de Klerk et al. (2005), which utilised a daily stress diary similar to the one included in the present studies design, reported an attrition rate of 48 per cent. This is similar to that reported by Boivin et al. (1998) who also used daily stress monitoring in a sample of new referral IVF patients and reported an attrition rate of 55 per cent. Problematic for the present study was the fact that attrition occurred before the study commenced.

It was not possible to examine in detail the reasons for non-response and withdrawal in the present study as obtaining this information via interview or questionnaire would have required additional ethical approval. However, one possible reason for the poor response rate to the study (in addition to the limited number of patients who met the inclusion criteria) was that patients were also being invited to participate in a drug trial which was ongoing in the clinic at the same time as the disclosure study, with the success of treatment being a priority for patients, involvement in the drug trial would have taken precedent over that of a psychosocial intervention.

Participants who were recruited into the study but withdrew on the day that the study was to due to start communicated that they wanted to concentrate solely on their treatment. This would suggest that they perceived the disclosure study protocol to be an additional and unnecessary burden. Because the study was introduced to patients as an investigation into the experiences of people attending an ACU that may help to develop services and information for future users and not as a psychosocial intervention that may provide direct benefit for the patient there was little motivation to participate or continue with the study.

A number of factors contributed to the premature termination of the present study including the limited number of eligible participants, a lengthy ethical process, the result of which was a limited timescale for recruitment and implementation of the study, and the unwillingness of patients to engage with the study at a time when they were undergoing a stressful and invasive medical intervention. Though the feasibility of implementing a written disclosure study for individuals with infertility recruited within the context of an ACU was not supported by this study, the possibility that disclosure writing could be a valuable therapeutic tool that could be used to ameliorate distress in infertile individuals warranted investigation. In order to further examine the efficacy of a

brief written disclosure intervention for individuals with infertility the written disclosure protocol was adapted to be delivered via the internet.

The primary aim of this thesis was to examine the efficacy of a written disclosure intervention for individuals experiencing infertility. Whilst the studies presented in Chapter 5 and 6 are not able to be generalized readily beyond a student sample, the findings of these studies support the adaptation of the written disclosure intervention to a home-based, computer-mediated format. The prospect of developing and providing an effective internet-mediated disclosure intervention for individuals experiencing infertility is encouraging. Internet-mediated research presents a number of ethical and methodological challenges. Chapter 7 presents a review of these challenges that need to be considered in the design and implementation of a web-based disclosure intervention.

A.2.5 Study Documents

A.2.5.1 Demographic Information Questionnaire

Sheffield Hallam University

Patient Identification No:

General Information

Thank you for agreeing to take part in this study. We would like to ask you some general questions about you and your health. Please use the available spaces to give your answers, tick the boxes and circle responses where indicted

1. Age: .....
2. Gender: (please circle) **Male / Female**
3. Ethnicity: (please circle one) **Black**

   White

   Asian

   Other (please specify) .....

4. Please indicate the type of treatment you are receiving? **IUI** ☐
   IVF ☐
   ICSI ☐

5. Is this your first attempt at assisted conception? **YES/NO**

6. If you answered NO to question 5. please indicate which treatment/s you have previously undergone and on how many occasions.

IUI.....

IVF.....

ICSI.....

7. Do you have any children? **YES/NO**

   If yes, how many do you have?

Number.....

8. Are you currently receiving counselling/psychotherapy? (Please circle your response)

9. Are you currently taking psychotropic medication (i.e. antidepressants, anti-anxiety drugs or mood stabilizers)? (Please circle your response)

YES / NO

10. For approximately how long have you and your partner being trying to conceive? **yrs...../mnths.....**

11. Have you been given a diagnosis by a doctor? **YES / NO**

12. Who has received the diagnosis?

you? ☐
your partner? ☐
both of you? ☐
unclear? ☐

13. What is the specific diagnosis?

for you
.....

for your partner.....

14. How is your treatment being funded?

NHS ☐
Self-funding ☐

A.2.5.2 Research Ethics Application

Date: 15/12/2005 Reference: 06/Q2305/2 Online Form

APPLICANT'S CHECKLIST

All studies except clinical trials of investigational medicinal products

REC Ref:	06/Q2305/2
Short Title of Study:	Experiences of people attending an assisted conception unit
CI Name:	Mrs K. J. Cutts
Sponsor:	STH Research Department

Please complete this checklist and send it with your application

- Send ONE copy of each document (except where stated)
- ALL accompanying documents must bear version numbers and dates (except where stated)
- When collating please do NOT staple documents as they will need to be photocopied.

Document	Enclosed?	Date	Version	Office use
Covering letter on headed paper	◉ Yes ○ No	15/12/2005		
NHS REC Application Form, Parts A&B	Mandatory	15/12/2005	Version 1	
NHS REC Application Form, Part C (SSA)	◉ Yes ○ No	15/12/2005	Version 1	
Research protocol (6 copies) or project proposal	Mandatory	15/11/2005	Version 3	
Summary C.V. for Chief Investigator (CI)	Mandatory	15/12/2005		
Summary C.V. for supervisor (student research)	◉ Yes ○ No	15/12/2005		
Research participant information sheet (PIS)	◉ Yes ○ No	16/11/2005	Version 3	
Research participant consent form	◉ Yes ○ No	08/07/2005	Version 1	
Letters of invitation to participants	◉ Yes ○ No	12/12/2005	Version 1	
GP/Consultant information sheets or letters	○ Yes ◉ No			
Statement of indemnity arrangements	◉ Yes ○ No	16/11/2005		
Letter from sponsor	○ Yes ◉ No			
Letter from statistician	○ Yes ◉ No			
Letter from funder	◉ Yes ○ No	14/12/2005		
Referees' or other scientific critique report	◉ Yes ○ No	15/11/2005		
Summary, synopsis or diagram (flowchart) of protocol in non-technical language	◉ Yes ○ No	18/11/2005	Version 1	
Interview schedules or topic guides for participants	○ Yes ◉ No			
Validated questionnaire	◉ Yes ○ No			
Non-validated questionnaire	○ Yes ◉ No			
Copies of advertisement material for research participants, e.g. posters, newspaper adverts, website. For video or audio cassettes, please also provide the printed script.	○ Yes ◉ No			
Intervention Group Instruction Sheet	◉ Yes ○ No	04/10/2005	Version 1	
Control Group Instruction Sheet	◉ Yes ○ No	04/10/2005	Version 2	
Debriefing Letter	◉ Yes ○ No	08/07/2005	Version 1	
Demographic Information Sheet	◉ Yes ○ No	08/07/2005	Version 1	

NHS REC Application Form – Version 5.0 0 AB/16024/1

WELCOME TO THE NHS RESEARCH ETHICS COMMITTEE APPLICATION FORM

This page is important. An application form specific to your project will be created from the answers you give.

1. Select one research category from the list below:

- ○ Clinical trials of investigational medicinal products (including phase 1 drug development)
- ○ Clinical investigations of medical devices
- ○ Research administering questionnaires for quantitative analysis
- ○ Research involving qualitative methods only
- ○ Research limited to taking and working with new samples
- ○ Non-interventional research

If your work does not fit any of these categories, select the option below:

- ◉ Other research

1a. Please answer the following questions:

a) Does your study involve the use of any radiation?	○ Yes	◉ No
b) Will you be taking new samples?	○ Yes	◉ No
c) Will you be using existing samples?	○ Yes	◉ No

2. Is your research confined to one site?

◉ Yes ○ No

3. Does your research involve work with prisoners?

○ Yes ◉ No

4. Does your research involve adults unable to consent for themselves through physical or mental incapacity?

○ Yes ◉ No

5. Is your work an educational project?

◉ Yes ○ No

6. Is your project an audit or service evaluation?

○ Yes ◉ No

NHS Research Ethics Committee NHS
Application form

This form should be completed by the Chief Investigator, after reading the guidance notes. See glossary for clarification of different terms in the application form.

Short title and version number: (maximum 70 characters – this will be inserted as header on all forms)
Experiences of people attending an assisted conception unit

Name of NHS Research Ethics Committee to which application for ethical review is being made:
South Sheffield Research Ethics Committee

Project reference number from above REC: 06/Q2305/2
Submission date: 15/12/2005

PART A: Introduction

A1. Title of the research

Full title: The Efficacy of an Expressive Writing Task upon Psychological Well-being in Individuals Attending an Assisted Conception Unit.

Key words: emotional expression
disclosure writing
infertility
in vitro fertilization
distress
coping
appraisal

A2. Chief Investigator

Title:	Mrs
Forename/Initials:	K. J.
Surname:	Cutts
Post:	PhD Student
Qualifications:	BSc (Hons) Psychology
Organisation:	Sheffield Hallam University, Psychology
Address:	Collegiate Crescent Sheffield
Post Code:	S10 2BP
E-mail:	k.cutts@shu.ac.uk
Telephone:	0114 2255844
Fax:	0114 2252430

A copy of a current CV (maximum 2 pages of A4) for the Chief Investigator must be submitted with the application

A3. Proposed study dates and duration

Start date: 06/02/2006
End date: 02/02/2007

Duration: Months: 12 ; Years: 0

A4. Primary purpose of the research: *(Tick as appropriate)*

- ☐ Commercial product development and/or licensing
- ☐ Publicly funded trial or scientific investigation
- ☑ Educational qualification
- ☐ Establishing a database/data storage facility
- ☐ Other

A6. Does this research require site-specific assessment (SSA) of each research site? (Advice can be found in the guidance notes on this topic.)

◉ Yes ○ No

If No, please justify:

If Yes, Part C of the form will need to be completed for each research site and submitted for SSA to the relevant Local Research Ethics Committee. Do not submit Part Cs for other sites until the application has been booked for review and validated by the main Research Ethics Committee.

Management approval to proceed with the research will be required from the RDDepartment for each NHS care organisation in which research procedures are undertaken. This applies whether or not the research is exempt from SSA.

PART A: Section 1

A7. What is the principal research question/objective? *(Must be in language comprehensible to a lay person.)*

Do IVF/ICSI patients who express their emotions through writing about the stress associated with infertility and their treatment, exhibit improvements in physical and psychological well-being compared to controls?

A8. What are the secondary research questions/objectives? *(If applicable, must be in language comprehensible to a lay person.)*

Does the location of a diagnosis of compromised fertility status (i.e. male factor/female factor/mixed etc.) effect the efficacy of the writing task?

Do other moderating variables affect the efficacy of the writing task (e.g. socio-demographic variables, personality variables – e.g. alexithymia)?

Do self-reported coping efforts change across the study period as a function of the writing task?

Is emotional expression or cognitive reappraisal evident within the writing task content?

A9. What is the scientific justification for the research? What is the background? Why is this an area of importance? *(Must be in language comprehensible to a lay person.)*

The experience of unwanted childlessness can be devastating for couples, and the physical and emotional demands placed on couples undergoing fertility treatment can have a negative impact on psychological functioning (e.g. Greil, 1997; Hurst, Dye, Rutherford, & Codit, 1999; Pook, Krause & Drescher, 2002). The stressful nature of the IVF process is such that some individuals feel unable to continue with treatment (Smeenk et al., 2004). In recognising that IVF can be both physically and psychologically demanding the Human Fertilization and Embryology Authority (HFEA) (2004) recommends counselling services are available for all couples undergoing treatment. Although the majority of clinics provide counselling services for their patients, free of charge, couples appear to be reluctant to use these services (Kerr, Brown & Balen, 1999). Suggested explanations for this include: difficulty of scheduling sessions, time constraints, potential perceived costs and fear of being labelled as having a psychological problem (Boivin, Scanlan & Walker, 1999).

Research has shown that a writing intervention which promotes disclosure and emotional expression is effective in improving psychological and physical well-being in both healthy participants (e.g. Greenberg & Stone, 1992) and medical patients such as women with breast cancer, men with prostrate cancer and rheumatoid arthritis patients (e.g. Stanton et al., 2002). Participants in studies which have examined the therapeutic benefits of writing are typically asked to write about their deepest thoughts and feeling relating to their past or current expereinces for 15–20 minutes on three to five days. Participants are assessed on a number of psychological and physical well-being measures up to six months after the final writing session (Pennebaker & Segal, 1999).

This study is thus concerned with investigating the therapeutic utility of a writing intervention that is relatively cost effective, can be used outside of the traditional clinical setting and is free from the social constraints and stigma that may deter infertile couples from seeking psychosocial counselling.

A10. Give a full summary of the purpose, design and methodology of the planned research, including a brief explanation of the theoretical framework that informs it. It should be clear exactly what will happen to the research participant, how many times and in what order. Describe any involvement of research participants, patient groups or communities in the design of the research.

This section must be completed in language comprehensible to the lay person. It must also be self-standing as it will be replicated in any applications for site-specific assessment on Part C. Do not simply reproduce or refer to the protocol. Further guidance is available in the guidance notes.

Writing about emotional upheavals and stressful experiences has been found to have therapeutic benefits in healthy individuals and medical patients. The methodology developed by Pennebaker and Beall (1986) involves individuals writing about their deepest thoughts and feelings relating to a stressful event on 3-5 occasions for 15-20 minutes. Putting these emotional experiences into words can help people organize their thoughts, leading to new appraisals of past or present circumstances, often providing a sense of control over uncontrollable events (Pennebaker, 1997). The purpose of this study is to investigate the utility of such a writing intervention for patients attending a fertility clinic in alleviating infertility/treatment related stress and improving psychological well-being.

Participants: New referral male and female IVF/ICSI patients.

Design: Recruited participants will be randomly allocated to one of two conditions, the writing intervention group or control group. Participants will not be informed that they will be randomly allocated into either an intervention group or control group as this may bias their responses to questionnaires.

Setting: Participants will be recruited from an Assisted Conception Unit (ACU) and will be interviewed at the time of their first IVF consultation with regards to participation in the study. Completion of questionnaires and writing sessions (intervention) will be completed in the participants' own homes to minimize participation burden.

Method of Data Collection: Questionnaires and diaries.

Outcome Measures: The study will employ a number of standardised psychological measures including the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983), Fertility Problem Inventory (FPI; Newton, Sherrard & Glavac, 1999), Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979) and Ways of Coping Questionnaire (WOC; Folkman & Lazarus, 1988). Physical symptoms will be assessed using the Physical Symptoms Inventory (PSI; Spector & Jex, 1998). Pre and post writing mood will be assessed using the Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988) and participants will also be asked to complete an essay evaluation questionnaire (EEQ) and Event Appraisal Questionnaire (EAQ; Paez, Velasco, Gonzales, 1999) post writing. Daily stress will be measured using the Daily Stress Inventory (DSI; Brantley, Waggoner, Jones & Rappaport, 1987) and the Toronto Alexithymia Scale (TAS-20; Taylor, Bagby & Parker, 1997) will be administered at the beginning of the study to determine if participants have deficits in emotional awareness, understanding or expression.

Procedure: New referral couples attending for IVF/ICSI treatment at the ACU will be contacted by letter prior to their initial consultation informing them of the study and requesting their participation. Interested couples will be provided detailed information (written and verbal) about the study at the time of first consultation and invited to take part.

Each participant will receive a study pack containing baseline measures, writing materials and pre and post writing mood questionnaires, two sets of follow-up questionnaires and a pack containing daily stress monitoring forms. All participants will be given detailed completion instructions and all packs will include dates for completion and pre-paid addressed envelopes for the return of completed questionnaires.

The day after recruitment participants will complete the baseline questionnaire booklet (TAS-20, SCL-90-R, WOC, PSI, IES and FPI). On the second day participants will begin completing the DSI which they will complete every evening for the next 48 days. On day eight, twenty-two and thirty-six, intervention participants will complete the pre-writing PANAS followed by a 15 minute writing session (intervention) and then the post-writing PANAS, EAQ and EEA. On day fifty and seventy-eight all participants will complete the follow-up questionnaire booklets (SCL-90-R, WOC, PSI, IES and FPI).

In order to maintain continued participation in the study and to provide reminders of completion dates all participants will be contacted at key times within the study period via phone/text or e-mail (at the descretion of the participant).

A11. Will any intervention or procedure, which would normally be considered a part of routine care, be withheld from the research participants?

○ Yes ◉ No

A12. Give details of any clinical intervention(s) or procedure(s) to be received by research participants over and above those which would normally be considered a part of routine clinical care. *(These include uses of medicinal products or devices, other medical treatments or assessments, mental health interventions, imaging investigations and taking samples of human biological material.)*

Additional Intervention	Average number per patient		Average time taken (mins/hours/days)	Details of additional intervention or procedure, who will undertake it, and what training they have received.
	Routine Care	Research		
Psychological therapies	0	3	15 mins	Participants in the intervention group ONLY will complete three 15 minute writing sessions, 14 days apart in their own home. Participants will be asked to write about their thoughts and feelings relating to their infertility.

A13. Give details of any non-clinical research-related intervention(s) or procedure(s). *(These include interviews, non-clinical observations and use of questionnaires.)*

Additional Intervention	Average number per patient	Average time taken (mins/hours/days)	Details of additional intervention or procedure, who will undertake it, and what training they have received.
Other Questionnaire	18	1 hour/ 3 times	Participants will receive three questionnaire booklets from the researcher at the recruitment stage of the study. Each booklet will contain six questionnaires that ask them to report information relating to their general physical and emotional state, fertility problems and coping efforts they use to deal with their fertility problem. All questionnaires are completed in the privacy of their own home at allocated time points throughout the study.
Other Questionnaire	48	5-10 mins/daily	Participants will receive a pack of stress inventories that they will be asked to complete daily throughout the study at home.
Other Questionnaire	6	5 mins	Participants in the intervention group ONLY will complete a questionnaire that assesses mood state immediately before and after writing.
Other Questionnaire	3	2 mins	Participants in the intervention group ONLY will complete a five item questionnaire to assess their subjective evaluation of the events they write about and their previous level of disclosure after each writing session.
Other Questionnaire	3	2 mins	Participants in the intervention group ONLY will complete a three item questionnaire to assess their subjective appraisal of the event they have written about. This will be completed after each writing session.

A14. Will individual or group interviews/questionnaires discuss any topics or issues that might be sensitive, embarassing or upsetting, or is it possible that criminal or other disclosures requiring action could take place during the study (e.g. during interviews/group discussions, or use of screening tests for drugs)?

◉ Yes ○ No

If Yes, give details of procedures in place to deal with these issues

All participants will be asked to complete questionnaires regarding their general physical and emotional well-being as well as a questionnaire that asks how participants specifically feel about issues surrounding their fertility and the effect this has on a number of aspects of their life. Intervention group participants will be asked to write about these issues and the IVF process which could cause them to feel upset. All participants will be informed at recruitment that they will be asked to divulge sensitive information that may cause them to feel some distress, this information is also included in the information sheet along with contact details of support groups and other organisations. However, participants will be advised to contact the units' counselling services if they become distressed and feel they need to talk to someone. It is not anticipated that any criminal or other disclosures will be made during the study that require action.

The Information Sheet should make it clear under what circumstances action may be taken

A15. What is the expected total duration of participation in the study for each participant?

The expected total duration for each participant in the study is approximately 78 days. This is calculated from the day of recruitment to the completion of the final follow-up questionnaire.

A16. What are the potential adverse effects, risks or hazards for research participants either from giving or withholding medications, devices, ionising radiation, or from other interventions (including non-clinical)?

There are no potential risks or hazards for participants but there is the potential for intervention participants to experience distress during and after the writing intervention. Participants will be informed of this at the time of recruitment and will be advised that they should contact the counselling services at the clinic if they feel they cannot cope with their distress. Information relating to other support groups and contacts will be included in the information sheets that participants receive.

A17. What is the potential for pain, discomfort, distress, inconvenience or changes to lifestyle for research participants?

It is acknowledged that there is the potential for all participants to experience some distress associated with completing self-report questionnaires that ask participants to disclose their feelings in relation to specific life events. In anticipation of this, participants are informed of the potential for distress in taking part in the study and directed to contact the clinic counselling services or other support services in this eventuallity.

In terms of intervention group participants it is well-documented that writing about stressful and traumatic events has the potential to cause short-term distress (Smyth, 1998), participants will be made fully aware of this and directed to relevent support services.

It is not anticipated that participation in the study will inconvenience participants or impact on their lifestyle but it is acknowledged that there is some element of time commitment required from participants throughout the study and as such they will be informed of the all stages and duration of the process. In order to reduce burden on participants all questionnaires and intervention writing will be completed in their own homes at their own pace.

A18. What is the potential for benefit to research participants?

As the study is examining the effectiveness of a writing intervention in improving physical and psychological well-being there is the potential for intervention group participants to benefit both physically and emotionally.

A19. What is the potential for adverse effects, risks or hazards, pain, discomfort, distress, or inconvenience to the researchers themselves? *(if any)*

None.

A20. How will potential participants in the study be (i) identified, (ii) approached and (iii) recruited?
Give details for cases and controls separately if appropriate:

Following ethical approval potential participants will be recruited from new referral IVF/ICSI patients. The principal researcher will liaise with a member of the clinical team to identify potential participants. Couples who are attending the clinic as new IVF/ICSI patients will be sent details of the study by letter prior to the start of their treatment cycle. This letter will include a general information sheet for them to read outlining the details of the study and what would be expected of them if they agreed to take part.

On the same day of their pre-arranged medical consultaion at the clinic, patients would be approached by the researcher and asked if they had considered taking part and those who agree would be given a verbal introduction to the study in the privacy of a consultation room and advised of their right to refuse to take part and that this would not affect their medical treatment.

Participants would be informed of their rights regarding withdrawal, confidentiality and anonymity before being asked to give signed consent.

A21. Where research participants will be recruited via advertisement, give specific details.

☑ Not Applicable

If applicable, enclose a copy of the advertisement/radio script/website/video for television (with a version number and date).

A22. What are the principal inclusion criteria? *(Please justify)*

The principal inclusion criteria are that individuals who take part in the study are new refferals to the Assisted Conception Unit (ACU) and have not previously undergone IVF/ICSI treatment. It is important to control for the number of IVF treatments experienced by patients as it is possible that couples react differently to repeated IVF attempts (Eugster & Vingerhoets, 1999).

A23. What are the principal exclusion criteria? *(Please justify)*

Participants must be able to read and write to take part in the study and must be able to read and write in English.

A24. Will the participants be from any of the following groups? *(Tick as appropriate)*

- ☐ Children under 16
- ☐ Adults with learning disabilities
- ☐ Adults who are unconscious or very severely ill
- ☐ Adults who have a terminal illness
- ☐ Adults in emergency situations
- ☐ Adults with mental illness (particularly if detained under Mental Health Legislation)
- ☐ Adults with dementia
- ☐ Prisoners
- ☐ Young Offenders
- ☐ Adults in Scotland who are unable to consent for themselves
- ☐ Healthy Volunteers
- ☐ Those who could be considered to have a particularly dependent relationship with the investigator, e.g. those in care homes, medical students
- ☐ Other vulnerable groups

Justify their inclusion

None

A25. Will any research participants be recruited who are involved in existing research or have recently been involved in any research prior to recruitment?

○ Yes ○ No ◉ Not Known

If Yes, give details and justify their inclusion. If Not Known, what steps will you take to find out?
Potential participants may be engaging in drug trials at the ACU, it is not thought that this will be problematic for this research.

A26. Will informed consent be obtained from the research participants?

◉ Yes ○ No

If Yes, give details of who will take consent and how it will be done. Give details of any particular steps to provide information (in addition to a written information sheet) e.g. videos, interactive material.

If participants are to be recruited from any of the potentially vulnerable groups listed in A24, give details of extra steps taken to assure their protection. Describe any arrangements to be made for obtaining consent from a legal representative.

If consent is not to be obtained, please explain why not.
Participants will receive information relating to the study in the form of an information sheet and will be verbally briefed at the time of recruitment by the principal researcher. Participants will be given the opportunity to ask questions prior to giving written consent.

Copies of the written information and all other explanatory material should accompany this application.

A27. Will a signed record of consent be obtained?

◉ Yes ○ No

If Yes, attach a copy of the information sheet to be used, with a version number and date.

A28. How long will the participant have to decide whether to take part in the research?

A letter of invitation to participate in the study will be sent to arrive approximately seven days before they are to attend the clinic for their medical consultation. Participants will be given the researchers contact details at this time if they wish to obtain any further information about the study.

A29. What arrangements have been made for participants who might not adequately understand verbal explanations or written information given in English, or who have special communication needs? *(e.g. translation, use of interpreters etc.)*

Patients who cannot adequately understand verbal or written information that is given in English will not be able to participate in the study. The researcher speaks only English and the costs associated with employing the services of an interpretor or translator to be available on a daily basis to assist non-English speaking/writing participants would be excessive. Furthermore, the standardized measures used have been validated in English speaking/writing populations and therefore would not be suitable for use with non-English speaking populations without prior validation.

A30. What arrangements are in place to ensure participants receive any information that becomes available during the course of the research that may be relevant to their continued participation?

If at anytime during the study information becomes available that may affect the continued participation of patients they will be informed in writing.

A31. Does this study have or require approval of the Patient Information Advisory Group (PIAG) or other bodies with a similar remit? *(see the guidance notes)*

○ Yes ◉ No

A32a. Will the research participants' General Practitioner be informed that they are taking part in the study?

○ Yes ◉ No

If Yes, enclose a copy of the information sheet/letter for the GP with a version number and date.

A32b. Will permission be sought from the research participants to inform their GP before this is done?

○ Yes ◉ No

If No to either question, explain why not
The research protocol has been discussed with the Consultant in charge of the ACU and their consent for the research to take part has been obtained. The clinical team responsible for the patients' care at the ACU will be aware of the patients' involvement in the study, and the demands placed on the patient. The clinical team will be the first point of contact for any issues relating to their treatment.

It should be made clear in the patient information sheet if the research participant's GP will be informed.

A33. Will individual research participants receive any payments for taking part in this research?

○ Yes ◉ No

A34. Will individual research participants receive *reimbursement of expenses* or any other *incentives or benefits* for taking part in this research?

○ Yes ◉ No

A35. What arrangements have been made to provide indemnity and/or compensation in the event of a claim by, or on behalf of, participants for *negligent* harm?

Sheffield Hallam University has purchased negligence cover and this applies to the research project here.

Please forward copies of the relevant documents.

A36. What arrangements have been made to provide indemnity and/or compensation in the event of a claim by, or on behalf of, participants for *non-negligent* harm?

No such cover has been arranged.

Please forward copies of the relevant documents.

A37. How is it intended the results of the study will be reported and disseminated? *(Tick as appropriate)*

- [x] Peer reviewed scientific journals
- [ ] Internal report
- [x] Conference presentation
- [ ] Other publication
- [ ] Submission to regulatory authorities
- [ ] Access to raw data and right to publish freely by all investigators in study or by Independent Steering Committee on behalf of all investigators
- [x] Written feedback to research participants
- [ ] Presentation to participants or relevant community groups
- [x] Other/none e.g. Cochrane Review, University Library

If other/none of the above, give details and justify:
A completed PhD thesis which will include the results of data obtained in the study will be placed in Sheffield Hallam University Library in accordance with university procedures.

A38. How will the results of research be made available to research participants and communities from which they are drawn?

Participants will be informed (included in the information sheet) that if they wish to be receive the results of the study that they can contact the researcher at any time after the Autumn of 2006 (this is when the complete results of the study should be available) and they will be sent a written summary of the findings. Participants will also be advised that the full results of the study will form part of a PhD thesis and that this will be placed in Sheffield Hallam University Library.

It is anticipated that the finidngs from the study will be presented to the clinical team in the form of a written report or oral presentation upon completion of the thesis.

A39. Will the research involve any of the following activities at any stage (including identification of potential research participants)? *(Tick as appropriate)*

- [x] Examination of medical records by those outside the NHS, or within the NHS by those who would not normally have access
- [ ] Electronic transfer by magnetic or optical media, e-mail or computer networks
- [ ] Sharing of data with other organisations
- [ ] Export of data outside the European Union
- [x] Use of personal addresses, postcodes, faxes, e-mails or telephone numbers
- [ ] Publication of direct quotations from respondents
- [ ] Publication of data that might allow identification of individuals
- [ ] Use of audio/visual recording devices
- [x] Storage of personal data on any of the following:
  - [ ] Manual files including X-rays
  - [ ] NHS computers
  - [ ] Home or other personal computers
  - [x] University computers
  - [ ] Private company computers
  - [x] Laptop computers

Further details:
Examination of medical records will be only conducted with the consent of participants. Personal data will be kept on a computer that is for the sole use of the researcher and is password protected.

A40. What measures have been put in place to ensure confidentiality of personal data? Give details of whether any encryption or other anonymisation procedures have been used and at what stage:

All data collected from participants will be anonymised using a coding system whereby participants generate their own 6 digit ID code which they will include on all questionnaires and writing booklets. It is essential that data collected from each participant at each stage of the study can be matched up.

Contact information for each participant will also be obtained in the form of address, telephone numbers and e-mail addresses (if applicable)in order for the researcher to remind participants to complete questionnaires or writing booklets on specific days throughout the study. To maintain confidentiality contact details will not be kept with participant data and the researcher will be the only person able to access the file containing contact details. This will be in the form of an electronic document that will be password protected and kept on a university computer.

All electronic data files (writing transcribed for analysis) will be stored in the researchers file space on the university network which is also password protected.

Participants will be asked to consent for the researcher to access their medical files. This will be to obtain information relating to treatment outcome (positive or negative pregnancy test).

A41. Where will the analysis of the data from the study take place and by whom will it be undertaken?

Analysis of the data from the study will take place in the Graduate School, Sheffield Hallam University and will be undertaken by the PhD student who is the principal researcher.

A42. Who will have control of and act as the custodian for the data generated by the study?

The supervisors of the PhD student, Dr Keith Hurst, Dr Madelynne Arden and Dr John Reidy, Psychology, Faculty of Development and Society, Sheffield Hallam University will be custodians.

A43. Who will have access to the data generated by the study?

The PhD student and her supervisors will have access to the data.

A44. For how long will data from the study be stored?

5 Years **0** Months

Give details of where they will be stored, who will have access and the custodial arrangements for the data:
Whilst the study is ongoing any data generated from the study will be stored in a locked filling cabinet in the office of the researcher. Once the PhD is published the raw data and data set will be stored in the univeristy archives.

A45–1. How has the scientific quality of the research been assessed? *(Tick as appropriate)*

- [x] Independent external review
- [ ] Review within a company
- [ ] Review within a multi–centre research group
- [x] Internal review (e.g. involving colleagues, academic supervisor)
- [ ] None external to the investigator
- [ ] Other, e.g. methodological guidelines *(give details below)*

Justify and describe the review process and outcome. If the review has been undertaken but not seen by the researcher, give details of the body which has undertaken the review:
The present study has been developed under the supervison of the students academic supervisors, the study protocol was continually reviewed throughout its devleopment by the supervisory team.

Independent scientific review was sought through the Research Department, STH NHS Foundation Trust. A favourable decision was from the lead reviewer indicated that the study could be taken forward and no changes were required but minor suggestions were made. The second reviewer requested that changes be made which included: more detailed information regarding participants' rights, data protection and data storage and the consultation of service users. The changes were made and a more detailed outline of the strategy for developing the study was also included.

Amendments were also made to the protocol in response to comments from the lead reviewer, which included justification for the proposed design and changes to the contact details contained in the participant information sheet .

On re–submission the second reviewer requested that one final amendment be made to the protocol and the participant information sheet regarding the time taken to complete questionnaires, it was suggested that 1 hour would be a more appropriate estimation for completion of the main questionnaire booklets. The protocol and information sheets were amended accordingly and the study was given approval to commence.

If you are in possession of any referees' comments or other scientific critique reports relevant to the proposed research, these must be enclosed with the application.

A45–2. Has the protocol submitted with this application been the subject of review by a statistician independent of the research team? *(Select one of the following)*

- ○ Yes – copy of review enclosed
- ○ Yes – details of review available from the following individual or organisation (give contact details below)
- ◉ No – justify below

The protocol submitted with this application has not been subject to statistical review independently of the supervisory team. The development of the protocol has been subject to scrutiny of all members of the supervisory team who are experienced in lecturing statistics and research methods. Dr John Reidy in particular has overall responsibility for the teaching of statistics in the Psychology Department and has published a book on statistics for psychologists. It was considered that with the combined experience and Dr Reidy's expertise in statistics and research methods that it was not necessary to seek independent advice or review.

A48. What is the primary outcome measure for the study?

The primary outcome measure for the study is psychological well-being, this will be assessed in terms of levels of anxiety, depression, infertility related distress and general overall psychological functioning on day 50 and day 78 of the study. This will be measured using the Symptom Checklist-90-Revised, Daily Stress Inventory and Fertility Problem Inventory.

A49. What are the secondary outcome measures? *(if any)*

Secondary outcome measures include self reported physical well-being as measured by the Physical Symptoms Inventory and coping efforts as measured by the Ways of Coping Questionnaire on day 50 and day 78 of the study. Treatment outcome will be included as a secondary outcome and will be assesed from the routine pregnancy test at the end of the IVF treatment cycle.

A50. How many participants will be recruited?
If there is more than one group, state how many participants will be recruited in each group. For international studies, say how many participants will be recruited in the UK and in total.

Attrition rates in psychological studies involving patients undergoing IVF treatment can be high. In one study that used daily stress monitoring similar to that which is to be used in this study, only 45% of participants completed the study (Boivin et al., 1998). A final sample of 48 participants is required for the study, in order to achieve this target and allow for attrition approximately 100 participants will be recruited.

A51. How was the number of participants decided upon?

In order to determine the sample size required to achieve adequate power in the final analysis Gpower (Erdfelder, Faul & Buchner, 1996) was used to calculate a priori the sample size required to obtain an effect size equivalent to those observed in previous diary writing studies. For example in a meta analysis conducted by Smyth (1998) an effect size of d = .66 was calculated for psychological well-being and d = .42 for self-reported physical health.

If a formal sample size calculation was used, indicate how this was done, giving sufficient information to justify and reproduce the calculation.
Using these previously published effect sizes as a guide (d = .66 and d = .42) power calculations indicated that a total sample size of 48 (á = .05, power = .80, Critical f = (1, 46) = 4.05, Lambda = 8.47) would be required to obtain a comparable effect size for psychological well-being and 22 (á = .05, power = .80, Critical f = (1, 20) = 4.35, Lambda = 9.58) for self-reported physical health. Thus a final sample size of 48 will be required.

A52. Will participants be allocated to groups at random?

◉ Yes ○ No

If yes, give details of the intended method of randomisation:
Participants will be allocated to the intervention or control group using block randomisation due to there being a relativley small sample size and to try and maintain equal numbered groups.

A53. Describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.

In order to determine if the intervention has been effective in producing positive benefits in relation to primary and secondary outcomes the data will be subject to analysis using ANOVA and t–test or the non–parametric equivalent (depending on suitability of the data). It is anticipated that secondary analysis will also be conducted using univariate methods to examine the influence of other variables on the outcome measures (i.e. gender and emotional awareness as measured by the Toronto Alexithymia Scale).

Analysis of the diaries written by intervention group participants will be conducted using a computerized text analysis programme, the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis & Boothe, 2001). The data generated from this will be subjected to univariate statistical analysis to determine the level of emotional and cognitive words used over the writing sessions.

A54. Where will the research take place? *(Tick as appropriate)*

- [x] UK
- [ ] Other states in European Union
- [ ] Other countries in European Economic Area
- [ ] Other

If Other, give details:

A55. Has this or a similar application been previously rejected by a Research Ethics Committee in the UK, the European Union or the European Economic Area?

○ Yes ◉ No

A56. In how many and what type of host organisations (NHS or other) in the UK is it intended the proposed study will take place?

Indicate the type of organisation by ticking the box and give approximate numbers if known:

	Number of organisations
☑ Acute teaching NHS Trusts	1
☐ Acute NHS Trusts	
☐ NHS Primary Care Trusts or Local Health Boards in Wales	
☐ NHS Trusts providing mental healthcare	
☐ NHS Health Boards in Scotland	
☐ HPSS Trusts in Northern Ireland	
☐ GP Practices	
☐ NHS Care Trusts	
☐ Social care organisations	
☐ Prisons	
☐ Independent hospitals	
☐ Educational establishments	
☐ Independent research units	
☐ Other (give details)	

Other:

A57. What arrangements are in place for monitoring and auditing the conduct of the research?

Regular meetings between the supervisors and the student will ensure monitoring and auditing of the research process.

Will a data monitoring committee be convened?

○ Yes ◉ No

If Yes, details of membership of the data monitoring committee (DMC), its standard operating procedures and summaries of reports of interim analyses to the DMC must be forwarded to the NHS Research Ethics Committee which gives a favourable opinion of the study.

What are the criteria for electively stopping the trial or other research prematurely?

Any unforseen adverse event will stop the research.

A58. Has external funding for the research been secured?

(●) Yes ( ) No

If Yes, give details of funding organisation(s) and amount secured and duration:

Organisation:	Sheffield Hallam University
Address:	Collegiate Crescent Campus
	Sheffield
Post Code:	S10 2BP
UK contact:	Prof. Peter Ashworth
Telephone:	0114 2252561 Fax:
E-mail:	P.D.Ashworth@shu.ac.uk
Amount (£):	500.00 Duration: 12 Months

A59. Has the funder of the research agreed to act as sponsor as set out in the Research Governance Framework?

( ) Yes (●) No

Has the employer of the Chief Investigator agreed to act as sponsor of the research?

( ) Yes (●) No

Sponsor *(must be completed in all cases)*

Name of organisation which will act as sponsor for the research:

STH Research Department

Status:

(●) NHS or HPSS care organisation ( ) Academic ( ) Pharmaceutical industry ( ) Medical device industry ( ) Other

If Other, please specify:

Address:	305 Western Bank Sheffield		
Post Code:	S10 2TJ		
Telephone:	0114 271 3740	Fax:	0114 271 1790
E-mail:	ResearchAdministration@sth.nhs.uk		

The responsibilities of the sponsor may be shared between co-sponsors. If this applies, name the lead sponsor for the REC application in this box and enclose a letter giving further details of co-sponsors and their responsibilities.

Sponsor's UK contact point for correspondence with the main REC

Title: Dr	Forename/Initials: Brenda	Surname: Zinober	
Address:	305 Western Bank Sheffield		
Post Code:	S10 2TJ		
Telephone:	0114 271 3465	Fax:	0114 271 1790
E-mail:	brenda.zinober@sth.nhs.uk		

A60. Has any responsibility for the research been delegated to a subcontractor?

○ Yes ◉ No

A61. Will individual *researchers* receive any personal payment over and above normal salary for undertaking this research?

○ Yes ◉ No

A62. Will individual *researchers* receive any other benefits or incentives for taking part in this research?

○ Yes ◉ No

A63. Will the host organisation or the researcher's department(s) or institution(s) receive any payment or benefits in excess of the costs of undertaking the research?

○ Yes ◉ No

A64. Does the Chief Investigator or any other investigator/collaborator have any direct personal involvement (e.g. financial, share-holding, personal relationship etc.) in the organisation sponsoring or funding the research that may give rise to a possible conflict of interest?

○ Yes ◉ No

A65. Other relevant reference numbers if known *(give details and version numbers as appropriate)*:

Applicant's/organisation's own reference number, e.g. RD(if available):	STH14116
Sponsor's/protocol number:	STH14116
Funder's reference number:	24RPSOSL01F1
International Standard Randomised Controlled Trial Number (ISRCTN):	
European Clinical Trials Database (EudraCT) number:	
Project website:	

A66. Other key investigators/collaborators *(all grant co-applicants should be listed)*

Title:

Forename/Initials: Surname:

Post:

Qualifications:

Organisation:

Address:

Telephone:

Fax:

Postcode:

E-mail:

A67. If the research involves a specific intervention, (e.g. a drug, medical device, dietary manipulation, lifestyle change etc.), what arrangements are being made for continued provision of this for the participant (if appropriate) once the research has finished?

☑ Not Applicable

PART A: Summary of Ethical Issues

A68. What do you consider to be the main ethical issues which may arise with the proposed study and what steps will be taken to address these?

Participants may find it distressing to write about their fertility problems and the treatments that they are undergoing. Participants will be advised of this at the time of recruitment. Contact details for members of the research team are clearly stated on the participant information sheet along with contact details of other useful support groups and organisations. First and foremost participants will be advised to contact the counselling services at the clinic if they become distressed. This advice will be given at recruitment. In the event of a distressed patient contacting a member of the research team, they will be advised to contact the counselling services.

It will be emphasized that participants do not have to take part in the study and if they do, they can withdraw from the study, without giving a reason and that this will not affect the treatment they receive from the clinic. The cut off point for participants to withdraw data is after Februray 2007 at which time analysis and write up will be underway. Participants will be reassured that they do not have to answer any questions that they do not want to and they will be given the opportunity to ask for more information or to ask any questions they wish.

Confidentiality and anonymity of patient information will be maintained at all times. All questionnaire data and writing booklets collected from participants will be coded, individual participants will not be identifiable from their data and all paper documentation will be stored in locked filing cabinets in the office of the researcher whilst the study is ongoing. Electronic data (writing transcribed for analysis) will be stored in the researchers file space on the university network which is password protected. Although participant ID codes will be noted in their clinic medical records (stored at the hospital), it will not be possible for anyone to cross reference study data with these records as all study data will be stored at the university.

PART A: Student Page

A70. Give details of the educational course or degree for which this research is being undertaken:

Name and level of course/degree:
Degree of Doctor of Philosophy (PhD) Social Science and Law

Name of educational establishment:
Sheffield Hallam University

Name and contact details of educational supervisor:
Dr Keith Hurst, Psychology, Faculty of Development and Society, Sheffield Hallam University, Southbourne Building, Collegiate Crescent Campus, Sheffield, S10 2BP. Tel: 0114 2254362 E-mail: k.m.hurst@shu.ac.uk

A71. Declaration of supervisor

I have read and approved both the research proposal and this application for the ethical review. I undertake to fulfil the responsibilities of a supervisor as set out in the Research Governance Framework for Health and Social Care.

Signature: .....

Print Name:

Date: (dd/mm/yyyy)

A one-page summary of the supervisor's CV should be submitted with the application

PART B: Section 1 – List of proposed research sites

List below all research sites you plan to include in this study. The name of the site is normally the name of the acute NHS Trust, GP practice or other organisation responsible for the care of research participants. In some cases it may be an individual unit, private practice or a consortium – see the guidance notes.

Principal Investigators at other sites should apply to the relevant local Research Ethics Committee for site-specific assessment (SSA) using Part C of the application form. Applications for SSA may be made in parallel with the main application for ethical review (once the main REC has validated the application), or following issue of a favourable ethical opinion. Approval for each site will be issued to you by the main REC following SSA.

1. Name of the research site:

Royal Hallamshire Hospital, Jessop Wing

Principal Investigator for the study at this site:

Title: Mrs Forename/Initials: Katie J. Surname: Cutts

Post: PhD Student
Address: Sheffield Hallam University
Collegiate Crescent Campus
Sheffield
Postcode: S10 2BP

PART B: Section 7 – Declaration

– The information in this form is accurate to the best of my knowledge and belief and I take full responsibility for it.

– I undertake to abide by the ethical principles underlying the Declaration of Helsinki and good practice guidelines on the proper conduct of research.

– If the research is approved I undertake to adhere to the study protocol, the terms of the full application of which the main REC has given a favourable opinion and any conditions set out by the main REC in giving its favourable opinion.

– I undertake to seek an ethical opinion from the main REC before implementing substantial amendments to the protocol or to the terms of the full application of which the main REC has given a favourable opinion.

– I undertake to submit annual progress reports setting out the progress of the research.

– I am aware of my responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of patient or other personal data, including the need to register when necessary with the appropriate Data Protection Officer.

– I understand that research records/data may be subject to inspection for audit purposes if required in future.

– I understand that personal data about me as a researcher in this application will be held by the relevant RECs and their operational managers and that this will be managed according to the principles established in the Data Protection Act.

– I understand that the information contained in this application, any supporting documentation and all correspondence with NHS Research Ethics Committees or their operational managers relating to the application, will be subject to the provisions of the Freedom of Information Acts. The information may be disclosed in response to requests made under the Acts except where statutory exemptions apply.

Signature: .....

Date: (dd/mm/yyyy)

Print Name:

PART C: Site-Specific Assessment (SSA)

This form should be completed by the Principal Investigator for each site (see glossary)

Part C should be completed and sent with the relevant enclosures to each NHS Research Ethics Committee, which needs to consider site-specific issues. See guidance notes at the COREC website for further information about the application procedure.

The data in this box is populated from Part A.

Short title and version number:
Experiences of people attending an assisted conception unit

Name of NHS Research Ethics Committee to which application for ethical review is being made:
South Sheffield Research Ethics Committee

Project reference number from above REC: 06/Q2305/2

Name of NHS REC responsible for SSA:
South Sheffield REC

SSA reference (for REC office use only):

Questions C1, C4, C5, C6, C7, C8 and C13a correspond to questions A1, A2, A65, A10, A12, A13 and A29 on main application form respectively and will populate automatically.

C1. Title of the research *(Populated from A1)*

Full title: The Efficacy of an Expressive Writing Task upon Psychological Well-being in Individuals Attending an Assisted Conception Unit.

Key words: emotional expression
disclosure writing
infertility
in vitro fertilization
distress
coping
appraisal

C2. Who is the Principal Investigator for this study at this site?

Title: Mrs Forename/Initials: Katie J. Surname: Cutts

Post: PhD Student

Qualifications: BSc (Honours) Psychology

Organisation: Sheffield Hallam University

Address: Collegiate Crescent Campus
Sheffield

Post Code: S10 2BP

E-mail: k.cutts@shu.ac.uk

Telephone: 0114 2255844

Fax: 0114 2252430

A copy of a current CV (maximum 2 pages of A4) for the Principal Investigator(s) must be submitted with the application

C2-1. Give the names and posts of other investigators or members of the research team responsible to the local Principal Investigator for this site.
Include all staff with a significant research role. If the site is a network or consortium, list all participating investigators below.

Title:
Forename/Initials:
Surname:
Position:
Qualifications:
Role in the research team:

C3. Indicate the number of trials/projects within the organisation that the local Principal Investigator has been involved with in the previous 12 months:

0

How many are still current (active or recruiting)?

0

C4. Chief Investigator *(Populated from A2)*

Title:	Mrs	Forename/Initials:	K. J.	Surname:	Cutts

Post: PhD Student
Qualifications: BSc (Hons) Psychology
Organisation: Sheffield Hallam University, Psychology
Address: Collegiate Crescent
Sheffield
Post Code: S10 2BP
E-mail: k.cutts@shu.ac.uk
Telephone: 0114 2255844
Fax: 0114 2252430

C5. Other relevant reference numbers if known *(Populated from A65)*

Applicants/organisation's own reference number, e.g. RD(if available): STH14116
Sponsor's/protocol number: STH14116
Funder's reference number: 24RPSOSL01F1
International Standard Randomized Controlled Trial Number (ISRCTN):
European Clinical Trials Database (EudraCT) Number:
Project website:

C6. Give a full summary of the purpose, design and methodology of the planned research, including a brief explanation of the theoretical framework that informs it. It should be clear exactly what will happen to the research participant, how many times and in what order. Describe any involvement of research participants, patient groups or communities in the design of the research.
(Populated from A10)

Writing about emotional upheavals and stressful experiences has been found to have therapeutic benefits in healthy individuals and medical patients. The methodology developed by Pennebaker and Beall (1986) involves individuals writing about their deepest thoughts and feelings relating to a stressful event on 3-5 occasions for 15-20 minutes. Putting these emotional experiences into words can help people organize their thoughts, leading to new appraisals of past or present circumstances, often providing a sense of control over uncontrollable events (Pennebaker, 1997). The purpose of this study is to investigate the utility of such a writing intervention for patients attending a fertility clinic in alleviating infertility/treatment related stress and improving psychological well-being.

Participants: New referral male and female IVF/ICSI patients.

Design: Recruited participants will be randomly allocated to one of two conditions, the writing intervention group or control group. Participants will not be informed that they will be randomly allocated into either an intervention group or control group as this may bias their responses to questionnaires.

Setting: Participants will be recruited from an Assisted Conception Unit (ACU) and will be interviewed at the time of their first IVF consultation with regards to participation in the study. Completion of questionnaires and writing sessions (intervention) will be completed in the participants' own homes to minimize participation burden.

Method of Data Collection: Questionnaires and diaries.

Outcome Measures: The study will employ a number of standardised psychological measures including the Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1983), Fertility Problem Inventory (FPI; Newton, Sherrard & Glavac, 1999), Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979) and Ways of Coping Questionnaire (WOC; Folkman & Lazarus, 1988). Physical symptoms will be assessed using the Physical Symptoms Inventory (PSI; Spector & Jex, 1998). Pre and post writing mood will be assessed using the Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988) and participants will also be asked to complete an essay evaluation questionnaire (EEQ) and Event Appraisal Questionnaire (EAQ; Paez, Velasco, Gonzales, 1999) post writing. Daily stress will be measured using the Daily Stress Inventory (DSI; Brantley, Waggoner, Jones & Rappaport, 1987) and the Toronto Alexithymia Scale (TAS-20; Taylor, Bagby & Parker, 1997) will be administered at the beginning of the study to determine if participants have deficits in emotional awareness, understanding or expression.

Procedure: New referral couples attending for IVF/ICSI treatment at the ACU will be contacted by letter prior to their initial consultation informing them of the study and requesting their participation. Interested couples will be provided detailed information (written and verbal) about the study at the time of first consultation and invited to take part.

Each participant will receive a study pack containing baseline measures, writing materials and pre and post writing mood questionnaires, two sets of follow-up questionnaires and a pack containing daily stress monitoring forms. All participants will be given detailed completion instructions and all packs will include dates for completion and pre-paid addressed envelopes for the return of completed questionnaires.

The day after recruitment participants will complete the baseline questionnaire booklet (TAS-20, SCL-90-R, WOC, PSI, IES and FPI). On the second day participants will begin completing the DSI which they will complete every evening for the next 48 days. On day eight, twenty-two and thirty-six, intervention participants will complete the pre-writing PANAS followed by a 15 minute writing session (intervention) and then the post-writing PANAS, EAQ and EEA. On day fifty and seventy-eight all participants will complete the follow-up questionnaire booklets (SCL-90-R, WOC, PSI, IES and FPI).

In order to maintain continued participation in the study and to provide reminders of completion dates all participants will be contacted at key times within the study period via phone/text or e-mail (at the descretion of the participant).

C7. Give details of any clinical intervention(s) or procedure(s) to be received by research participants over and above those which would normally be considered a part of routine clinical care. *(These include uses of medicinal products or devices, other medical treatments or assessments, mental health interventions, imaging investigations and taking samples of human biological material.)*
(Populated from A12)

Additional Intervention	Average number per patient		Average time taken (mins/hours/days)	Details of additional intervention or procedure, who will undertake it, and what training they have received.
	Routine Care	Research		
Psychological therapies	0	3	15 mins	Participants in the intervention group ONLY will complete three 15 minute writing sessions, 14 days apart in their own home. Participants will be asked to write about their thoughts and feelings relating to their infertility.

C8. Give details of any non-clinical research-related intervention(s) or procedure(s). *(These include interviews, non-clinical observations and use of questionnaires.)*
(Populated from A13)

Additional Intervention	Average number per patient	Average time taken (mins/hours/days)	Details of additional intervention or procedure, who will undertake it, and what training they have received.
Other Questionnaire	18	1 hour/ 3 times	Participants will receive three questionnaire booklets from the researcher at the recruitment stage of the study. Each booklet will contain six questionnaires that ask them to report information relating to their general physical and emotional state, fertility problems and coping efforts they use to deal with their fertility problem. All questionnaires are completed in the privacy of their own home at allocated time points throughout the study.
Other Questionnaire	48	5-10 mins/daily	Participants will receive a pack of stress inventories that they will be asked to complete daily throughout the study at home.
Other Questionnaire	6	5 mins	Participants in the intervention group ONLY will complete a questionnaire that assesses mood state immediately before and after writing.
Other Questionnaire	3	2 mins	Participants in the intervention group ONLY will complete a five item questionnaire to assess their subjective evaluation of the events they write about and their previous level of disclosure after each writing session.
Other Questionnaire	3	2 mins	Participants in the intervention group ONLY will complete a three item questionnaire to assess their subjective appraisal of the event they have written about. This will be completed after each writing session.

C9a. Give the name of the research site for which the PI is responsible: *(Please give the name only. Further details of locations should be given in C10. The name of the site is normally the name of the acute NHS Trust, GP practice or other organisation responsible for the care of research participants. In some cases it may be an individual unit, private practice or consortium – see the guidance notes. Each GP practice is a separate site unless a formal consortium/network is in place.)*

Jessop Wing, Royal Hallamshire Hospital

If you wish to add further information about the definition of the site, please do so below:

C9b. Give the name of the NHS or other organisation with which the PI holds the necessary contract (substantive or honorary) to undertake the research at this site:

Sheffield Teaching Hospitals, NHS Foundation Trust.

C9c. For NHS sites, give the name and contact details of the Research Governance contact for the research site at the care organisation or consortium:

Title:	Dr		
Forename/Initials:	Brenda		
Surname:	Zinober		
Address:	305 Western Bank		
	Sheffield	Telephone:	0114 271 3740
		Fax:	0114 271 1790
Postcode:	S10 2TJ		
E-mail:	brenda.zinober@sth.nhs.		

C9d. For non-NHS sites, give details of the arrangements for the management and monitoring of the research at this site:

C10. Specify all locations or departments at which research procedures will be conducted at this site.
Include details of any centres at other NHS care organisations where potential participants may be seen and referred for inclusion in the research at this site. Give details of any research procedures to be carried out off site, for example in participants' homes.

Recruitment of participants and introduction interview will be conducted in the Assited Conception Unit (ACU) of the Jessop Wing, Hallamshire Hospital. Completion of all outcome questionnaires and intervention writing will be done by the participant in their own home.

C11. How many research participants/samples is it anticipated will be recruited/obtained from this organisation in total?

It is anticipated that approximatley 100 participants will be recruited from this organisation.

C12a. Give details of who will be responsible for obtaining informed consent locally, their qualifications and relevant expertise and training in obtaining consent for research purposes:

Obtaining consent will be the responsibility of the researcher.

C13a. What arrangements have been made for participants who might not adequately understand verbal explanations or written information given in English, or who have special communication needs? *(e.g. translation, use of interpreters etc.) (Populated from A29)*

Patients who cannot adequately understand verbal or written information that is given in English will not be able to participate in the study. The researcher speaks only English and the costs associated with employing the services of an interpretor or translator to be available on a daily basis to assist non-English speaking/writing participants would be excessive. Furthermore, the standardized measures used have been validated in English speaking/writing populations and therefore would not be suitable for use with non-English speaking populations without prior validation.

C13b. What local arrangements have been made to meet these requirements (where applicable)?

☑ Not Applicable

C14. In addition to informing the GP (if required), what arrangements have been made to inform those responsible for the care of the research participants in the host care organisation of their involvement in the research?

Mr Jonathan Skull, Consultant in Reproductive Medicine who has overall responsibility for the care of patients attending the clinic has been informed at all stages of research development and review . The principal researcher will liaise with the clinical team that are responsible for the care of potential participants.

C15. Are the facilities and staffing available locally adequate to perform any necessary procedures or interventions required for the study, and to deal with any unforeseen consequences of these? *(This should include consideration of procedures and interventions in both control and intervention arms of a study.)*

(•) Yes ( ) No

If Yes, give the information necessary to justify your answer. If No, indicate what arrangements are being made to deal with the situation:
The intervention is designed to be conducted in the privacy of the participants own home and therefore does not require the use of the clinics facilities. In the event that participants' experience distress the clinic counselling services are available for the participants to use.

C16a. Give brief details of a contact point where participants may obtain further information about the study.

Participants are directed to contact a member of the research team if they require further information about the study. Contact details are available on the information sheet as follows:

Mrs Katie Cutts Tel: 0114 2255844, E-mail at: k.cutts@shu.ac.uk

Dr Keith Hurst Tel: 0114 2254362, E-mail at: k.m.hurst@shu.ac.uk

C16b. What is the contact point for potential complaints by research participants?

Professor Chris Welsh, Medical Director, STH NHS Foundation Trust, 305 Western Bank, Sheffield. S10 2TJ

C16c. Is there a local source where potential participants can obtain independent information about being involved in a research study? *See guidance notes.*

Professor Chris Welsh, Medical Director, STH NHS Foundation Trust, 305 Western Bank, Sheffield. S10 2TJ

C16d. Please specify the headed paper to be used for the participant information sheet.

Sheffield Hallam University & STH NHS Foundation Trust

C17. If any extra support might be required by research participants as a result of their participation, what local arrangements are being made to provide this?

Arrangements have been made with the ACU for the counselling services to be made available to participants if they experience distress as a result of their participation in the study.

PART C: Declaration

– The information in this form is accurate to the best of my knowledge and belief and I take full responsibility for it.

– I undertake to abide by the ethical principles underpinning the Declaration of Helsinki and good practice guidelines on proper conduct of research.

– If the research is approved I undertake to adhere to the study protocol, the terms of the full application of which the main REC has given a favourable opinion and any conditions set out by the main REC in giving its favourable opinion.

– I am aware of my responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of patient or other personal data, including the need to register when necessary with the appropriate Data Protection Controller.

– I understand that research records/data may be subject to inspection for audit purposes if required in future.

– I understand that personal data about me as a researcher in this application will be held by the relevant RECs and their operational managers and that this will be managed according to the principles established in the Data Protection Act.

– I understand that the information contained in this application, any supporting documentation and all correspondence with Research Ethics Committees relating to the application will be subject to the provisions of the Freedom of Information Acts. The information may be disclosed in response to a request under the Acts except where statutory exemptions apply.

Signature of the local Principal Investigator * .....

Date: (dd/mm/yyyy)

Print Name:

** The Chief Investigator should sign where s/he is also the local Principal Investigator for this research site.*

***PART C IS NOW COMPLETE AND SHOULD BE SUBMITTED** to the NHS Research Ethics Committee responsible for the site-specific assessment.*

A.2.5.3 Confirmation of Ethical Approval

South Sheffield Research Ethics Committee
Upstairs 1st Floor Vickers Corridor
Northern General Hospital
Herries Road
Sheffield S57AU
Telephone: 01142269515

Email: Louise.Horne@sth.nhs.uk
Chair: Dr. M Hatton REC Coordinator: Ms. L Horn

21st April 2006

Mrs K. J. Cutts
PhD Student Sheffield Hallam University,
Psychology
Collegiate Crescent
Sheffield
S102BP

Dear Mrs Cutts

Full title of study:	The Efficacy of an Expressive Writing Task upon Psychological Well-being in Individuals Attending an Assisted Conception Unit.
REC reference number:	*06/Q2305/61*

Thank you for your letter of 07 April 2006, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair. .

Confirmation of ethical opinion
On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA. There is no requirement for [other] Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents
The final list of documents reviewed and approved by the Committee is as follows:

Investigator CV Student - Mrs. K Cutts		
Investigator CV Supervisor - Mr. K Hurst		
Protocol	3	15 December 2005
Covering Letter		15 December 2005
Summary/Synopsis	1	18 November 2005
Peer Review		15 December 2005
Questionnaire Essay Evaluation	1	08 July 2005
Questionnaire Fertility Problem Inv	1	22 November 2005 r 2005
Questionnaire Stressful Events	1	08 July 2005
Questionnaire Physical Symptoms Inventory	1	08 July 2005
Questionnaire Symptom Checklist	1	08 July 2005
Questionnaire 20-iten toronto alexithymia scale	1	08 July 2005
Questionnaire Daily Stress Inventory	1	08 July 2005
Questionnaire Ways of Coping	1	08 July 2005
Questionnaire General Information	1	08 July 2005
Letter of invitation to participant	1	13 December 2005
Participant Information Sheet	3	16 November 2005
Participant Information Sheet Information Sheet	4	03 April 2006
Participant Consent Form	1	08 July 2005
Response to Request for Further Information		07 April 2006
Letter from Funder		14 December 2005
Intervention Group Instruction Sheet	1	04 October 2005
Control Group Instruction Sheet	2	04 October 2005
Debriefing Letter	1	08 July 2005
Unfavourable Opinion Letter		02 February 2006
Email Correspondence from Keith Hurst		08 February 2006
Additional Information Relating to Participant Burden		07 March 2006

Research governance approval

You should arrange for the at relevant NHS care organisations to notified that the research will be taking place. and provide a copy of the REC application. the protocol and this letter.

All researchers who will be participating in the research must obtain final research commencing any research procedures. Where a substantive contract is not held with the care organisation, it may be necessary for an honorary contract to for the research can be given.

Statement of Compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

06/Q2305/61	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project
Yours sincerely

Dr. M Hatton 'Chair
Enc Study approval conditions
CC STH R&D

A.2.5.4 Letter of Invitation

Sheffield Hallam University

Name
Address

Faculty of Development and Society
Sheffield Hallam University
45 Broomgrove Road
S10 2SF

Tel: {number}
E-mail: {e-mail address}

Date
Dear Sir/Madam,

An invitation to take part in research investigating the experiences of people attending an assisted conception unit.

A study is currently being undertaken in the Assisted Conception Unit (ACU) of the Jessop Wing, Hallamshire Hospital regarding the experiences of people attending the ACU for Intrauterine Insemination (IUI), *in vitro* fertilisation (IVF) and *intra cytoplasmic sperm injection* (ICSI) treatment. The study is a collaboration between Sheffield Hallam University and the ACU.

The attached information sheet explains the study in detail, and shows what will be involved if you choose to take part. Please take the time to read through the attached information carefully. If you would like more information please free to contact either Katie Cutts (the principal researcher;{telephone number) or Dr. Keith Hurst (research supervisor).

On the day of your first consultation at the ACU you will be approached by the principal researcher. At this time you will be asked if you are willing to take part in the study or if you require more information about the study before you make a decision. If you do not wish to take part in the study this will not affect the treatment you receive at the ACU. Participation in the study is voluntary and you have the right to withdraw at any time.

Thank you in advance for your time.
Yours sincerely,

Katie Cutts BSc.
Applied Social Science Division
Faculty of Development and Society

A.2.5.5 General Information Sheet

Sheffield Hallam University

An investigation into the experiences of people attending an assisted conception unit.

Information Sheet

You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being carried out and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. You will then have the opportunity to meet the researcher and ask if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?
Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. For some people these difficulties can only be resolved through assisted conception such as Intrauterine Insemination (IUI) *In Vitro* Fertilization (IVF) and Intra Cytoplasmic Sperm Injection (ICSI). To understand the experience of assisted conception more fully we are conducting an investigation of patients attending this clinic to undergo IUI and IVF/ICSI treatment.

Why have I been chosen?
You have been chosen to take part in the study as a patient at the Assisted Conception Unit (ACU) here at The Jessop Wing, starting a cycle of IUI or IVF/ICSI treatment along with your partner. All patients attending the ACU over the next 12 months, who are receiving IUI or IVF/ICSI treatment, will be invited to take part in the study.

Do I have to take part?
It is up to you to decide whether or not to take part. If you decide not to take part, this will have no effect on your treatment within the hospital. If your partner does not wish to take part you can still take part in the study, you do not have to take part as a couple if one of you decides that they do not wish to be involved in the study this also will not affect your involvement in the study or the standard of care either of you will receive whilst undergoing treatment. If you do decide to take part you will be given this information sheet to keep and asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will happen to me if I take part?
You will be asked to complete some questionnaires asking you about how you feel in general.

What do I have to do?
If you agree to take part you will meet with the researcher at your first consultation at the clinic. Your involvement in the study will last the length of your treatment cycle

(approximately 3 to 4 weeks). To obtain information about your experiences over this period we would like to ask you questions mainly about how you are feeling, the kinds of stresses you are under and the ways you try to handle these stresses. You will be asked to complete questionnaire booklets on three separate occasions, which will take approximately 40 minutes to 1 hour, and write about how you feel about your difficulties in having a child and your ongoing treatment. In order to fully understand how feelings may alter throughout the treatment cycle we would also ask you to complete a daily assessment of the events that you experience over the cycle period. If you agree to take part you will complete all of the questionnaires at home, and the researcher will provide you with the questionnaire packs that you will need to complete, along with detailed instructions outlining when and how they should be completed.

What are the possible disadvantages and risks of taking part?
You may feel uncomfortable or distressed in writing about your personal experiences and answering some of the questions in the study packs. You do not have to answer any questions that you do not want to, but any information that you do provide will assist us in understanding the experience of assisted conception, and of course, the information will be treated in confidence.

There is support available for you if you feel distressed or just want to obtain further information. There is a list of names, addresses and phone numbers on page 3 below, showing relevant support services.

What are the possible benefits of taking part?
The information gained from this study may help us to develop further the information and counselling services for patients undergoing assisted conception, with a view to assisting people during what can be a very difficult time.

Will my taking part in the study be kept confidential?
If you consent to take part in the research your medical records held by the ACU may be examined by the principal researcher. However, personally identifiable information will not be disclosed to anyone. All information collected during the course of the research will be kept strictly confidential.

What will happen to the results of the research study?
The results of the study will form part of a PhD thesis. If you are interested in knowing about the results, please indicate this to the researcher and you will be contacted after the study has finished in autumn 2006. Your name and address will not appear on any written reports or other material. Results from the investigation may also be written up for publication in reputable scientific journals, but again, please be assured that any information published will not be personally identifiable.

Who is organising and funding the research?
The study is being funded by Sheffield Hallam University and is being conducted in collaboration with the Centre for Reproductive Medicine and Fertility here at the Jessop Wing.

Who has reviewed the study?
The Sheffield (South) Research Ethics Committee and the Ethics Committee of the Faculty of Development and Society, Sheffield Hallam University have reviewed this study to ensure that it is conducted in an ethically appropriate manner.

If you decide to take part in this research, you will be asked to complete a consent form. You will be given this information sheet and a copy of the signed consent form to

keep. If you decide to take part, you are still free to withdraw at any time and without giving a reason.

Contact for further Information
If you would like more information or to ask any questions before deciding whether you want to take part in this study, you can speak to a member of the research team:

Mrs Katie Cutts Tel: {number}, E-mail at: {e-mail}

Dr Keith Hurst Tel: {number},, E-mail at: {e-mail}

INFORMATION ON COUNSELLING AND SUPPORT FOR ISSUES IN IVF/ICSI

ASSISTED CONCEPTION UNIT:
Jessop Wing, Sheffield Teaching Hospitals NHS Trust:
Reception Tel: 0114 2268050

COUNSELLING SERVICE:
Jessop Wing, Sheffield Teaching Hospitals NHS Trust:
Tel: 0114 2268014

INFERTILITY NETWORK UK:
Information and support networks for those experiencing fertility problems.
http://www.infertilitynetworkuk.com/
Advice Line: 08701 188 088
Evening Telephone Counselling Line: 08701 188088 available Monday to Friday from 7:30pm to 9:30pm.

A.2.5.6 Consent Form

Sheffield Hallam University

Patient Identification Number: _____

Title of study: **An investigation into the experiences of people attending an assisted conception unit.**

Principal Researcher: **Katie Cutts**

Please answer the following questions by circling your responses:

1. Have you read and understood the information sheet for the above study? YES / NO
2. Have you had the opportunity to ask questions about this study? YES / NO
3. Have you received enough information about this study? YES / NO
4. Do you understand that your participation is voluntary and you are free to withdraw from this study at any time, without giving any reason and without your medical care or legal rights being affected? YES / NO
5. Do you understand that sections of your medical notes may be looked at by Katie Cutts where it is relevant to your taking part in the study? YES / NO
6. Do you give permission for Katie Cutts to have access to your records? YES / NO
7. Any responses to questionnaires or personal writings will be anonymised. Do you give permission for members of the research team at Sheffield Hallam University to have access to your anonymised responses? YES / NO
8. Do you agree to take part in this study? YES / NO

Your signature will certify that you have voluntarily decided to take part in this research study having read and understood the information in the sheet for participants. It will also certify that you have had adequate opportunity to discuss the study with an investigator and that all questions have been answered to satisfaction.

Signature of participant:..... Date:.....

Name (block capitals):.....

Signature of investigator:.....Date:.....

Katie Cutts BSc,
Applied Social Sciences Division
Faculty of Development and Society,
Sheffield Hallam University.
Tel: {number}
E-mail Address: {e-mail}

A.2.5.7 Disclosure Writing Instructions

Writing Session One

Over the three writing sessions in this study I would like you to write about your deepest thoughts and feelings concerning your experience of difficulties in having a child, and the treatment process you are going through at the moment. I realise that people who encounter such difficulties experience a full range of emotions, and I want you to focus on any and all of them. In your writing I want you to really let go and explore your deepest emotions and thoughts. You might think about all the various feelings and changes that you experienced before being diagnosed, after diagnosis, up to starting IVF treatment as well as now, during the treatment itself. Whatever aspect you choose to write about, it is critical that you focus on your deepest thoughts and feelings. You might also tie your thoughts and feelings about your difficulties in having a child and your current treatment to other parts of your life - people you love, who you are, or who you want to be. Again the most important part of your writing is that you really focus on your deepest emotions and thoughts. The only rule we have is that you keep writing for the entire ***15 minutes***. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Don't worry about erasing or crossing things out. Just write.

Writing Session Two

Today, I want you to continue writing about your experience of difficulties in having a child and the treatment process you are going through at the moment. Again, in your writing I want you to really let go and explore your deepest emotions and thoughts. You might think about all the various feelings and changes that you experienced before being diagnosed, after diagnosis, up to starting IVF treatment and now, during the treatment. Whatever aspect you choose to write about this time, it is critical that you focus on your deepest thoughts and feelings. Remember, you might also tie your thoughts and feelings about your difficulties in having child and your current treatment to other parts of your life - people you love, who you are, or who you want to be. Again the most important part of your writing is that you really focus on your deepest emotions and thoughts. The only rule we have is that you keep writing for the entire ***15 minutes***. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Don't worry about erasing or crossing things out. Just write.

Writing Session Three

Today is the last writing session. In your writing today, I again want you to explore your deepest thoughts and feelings about your experience of difficulties in having a child and the treatment process you are going through at the moment. You can choose to write about the same things as you have done on the last two occasions, or you can choose a different focus for your writing. Whatever aspect you choose to write about this time, it is critical that you focus on your deepest thoughts and feelings. Remember, you can tie your thoughts and feelings about your difficulties in having child and your current treatment to other parts of your life - people you love, who you are, or who you want to be. Again the most important part of your writing is that you really focus on your deepest emotions and thoughts. Again the only rule we have is that you keep writing for the entire ***15 minutes***. If you run out of things to say, just repeat what you have already written. Don't worry about grammar, spelling, or sentence structure. Don't worry about erasing or crossing things out. Just write.

A.2.5.8 Debriefing Letter

Sheffield Hallam University

Faculty of Development and Society
Sheffield Hallam University
45 Broomgrove Road
S10 2BP

Tel: {number}
E-mail: {e-mail address}

Participants Name
Address

Date

Dear Participant,

SUBJECT: An investigation into the experiences of people attending an assisted conception unit. - Debriefing Information

Thank you for your participation in this study we very much appreciate that you have taken the time to complete the series of questionnaires that were given to you. I would like to take this opportunity to provide you with some information about the study and what we hope to find. In order to make comparisons patients who were recruited were put into groups. Some participants were asked to write about their feelings towards their difficulties trying to conceive and their experience of the treatment they were receiving in addition to completing questionnaires; others were asked only to complete the series of questionnaires.

It is widely understood that the IVF/ICSI process can be stressful, and that couples have to deal not only with the psychological demands associated with the treatment process itself, but also with the broader situation in which they find themselves – that is, the inability to conceive, or cause conception, without medical intervention. Because of this, the Human Embryo and Fertilization Authority recommend that IVF/ICSI patients have counselling, yet there is a concern amongst health professionals that couples who are undergoing such treatments are not using the counselling services available to them, at times when it could be of benefit. The reasons for this are thought to include time constraints, perceived costs of treatment and fear of being labelled as having a psychological problem.

Previous research has shown that writing about thoughts and feelings relating to distressing events can help alleviate the distress associated with the event and improve the general-well being of the individual. It is hoped that a writing intervention can also be effective for alleviating distress in IVF/ICSI patients. This study has sought to investigate this and it is hoped that patients who wrote about their experiences showed some improvement in they way they felt. If

this type of writing intervention proves to be effective it could be a useful tool through which patients can express their feelings in a way that is free from social constraints and is time effective.

Further to this it is also hoped that the results of this study can provide information on how people feel in general at different stages of the IVF process, this is the reason why you were asked to report on a daily basis how you were feeling and what you had experienced in the last 24 hours. These results will help to inform future research into the development of interventions that can help alleviate the distress associated with IVF treatment.

Thank you again for participating in this study. If you have any questions about the study please do not hesitate to contact me on the above telephone number or at the e-mail address.

Yours faithfully

Katie Cutts BSc.
Applied Social Science Division
Faculty of Development and Society

A.2.5.9 Notice of Substantial Amendments

NHS
Central Office for Research Ethics Committees
(COREC)

NOTICE OF SUBSTANTIAL AMENDMENT

For use in the case of all research other than clinical trials of investigational medicinal products (CTIMPs). For substantial amendments to CTIMPs, please use the EU-approved notice of amendment form (Annex 2 to ENTR/CT1) at http://eudract.emea.eu.int/document.html#guidance.

To be completed in typescript by the Chief Investigator in language comprehensible to a lay person and submitted to the Research Ethics Committee that gave a favourable opinion of the research ("the main REC"). In the case of multi-site studies, there is no need to send copies to other RECs unless specifically required by the main REC.

Further guidance is available at http://www.corec.org.uk/applicants/apply/amendments.htm.

Details of Chief Investigator:	
Name:	Mrs. K. J. Cutts
Address:	Sheffield Hallam University, Psychology Section Collegiate Crescent Campus Sheffield S10 2BP
Telephone:	0114 2255844
E-mail:	k.cutts@shu.ac.uk
Fax:	0114 2252430

Full title of study:	The Efficacy of an Expressive Writing Task upon Psychological Well-being in Individuals Attending an Assisted Conception Unit.
Name of main REC:	South Sheffield REC

REC reference number:	06/Q2305/61
Date study commenced:	9th January 2007
Protocol reference *(if applicable)*, current version and date:	Version 4 17/01/2007
Amendment number and date:	Amendment 1 17/01/2007

Type of amendment (indicate all that apply in bold)

(a) Amendment to information previously given on the REC application form

Yes *No*

If yes, please refer to relevant sections of the REC application in the "summary of changes" below.

(b) Amendment to the protocol

Yes **No**

If yes, please submit either the revised protocol with a new version number and date, highlighting changes in bold, or a document listing the changes and giving both the previous and revised text.

(c) Amendment to the information sheet(s) and consent form(s) for participants, or to any other supporting documentation for the study

Yes *No*

If yes, please submit all revised documents with new version numbers and dates, highlighting new text in bold.

Is this a modified version of an amendment previously notified to the REC and given an unfavourable opinion?

Yes ***No***

Summary of changes

Briefly summarise the main changes proposed in this amendment using language comprehensible to a lay person. Explain the purpose of the changes and their significance for the study. In the case of a modified amendment, highlight the modifications that have been made.

If the amendment significantly alters the research design or methodology, or could otherwise affect the scientific value of the study, supporting scientific information should be given (or enclosed separately). Indicate whether or not additional scientific critique has been obtained.

In order to keep the sample under investigation as homogenous as possible the original protocol included only new referral IVF/ICSI patients. However the number of patients being referred for first cycle IVF/ICSI treatment has proved to be less than was originally approximated in consultation with the clinic. It has become apparent that the study inclusion criteria need to be amended to include a wider range of patients in order to obtain the sample size of 48 required in the time available to achieve adequate power in the final analysis (Erdfelder, Faul & Buchner, 1996).

In order to try and improve recruitment into the study the protocol will be amended to include patients who are undergoing repeat cycles of IVF/ICSI and also Stimulated Intrauterine Insemination (sIUI), a procedure which follows the same cycle as IVF but does not involve the retrieval of eggs or fertilization outside of the uterus. The amendment of inclusion criteria does not alter the research design or methodology. There is some evidence to suggest that there are differences in the emotional reactions that first time IVF patients and repeat cycle patients experience (Thiering, Beaurepaire, Jones, Saunders & Tennant, 1993). It is suggested that repeat cycle patients, especially women, have increased levels of depressive symptoms (Thiering et al., 1993) and that first time patients experience more feelings of confusion (Slade, Emery & Lieberman, 1997). Statistical analysis will be conducted to determine if there are any differences on outcome measures between new referral IVF/ICSI, sIUI and repeat cycle patients prior to the main analysis.

It is through discussions with the clinical director of the Assisted Conception Unit that the necessity for this change to the protocol has been decided and given that the design has remained unchanged the need for additional scientific critique of this change to the protocol is not considered necessary.

This change to inclusion criteria has resulted to some very minor changes to the wording of the protocol (underlined and highlighted in bold writing on pages, 9, 10 and 11) and minor changes to the participant information sheet and instruction sheets. The demographic information questionnaire has been altered to include additional questions to clarify the characteristics of the patient sample with regard to the clinical procedure which they are undergoing (underlined and highlighted in bold writing).

Any other relevant information

Applicants may indicate any specific ethical issues relating to the amendment, on which the opinion of the REC is sought.

List of enclosed documents

Document	*Version*	*Date*
Completed Protocol	4	17/01/07
General Information Sheet	4	17/01/07
Patient Invitation Letter	2	17/01/07
Demographic Information Sheet	2	17/01/07

Declaration

- I confirm that the information in this form is accurate to the best of my knowledge and I take full responsibility for it.
- I consider that it would be reasonable for the proposed amendment to be implemented.

Signature of Chief Investigator: .....

Print name: .....

Date of submission: .....

A.2.5.10 Confirmation of Ethical Approval

National Research Ethics Service

South Sheffield Research Ethics Committee

Upstairs 1 st Floor Vickers Corridor
Northern General Hospital
Herries Road
Sheffield
S57AU

Tel: 01142269515

03 April 2007

Mrs K. J. Cutts
PhD Student
Collegiate Crescent
Sheffield S102BP

Dear Mrs Cutts

Study title: The Efficacy of an Expressive Writing Task upon Psychological Well-being in Individuals Attending an Assisted Conception Unit.

REC reference: *06/Q2305/61*
Amendment number: 1.1
Amendment date: 15 March 2007

Thank you for submitting the above amendment, which was received on 17 March 2007. It is noted that this is a modification of an amendment previously rejected by the Committee (our letter of 02 March 2007 refers).

The modified amendment was considered at the meeting of the Sub-Committee of the REC held on 03 April 2007. A list of the members who were present at the meeting is attached.

Ethical opinion

I am pleased to confirm that the Committee has given a favourable ethical opinion of the modified amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved are:

Document	Version	Date
Questionnaire	2	17 January 2007
Protocol	4	17 January 2007
Participant Information Sheet	4	17 January 2007
Modified Amendment	1.1	15 March 2007
Letter of invitation to participant	2	17 January 2007

Covering Letter		15 March 2007

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the *Governance* Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

06/Q2305/61: Please quote this number on all correspondence

Yours sincerely

Miss Tara Bamford

Assistant Committee Co-ordinator

E-mail: Tara.Bamford@sth.nhs.uk

Copy to: Dr Brenda Zinober, Sheffield Teaching Hospitals NHS Foundation Trust

A.3 Essay Evaluation Questionnaire

The following questions are related to the essay you have written today. Please rate your response to each question by **circling** a number ranging from *(1) not at all to (7) a great deal.*

1. Overall, how personal was the essay that you wrote today?

Not at all 1 2 3 4 5 6 7 A great deal

2. Overall, how meaningful was the essay that you wrote today?

Not at all 1 2 3 4 5 6 7 A great deal

3. Overall, how much did you reveal your emotions in what you wrote today?

Not at all 1 2 3 4 5 6 7 A great deal

4. How much have you wanted to talk to others about the event you wrote about today?

Not at all 1 2 3 4 5 6 7 A great deal

5. How much have you held back from talking about the event you have written about today?

Not at all 1 2 3 4 5 6 7 A great deal

A.4 Ethics Proforma and Approval Letter

A.4.1 Ethics Proforma

Faculty of Development and Society
Application for Research Ethics Approval Staff and Postgraduate Research Students

Section A

1. **Name of principal investigator:** Katie Cutts
   Faculty: Development and Society
   Email address: katiejane.j.cutts@student.shu.ac.uk

2. **Title of research: An Examination of the Effects of Mode of Writing, Timing of writing Sessions and Environmental Context in a Written Emotional Disclosure Task.**

3. **Supervisor if applicable:** Dr Maddy Arden, Dr Keith Hurst and Dr John Reidy
   Email address: m.arden@shu.ac.uk. k.m.hurst@shu.ac.uk, j.g.reidy@shu.ac.uk

4. **ENT number if applicable:**

5. **Other investigators (within or outside SHU)**

Title	Name	Post	Division	Organisation

6. **Proposed Duration of Project:**
   Start date: 31st January 2005 End Date: 22nd April 2005

7. **Main purpose of Research:**
   ☐ Educational qualification
   ☐ Publicly funded research
   ☐ Staff research project
   ☐ Other (Please supply details)

8. **Background to the Study and Scientific Rationale** (500 words)

In undergraduate populations, disclosing emotional reactions to stressful and traumatic experiences through writing has been shown to have beneficial influences on physical health, as measured by fewer health care visits and a reduction in physical symptoms (Greenberg & Stone, 1992; Pennebaker & Beall, 1986), improved psychological well-being (Paez, Velasco & Gonzalez, 1999; Greenberg, Wortman & Stone, 1996), positive changes in physiological markers such as immunological responses (Esterling, Antonio, Fletcher, Margulies & Schneiderman, 1994) and improvements in grade point average (Lumley & Provenzano, 2003).

The empirical evidence suggesting that the disclosure of traumatic and stressful experiences through writing can have positive physical, psychological and behavioural effects are numerous (for a review see Smyth, 1998), yet the operative mechanisms for this process remain unclear. A number of possible explanations for such beneficial effects have been proposed including: emotional inhibition (Pennebaker & Beall, 1986), habituation (Lepore, 1997) and cognitive adaptation (Pennebaker, Mayne & Francis, 1997). To examine the underlying processes involved in disclosure tasks, recent studies have focussed on the *content* of written essays. For example, Pennebaker and Francis (1996) found that an increased use of causal and insightful words were associated with improved physical health at follow-up.

In addition to examining the mechanisms which underlie the writing paradigm attention has recently focused on identifying procedural differences that affect the disclosure effects. Comparisons have been made between writing and talking about traumas with results indicating comparable outcomes (Esterling et al., 1994). It has been suggested that choice of topic may selectively influence the outcome, for example students who write about their emotional reactions to coming to university show improvements in their grades, relative to students who write about other traumatic experiences (Pennebaker, Colder & Sharp, 1990). In a recent meta-analytical review Smyth (1998) suggested that spacing writing sessions over longer periods of time may produce stronger outcome effects, however this has not been empirically tested.

Sheffield, Duncan, Thomson and Johal (2002) conducted a home-based study and found that at three-week follow-up participants who wrote emotionally over three consecutive days experienced a significant increase in physical symptoms and absence from college due to illness compared to the unemotive writing and control group which led them to caution against the use of a written emotional expression intervention within a home based context. Contrary to this, Wetherell, Byrne-Davis, Brookes, Byron, Dieppe, Donovan, Horne and Weinman (2003), found that rheumatoid arthritis patients who wrote about a traumatic or stressful experience at home, evidenced a significant improvement in disease activity and mood state.

One final methodological issue is that of writing mode, in a study reported by Brewin and Lennard (1999) it was suggested that participants who described their traumatic experiences by typing experienced less immediate distress compared to those who wrote long hand. However, this study failed to go beyond an initial writing session and participants were not followed up to

determine if there were any differences in long-term outcome variables between the two conditions. Two possible conclusions could be drawn form this finding, firstly typing could be a more beneficial option for study participants in terms of reducing the short term distress that is consistently evidenced in these studies. Secondly, it is possible that these findings are an indicator that typing descriptions of traumatic events reduces the efficacy of the writing task and thus limits the potential for positive outcomes.

9. Main Research Questions

Based on the above theoretical rationale the main aims of this study are to determine how methodological differences such as study context, mode of writing and the timing of writing sessions, will impact on psychological and physical outcomes, as well as examining how cognitive processing of the trauma changes over time as represented by an increase in cognitive words consistent with a cognitive adaptation model of disclosure writing (Pennebaker & Francis, 1996).

10. Summary of Methods including Proposed Data Analyses

Study 1 will be conducted using a randomized, repeated measures, 2 (Typing vs. writing) x 2 (home vs. laboratory) x2 (neutral event vs. stressful event) x3 (pre-test, post-test and follow-up) design. Study 2 will be conducted using a 2 (neutral event vs. stressful event) x 2 (consecutive writing vs. fortnightly writing) x3 (pre-test, post-test and follow-up) design. Participants will be recruited through 1st and 2nd year Research Methods and Practical sessions. Participants in the 1st year RMP groups will be randomly allocated to either write or type about a stressful or traumatic experience (the experimental conditions) or a neutral event (the control condition) over three sessions. Each writing session will last 15-minutes and will be conducted within the laboratory session. Participants in the 2nd year RMP groups will be randomly allocated to either write or type about a stressful or traumatic experience or a neutral event. Further to this some participants will be allocated to groups that write only about a traumatic experience or a neutral event over three consecutive days to comply with the Study 2 protocol. All 2nd year participants will complete the three writing sessions at home.

All participants will be asked to complete questionnaires to measure physical symptoms, psychological functioning and event appraisal at baseline, 2-weeks after completing the writing tasks and again at 7-weeks post-writing. These questionnaires include the Impact of Event Scale (Horowitz, Wilner & Alverez, 1979), Event Appraisal Questionnaire (Paez, Valesco & Gonzalex, 1999), Positive and Negative Affectivity Scale (Watson, Clark & Tellegan, 1988), Physical Symptoms Inventory (Spector & Jex, 1998), Symptom Checklist-90-Revised (Derogatis, 1992 and the Toronto Alexithymia Scale (Taylor, Bagby & Park, 1997) (See Appendix A for copies of questionnaires). Those participating in the lab-based sessions will complete these questionnaires within lab sessions, home-based participants will be given the relevant questionnaires in sealed envelopes and will be asked to return these by post (pre-paid envelopes will be

supplied).All participants will be fully debriefed after the final follow-up session.

For both studies difference in symptomology, psychological functioning and affect between groups and across time will be examined using a series of repeated measures ANCOVA's (with baseline scores entered as covariates). Analysis of essays written by experimental group participants will be conducted using a text analysis programme (Linguistic Inquiry and Word Count; LIWC, Pennebaker, Francis & Booth, 2001) to measures use of emotion and cognitive words, followed by repeated measures ANOVA's to determine between group differences in word usage as well as regression analysis to examine predictive ability of word usage on physical and psychological health outcomes.

Section B

8. **Describe the arrangements for selecting/sampling and briefing potential participants.** (This should include copies of any advertisements for volunteers or letters to individuals/organisations inviting participation.)

Participants will be recruited though 1st and 2nd year Research Methods and Practical sessions by the main researcher. On initial contact with these groups the researcher will give a brief overview of the study's purpose (looking at health and writing) and overview of what would be expected of participants including, the length of the study, timing and the writing procedure.

9. **What is the potential for participants to benefit from the research?**

RMP 1 participants can expect to receive 1 hour and 45 minutes of research credits for taking part in this study.

10. **Describe any possible negative consequences of participation in the research along with the ways in which these consequences will be limited.**

Participants who are allocated to the experimental group will be asked to write about traumatic and stressful experiences. Therefore, there is the possibility that some individuals will experience some level of distress after completing a writing task. Information sheets (See Appendix B for Information Sheets) given to participants will contain a number of organisations which they can contact if they feel that they need to talk to someone about the distress they are feeling. Further to this all participants will be informed that if at any point in the study they feel that the writing task is causing them to experience levels of distress with which they cannot cope they are free to withdraw from the study. In the event of a participants becoming highly distressed within the writing session they will be free to leave the room, in this event they will be advised to contact their support tutor.

11. **Describe the arrangements for obtaining participants' consent.** (This should include copies of the information that they will receive & written consent forms

where appropriate. If children or vulnerable people are to be participants in the study details of the arrangements for obtaining consent from those acting in *loco parentis* or as advocates should be provided.)

Participants will be asked to read and sign a consent form (See Appendix B for Consent Form) prior to participating in the study.

12. **Describe how participants will be made aware of their right to withdraw from the research.** (This should also include information about participants' right to withhold information.)

Participants will be advised of their right to withdraw at any time from the study and withhold information in the initial briefing sessions. Right to withdraw and withhold information is also included in the consent form.

13. If your data collection requires that you work alone with children or other vulnerable participants have you undergone **Criminal Records Bureau screening**? Please supply details.

N/A

14. **Describe the arrangements for debriefing the participants.** (This should include copies of information that participants will receive where appropriate.)

Participants will be debriefed in person in the final session of the study as well as receiving a debriefing information sheet informing them of the nature of the study and giving contact details of the researcher as well as contact information for organisation that they can contact if they feel that they need to talk to someone about the information they have divulged in the study. (See (Appendix B for Debrief Sheet).

15. **Describe the arrangements for ensuring participant confidentiality.** (This should include details of how data will be stored to ensure compliance with data protection legislation and how results will be presented.)

To ensure participant confidentiality whilst maintaining the facility to match baseline and follow-up data all questionnaire sheets and writing booklets will contain a coding box. Participants will be asked to devise there own identity codes (suggestions for which are included in the information sheet) which to complete on all materials they fill in. This will ensure that the data can be collected and matched accordingly without revealing the identity of any participant. In the case of participants who are completing their tasks by typing into text files, no personal information will be recorded either on the disks they use, or within the text document. To further ensure anonymity, all files will be saved to disk in Rich Text Format (.rtf) which eliminates the possibility of personal information being contained within the document. Contact details will be needed to send reminders to those participants in the home-based groups to remind them to complete the relevant questionnaires and writing booklets at certain times throughout the study. These will be collected on separate sheets to

any other data so that contact details cannot be matched to any collected data. All completed questionnaires, writing booklets and contact information will be stored in locked filling cabinets in the office of the researcher.

16. **Are there any conflicts of interest in you undertaking this research?** (E.g. Are you undertaking research on work colleagues; or in an organisation where you are a consultant?) Please supply details.
None

SECTION C

RISK ASSESSMENT FOR THE RESEARCHER

1. Will the proposed data collection take place on campus?

☐xYes (Please answer questions 4 and 6 only)
☐☐ No (Please complete all questions)

2. Where will the data collection take place?
(Tick as many as apply if data collection will take place in multiple venues)

☐☐ Own house/flat ☐☐ Residence of participant
☐☐ School ☐☐ Business/Voluntary Organisation
☐☐ Public Venue (e.g. Youth Club; Church; etc)
☐☐ Other (Please specify) _____

3. How will you travel to and from the data collection venue?

☐☐ On foot ☐☐ By car ☐☐ Public Transport
☐☐ Other (Please specify) _____

Please outline how you will ensure your personal safety when travelling to and from the data collection venue:

4. How will you ensure your own personal safety whilst at the research venue?

The research venue is on-campus in an environment that the researcher is familiar with. Further to this all research sessions will be undertaken in the presence of lecturers running the sessions. There is no cause to suggest that the researcher will experience any threat to her personal safety.

5. If you are carrying out research off-campus, you must ensure that each time you go out to collect data you ensure that someone you trust knows where you are going (without breaching the confidentiality of your participants), how you are getting

there (preferably including your travel route), when you expect to get back, and what to do should you not return at the specified time. Please outline here the procedure you propose using to do this:

N/A

6. Are there any potential risks to your health and wellbeing associated with either (a) the venue where the research will take place and/or (b) the research topic itself?

xNone that I am aware of
☐☐ Yes (Please outline below)

7. Does this research project require a health and safety risk analysis for the procedures to be used? No

If YES current status of Health and Safety Risk Assessment.

I confirm that this research will conform to the principles outlined in the Sheffield Hallam University Research Ethics policy.
I confirm that this application is accurate to the best of my knowledge.

Principal Investigator's signature	
Date	

Supervisor's signature (if applicable)	
Date	

A.4.2 Letter of Approval

Our Ref AM/HE

30th January 2007

K Cutts
{Address}

Dear Katie,

Request for Ethical Approval of Research Project

Your research project entitled "An Examination of the Effects of Mode of Writing, Timing of Writing Sessions and Environmental Context in a Written Emotional Disclosure Task" has been resubmitted for ethical review to the Faculty's rapporteurs and I am pleased to confirm that they have approved your project.

However, they have suggested that you remove the paragraph about keeping diaries and writing about traumatic events from the information sheet as it is confusing.

I wish you every success with your research project.

Yours sincerely

Professor A Macaskill
Chair Faculty
Research Ethics Committee

Office address:
Sheffield Hallam University
Faculty of Development & Society
Research Support Team
Room 1,45 Broomgrove Road
Collegiate Crescent Campus
Sheffield S10 1 BP

Telephone: 0114-2255846
E-mail: a.p.wilson@shu.ac.uk

A.5 Information Sheets

A.5.1 Information Sheet for Writing Participants

An Investigation into the Relationship between Writing and Health

A large number of individuals keep diaries as a means of organising their thoughts and feelings relating to the daily events they encounter. In order to understand how writing about stressful or traumatic events can help people to organize their thoughts, a study is being conducted that asks you to complete a selection of questionnaires relating to your general well-being and write about a designated topic for 15 minutes in three separate sessions, over the next six weeks.

In this first session you will be asked to complete a number of questionnaires relating to how you have felt in general over the last few weeks, as well as your feelings towards your chosen writing topic. After this you will be given a writing booklet that contains instructions for writing, and space in which to write. You will be asked to write for 15-minutes about a chosen topic. Then in your next two RMP sessions you will again be asked to write for 15-minutes on a chosen topic. After each writing session you will be asked to complete a general well-being questionnaire. Then at 2-weeks and 7-weeks following your final writing session you will be asked to complete a number of questionnaires relating to your general well-being. The writing session and completion of questionnaires will all be conducted within your Research Methods and Practical sessions and will amount to 1 hour and 45 minutes towards research credits.

Participation in this study is voluntary. Any information that you give will be treated confidentially. Individuals will not be identified in the results of this study, as all the data will be presented anonymously.

To maintain confidentiality a coding system will be used to match questionnaires and personal writing completed in the first session with those completed in subsequent sessions. To keep it simple and easy to remember, everybody's code will be made up of the first three letters of their mothers maiden name and the last three numbers of their telephone number i.e. if your mothers maiden name is Smith and your telephone number is 07932 678 678 then your code will be 'smi678'. Your own code, similar to this one, should be written in the available space at the top of each page on each questionnaire booklet and writing booklet.

If after taking part in this study you have any concerns, you will see that listed below are some useful contact numbers that you can contact if you feel that you need to talk to somebody.

Contact numbers:

Sheffield Hallam University Counselling Service: Tel:0114 225 2136
E-mail:counselling@shu.ac.uk

The Samaritans: 08457 90 90 90

Or your own GP

If you agree to take part in this study please complete and sign the consent form overleaf. If you require any additional information please feel free to contact me at {e-mail address}.

Thank you.

A.5.2 Information Sheet for Typing Participants

An Investigation into the Relationship between Writing and Health

A large number of individuals keep diaries as a means of organising their thoughts and feelings relating to the daily events they encounter. In order to understand how writing about stressful or traumatic events can help people to organize their thoughts, a study is being conducted that asks you to complete a selection of questionnaires relating to your general well-being and write about a designated topic for 15 minutes in three separate sessions, over the next six weeks.

In this first session you will be asked to complete a number of questionnaires relating to how you have felt in general over the last few weeks, as well as your feelings towards your chosen writing topic. You will be given a floppy disk which contains three documents titled *Writing Session 1*, *Writing Session 2* and *Writing Session 3*. These documents contain instructions for writing and space in which to type. In the first session you will be asked to write for 15-minutes about your chosen topic following the instructions in *Writing Session 1*. Then in your next two RMP sessions you will complete *Writing Session 2* and *Writing Session 3*, these again will take 15 minutes each. After each writing session you will be asked to complete a general well-being questionnaire. At 2-weeks and 7-weeks following your final writing session you will be asked to complete a number of questionnaires relating to your general well-being. The writing sessions and completion of questionnaires will all be conducted within your Research Methods and Practical sessions and will amount to 1 hour and 45 minutes towards research credits.

Participation in this study is voluntary. Any information that you give will be treated confidentially. Individuals will not be identified in the results of this study, as all the data will be presented anonymously.

To maintain confidentiality a coding system will be used to match questionnaires and personal writing completed in the first session with those completed in subsequent sessions. To keep it simple and easy to remember, everybody's code will be made up of the first three letters of their mothers maiden name and the last three numbers of their telephone number i.e. if your mothers maiden name is Smith and your telephone number is 07932 678 678 then your code will be 'smi678'. Your own code, similar to this one, should be written in the available space at the top of each page on each questionnaire booklet and writing booklet.

If after taking part in this study you have any concerns, you will see that listed below are some useful contact numbers that you can contact if you feel that you need to talk to somebody.

Contact numbers:

Sheffield Hallam University Counselling Service: Tel:0114 225 2136
E-mail:counselling@shu.ac.uk

The Samaritans: 08457 90 90 90

Or your own GP

If you agree to take part in this study please complete and sign the consent form overleaf. If you require any additional information please feel free to contact me at {e-mail address}.

Thank you.

A.6 Consent Form

TITLE OF STUDY: **An Investigation into the Relationship between Writing, and Health**

PRINCIPAL RESEARCHER: **Katie J. Cutts**

Please answer the following questions by circling your responses:

1. Have you read the information sheet about this study? Yes / No
2. Have you been able to ask questions about this study? Yes / No
3. Have you received answers to all your questions? Yes / No
4. Have your received enough information about this study? Yes / No
5. Who have you spoken to about this study?

   _____

6. Do you consent to publication of the study's results in reputable scientific reports, so long as the results remain totally anonymous ? Yes / No
7. Do you understand that you are free to withdraw from this study:
   - At any time? Yes / No
   - Without giving a reason for withdrawal? Yes / No
8. Do you understand that you have the right to withhold any information? Yes / No
9. Do you agree to take part in this study? Yes / No

Your signature will certify that you have voluntarily decided to take part in this research study having read and understood the information in the sheet for participants. It will also certify that you have had an adequate opportunity to discuss the study with an investigator and that all questions have been answered to your satisfaction.

Signature of Participant:.....Date:.....

Name (bock capitals):.....

Signature of investigator:.....Date:.....

A.7 Writing/Typing Instructions

A.7.1 Disclosure Group Instructions

Writing Session One

Writing Time: **15 Minutes**

What I would like to have you write about today and over the next two writing sessions is the most traumatic, upsetting experience of your entire life. In your writing, I want you to really let go and explore your very deepest emotions and thoughts. You can write about the same experience on all three days or about different experiences each day. In addition to a traumatic experience, you can also write about major conflicts or problems that you have experienced or are experiencing now. Whatever you choose to write, however, it is critical that you really delve into your deepest emotions and thoughts. Ideally, we would also like you to write about significant experiences or conflicts that you have not discussed in great detail with others. You might tie your personal experiences to other parts of your life. How is it related to your childhood, your parents, people you love, who you are, or who you want to be. All of your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure. The only rule is that once you begin writing continue to do so until your time is up, if you run out of things to say just repeat what you have already written Again, in your writing, examine your deepest emotions and thoughts.

Writing Session Two

Writing Time: **15 Minutes**

Today, I want you to continue writing about the most traumatic experience of your life. It could be the same topic that you wrote about in the previous session or it could be something different. But today, I really want you to explore your very deepest emotions and thoughts. Again I will remind you that your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure. The only rule is that once you begin writing continue to do so until your time is up, if you run out of things to say just repeat what you have already written.

Writing Session Three

Writing Time: **15 Minutes**

Today is the last writing session. In your writing today, I again want you to explore your deepest thoughts and feelings about the most traumatic experience of your life. Remember that this is the last day and so you might want to wrap everything up. For

example, how is this experience related to your current life and your future? But feel free to go in any direction you feel most comfortable with and delve into your deepest emotions and thoughts. All of your writing will be completely confidential. Don't worry about spelling, grammar or sentence structure. The only rule is that once you begin writing continue to do so until your time is up, if you run out of things to say just repeat what you have already written.

A.7.2 Control Group Instructions

Writing session One

Writing Time: **15 Minutes**

What I would like you to write about today and over the next two sessions is how you use your time. Each day, I will give you different writing assignments on the way you spend your time. In your writing, I want you to be as objective as possible. I am not interested in your emotions or opinions. Rather I want you to try to be completely objective. Feel free to be as detailed as possible. In today's writing, I want you to describe what you did yesterday from the time you got up until the time you went to bed. For example, you might start when your alarm went off and you got out of bed. You could include the things you ate, where you went, which buildings or objects you passed by as you walked from place to place. The most important thing in your writing, however, is for you to describe your days as accurately and as objectively as possible.

Writing Session Two

Writing Time: **15 Minutes**

Today, I would like you to describe what you have done today since you woke up. Again, I want you to be as objective as possible to describe exactly what you have done up until coming to this session.

Writing Session Three

Writing Time: **15 Minutes**

This is the last day of the experiment. In your writing today, I would like you to describe what you will be doing over the next week. The most important thing in your writing, however, is for you to describe your days as accurately and as objectively as possible.

A.8 Debriefing Information

Thank you for your participation in this study. This study has a number of aims. Firstly, it aims to replicate previous research showing that the expression of emotion through writing can be beneficial in improving both physical and psychological well being in healthy individuals (Pennebaker, 1997). Secondly, this study aims to investigate how methodological changes to the classic "Pennebaker Writing Task" can affect short and longer-term well-being in those people undertaking such a writing task. To address these questions the participants in this study were asked to do different things. Some people were asked to write about their experiences with pen and paper, and some were asked to type, others completed the writing sessions at home and others within the Research Methods and Practical session.

In addition to these methodological issues, the study asks a number of questions designed to obtain information relating to the processing of information connected to the event about which people wrote, and also a measure of how easy it is for people to express their emotions.

The results and information obtained from this study will be used to help examine the mechanisms that underlie the effects of writing about stressful experiences, and will help to determine how future writing studies should be designed to obtain optimum benefits for individuals who are experiencing chronic stress.

Thank you again for participating in this study. If you have any questions about the study please do not hesitate to contact me at: (e-mail address)

If you feel distressed due to your participation in this study please contact one of the following organisations:

Sheffield Hallam University Counselling Service: Tel:0114 225 2136

E-mail:counselling@shu.ac.uk

The Samaritans: 08457 90 90 90

Or your own GP

Thank you

A.9 SPSS Output for Hierarchical Regression Analysis – LIWC Variables as Predictors

A.9.1 Physical Symptoms (PSI)

A.9.1.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Physical Symptoms Inventory	5.0968	2.82081	31
Time Point 1 Physical Symptoms Inventory	4.0968	2.28553	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Physical Symptoms Inventory[a]	.	Enter
2	Posem Change, Negem Change, Cogmecc Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Physical Symptoms Inventory

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.366[a]	.134	.104	2.67043	.134	4.474	1	29	.043
2	.406[b]	.165	.037	2.76885	.031	.325	3	26	.807

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, PosemChange, NegemChange, CogmeccChange

c. Dependent Variable: Time Point 2 Physical Symptoms Inventory

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.905	1	31.905	4.474	.043[a]
	Residual	206.804	29	7.131		
	Total	238.710	30			
2	Regression	39.380	4	9.845	1.284	.302[b]
	Residual	199.330	26	7.667		
	Total	238.710	30			

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, PosemChange, NegemChange, CogmeccChange

c. Dependent Variable: Time Point 2 Physical Symptoms Inventory

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.248	.997		3.258	.003
	Time Point 1 Physical Symptoms Inventory	.451	.213	.366	2.115	.043
2	(Constant)	3.197	1.111		2.877	.008
	Time Point 1 Physical Symptoms Inventory	.468	.224	.379	2.093	.046
	NegemChange	-.068	.298	-.041	-.227	.822
	PosemChange	-.230	.325	-.127	-.708	.486
	CogmeccChange	.133	.191	.126	.697	.492

a. Dependent Variable: Time Point 2 Physical Symptoms Inventory

A.9.1.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Physical Symptoms Inventory	4.3226	2.63802	31
Time Point 1 Physical Symptoms Inventory	4.0968	2.28553	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Physical Symptoms Inventory[a]	.	Enter
2	Posem Change, Negem Change, Cogmecc Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Physical Symptoms Inventory

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.653[a]	.426	.406	2.03312	.426	21.507	1	29	.000
2	.661[b]	.437	.351	2.12565	.011	.177	3	26	.911

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, PosemChange, NegemChange, CogmeccChange

c. Dependent Variable: Time Point 3 Physical Symptoms Inventory

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.901	1	88.901	21.507	.000[a]
	Residual	119.873	29	4.134		
	Total	208.774	30			
2	Regression	91.296	4	22.824	5.051	.004[b]
	Residual	117.478	26	4.518		
	Total	208.774	30			

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, PosemChange, NegemChange, CogmeccChange

c. Dependent Variable: Time Point 3 Physical Symptoms Inventory

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.237	.759		1.630	.114
	Time Point 1 Physical Symptoms Inventory	.753	.162	.653	4.638	.000
2	(Constant)	1.315	.853		1.542	.135
	Time Point 1 Physical Symptoms Inventory	.742	.172	.643	4.323	.000
	NegemChange	.110	.228	.071	.482	.634
	PosemChange	.123	.250	.073	.492	.627
	CogmeccChange	-.044	.147	-.045	-.301	.766

a. Dependent Variable: Time Point 3 Physical Symptoms Inventory

A.9.2 Intrusion (IES)

A.9.2.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Intrusion	10.4000	9.39773	30
Time Point 1 Intrusion Subscale IES	12.7000	8.54259	30
NegemChange	-.7973	1.70607	30
PosemChange	.6167	1.57038	30
CogmeccChange	.4083	2.66172	30

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Intrusion Subscale IES[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Intrusion

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.415[a]	.172	.142	8.70268	.172	5.817	1	28	.023
2	.559[b]	.312	.202	8.39295	.140	1.702	3	25	.192

a. Predictors: (Constant), Time Point 1 Intrusion Subscale IES

b. Predictors: (Constant), Time Point 1 Intrusion Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Intrusion

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	440.572	1	440.572	5.817	.023[a]
	Residual	2120.628	28	75.737		
	Total	2561.200	29			
2	Regression	800.159	4	200.040	2.840	.045[b]
	Residual	1761.041	25	70.442		
	Total	2561.200	29			

a. Predictors: (Constant), Time Point 1 Intrusion Subscale IES

b. Predictors: (Constant), Time Point 1 Intrusion Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Intrusion

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.605	2.880		1.599	.121
	Time Point 1 Intrusion Subscale IES	.456	.189	.415	2.412	.023
2	(Constant)	7.589	3.223		2.355	.027
	Time Point 1 Intrusion Subscale IES	.388	.194	.353	1.995	.057
	NegemChange	1.346	.974	.244	1.382	.179
	PosemChange	-1.385	1.000	-.231	-1.385	.178
	CogmeccChange	-.467	.590	-.132	-.792	.436

a. Dependent Variable: Time Point 2 Intrusion

A.9.2.2 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Intrusion	10.0333	9.33840	30
Time Point 1 Intrusion Subscale IES	12.7000	8.54259	30
NegemChange	-.7973	1.70607	30
PosemChange	.6167	1.57038	30
CogmeccChange	.4083	2.66172	30

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Intrusion Subscale IES[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Intrusion

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.455[a]	.207	.179	8.46153	.207	7.322	1	28	.011
2	.530[b]	.280	.165	8.53163	.073	.847	3	25	.481

a. Predictors: (Constant), Time Point 1 Intrusion Subscale IES

b. Predictors: (Constant), Time Point 1 Intrusion Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Intrusion

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	524.236	1	524.236	7.322	.011[a]
	Residual	2004.731	28	71.598		
	Total	2528.967	29			
2	Regression	709.250	4	177.312	2.436	.074[b]
	Residual	1819.717	25	72.789		
	Total	2528.967	29			

a. Predictors: (Constant), Time Point 1 Intrusion Subscale IES

b. Predictors: (Constant), Time Point 1 Intrusion Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Intrusion

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.712	2.801		1.326	.196
	Time Point 1 Intrusion Subscale IES	.498	.184	.455	2.706	.011
2	(Constant)	6.067	3.276		1.852	.076
	Time Point 1 Intrusion Subscale IES	.409	.198	.374	2.069	.049
	NegemChange	1.370	.990	.250	1.383	.179
	PosemChange	.048	1.016	.008	.048	.962
	CogmeccChange	-.406	.599	-.116	-.677	.505

a. Dependent Variable: Time Point 3 Intrusion

A.9.3 Avoidance (IES)

A.9.3.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Avoidance	12.2000	10.48940	30
Time Point 1 Avoidance Subscale IES	12.1430	9.59337	30
NegemChange	-.7973	1.70607	30
PosemChange	.6167	1.57038	30
CogmeccChange	.4083	2.66172	30

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Avoidance Subscale IES[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Avoidance

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.696[a]	.485	.466	7.66348	.485	26.331	1	28	.000
2	.763[b]	.582	.515	7.30655	.097	1.934	3	25	.150

a. Predictors: (Constant), Time Point 1 Avoidance Subscale IES

b. Predictors: (Constant), Time Point 1 Avoidance Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Avoidance

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1546.392	1	1546.392	26.331	.000[a]
	Residual	1644.408	28	58.729		
	Total	3190.800	29			
2	Regression	1856.158	4	464.040	8.692	.000[b]
	Residual	1334.642	25	53.386		
	Total	3190.800	29			

a. Predictors: (Constant), Time Point 1 Avoidance Subscale IES

b. Predictors: (Constant), Time Point 1 Avoidance Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Avoidance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.957	2.281		1.296	.205
	Time Point 1 Avoidance Subscale IES	.761	.148	.696	5.131	.000
2	(Constant)	7.090	2.827		2.508	.019
	Time Point 1 Avoidance Subscale IES	.579	.169	.529	3.433	.002
	NegemChange	2.086	.943	.339	2.213	.036
	PosemChange	-.584	.880	-.087	-.664	.513
	CogmeccChange	.255	.513	.065	.498	.623

a. Dependent Variable: Time Point 2 Avoidance

A.9.3.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Avoidance	11.3333	10.00460	30
Time Point 1 Avoidance Subscale IES	12.1430	9.59337	30
NegemChange	-.7973	1.70607	30
PosemChange	.6167	1.57038	30
CogmeccChange	.4083	2.66172	30

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Avoidance Subscale IES[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Avoidance

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.559[a]	.313	.288	8.44098	.313	12.739	1	28	.001
2	.603[b]	.363	.261	8.59987	.050	.658	3	25	.585

a. Predictors: (Constant), Time Point 1 Avoidance Subscale IES

b. Predictors: (Constant), Time Point 1 Avoidance Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Avoidance

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	907.662	1	907.662	12.739	.001[a]
	Residual	1995.005	28	71.250		
	Total	2902.667	29			
2	Regression	1053.723	4	263.431	3.562	.020[b]
	Residual	1848.943	25	73.958		
	Total	2902.667	29			

a. Predictors: (Constant), Time Point 1 Avoidance Subscale IES

b. Predictors: (Constant), Time Point 1 Avoidance Subscale IES, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Avoidance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.252	2.512		1.692	.102
	Time Point 1 Avoidance Subscale IES	.583	.163	.559	3.569	.001
2	(Constant)	6.394	3.327		1.922	.066
	Time Point 1 Avoidance Subscale IES	.445	.198	.427	2.241	.034
	NegemChange	1.271	1.110	.217	1.145	.263
	PosemChange	.954	1.036	.150	.921	.366
	CogmeccChange	-.091	.604	-.024	-.150	.882

a. Dependent Variable: Time Point 3 Avoidance

A.9.4 Depression (SCL-90-R)

A.9.4.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Depression	1.0347	.65176	31
Time Point 1 Depression Raw Score	1.1241	.77833	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Depression Raw Score[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Depression

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.628[a]	.395	.374	.51582	.395	18.895	1	29	.000
2	.667[b]	.445	.360	.52151	.051	.790	3	26	.510

a. Predictors: (Constant), Time Point 1 Depression Raw Score

b. Predictors: (Constant), Time Point 1 Depression Raw Score, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Depression

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.028	1	5.028	18.895	.000[a]
	Residual	7.716	29	.266		
	Total	12.744	30			
2	Regression	5.672	4	1.418	5.214	.003[b]
	Residual	7.071	26	.272		
	Total	12.744	30			

a. Predictors: (Constant), Time Point 1 Depression Raw Score

b. Predictors: (Constant), Time Point 1 Depression Raw Score, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 2 Depression

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.444	.165		2.695	.012
	Time Point 1 Depression Raw Score	.526	.121	.628	4.347	.000
2	(Constant)	.543	.192		2.834	.009
	Time Point 1 Depression Raw Score	.478	.132	.571	3.620	.001
	NegemChange	.034	.059	.089	.573	.572
	PosemChange	.009	.062	.022	.144	.887
	CogmeccChange	-.052	.036	-.213	-1.439	.162

a. Dependent Variable: Time Point 2 Depression

A.9.4.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Depression Raw Score	.8462	.67295	31
Time Point 1 Depression Raw Score	1.1241	.77833	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Depression Raw Score[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Depression Raw Score

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.762[a]	.580	.566	.44339	.580	40.105	1	29	.000
2	.796[b]	.634	.577	.43760	.053	1.257	3	26	.309

a. Predictors: (Constant), Time Point 1 Depression Raw Score

b. Predictors: (Constant), Time Point 1 Depression Raw Score, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Depression Raw Score

ANOVA [c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.885	1	7.885	40.105	.000[a]
	Residual	5.701	29	.197		
	Total	13.586	30			
2	Regression	8.607	4	2.152	11.236	.000[b]
	Residual	4.979	26	.191		
	Total	13.586	30			

a. Predictors: (Constant), Time Point 1 Depression Raw Score

b. Predictors: (Constant), Time Point 1 Depression Raw Score, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Depression Raw Score

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.106	.141		.748	.461
	Time Point 1 Depression Raw Score	.659	.104	.762	6.333	.000
2	(Constant)	.116	.161		.722	.477
	Time Point 1 Depression Raw Score	.635	.111	.735	5.736	.000
	NegemChange	.043	.049	.110	.875	.390
	PosemChange	.044	.052	.102	.845	.406
	CogmeccChange	.045	.030	.178	1.482	.150

a. Dependent Variable: Time Point 3 Depression Raw Score

A.9.5 Anxiety (SCL-90-R)

A.9.5.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Anxiety Raw Score	.5226	.58464	31
Time Point 1 Anxiety Raw Score	.6154	.50379	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Anxiety Raw Score[a]	.	Enter
2	Cogmecc Change, Negem Change, Posem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Anxiety Raw Score

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.686[a]	.471	.453	.43253	.471	25.811	1	29	.000
2	.766[b]	.587	.523	.40380	.116	2.425	3	26	.088

a. Predictors: (Constant), Time Point 1 Anxiety Raw Score

b. Predictors: (Constant), Time Point 1 Anxiety Raw Score, CogmeccChange, NegemChange, PosemChange

c. Dependent Variable: Time Point 2 Anxiety Raw Score

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.829	1	4.829	25.811	.000[a]
	Residual	5.425	29	.187		
	Total	10.254	30			
2	Regression	6.015	4	1.504	9.222	.000[b]
	Residual	4.239	26	.163		
	Total	10.254	30			

a. Predictors: (Constant), Time Point 1 Anxiety Raw Score

b. Predictors: (Constant), Time Point 1 Anxiety Raw Score, CogmeccChange, NegemChange, PosemChange

c. Dependent Variable: Time Point 2 Anxiety Raw Score

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.032	.124		.262	.795
	Time Point 1 Anxiety Raw Score	.796	.157	.686	5.080	.000
2	(Constant)	.142	.131		1.090	.286
	Time Point 1 Anxiety Raw Score	.776	.158	.669	4.924	.000
	NegemChange	.038	.044	.112	.865	.395
	PosemChange	-.077	.049	-.206	-1.570	.129
	CogmeccChange	-.050	.028	-.226	-1.755	.091

a. Dependent Variable: Time Point 2 Anxiety Raw Score

A.9.5.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Anxiety	.4097	.41662	31
Time Point 1 Anxiety Raw Score	.6154	.50379	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Anxiety Raw Score [a]	.	Enter
2	Cogmecc Change, Negem Change, Posem Change [a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Anxiety

Model Summary [c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.767[a]	.588	.574	.27205	.588	41.357	1	29	.000
2	.827[b]	.684	.636	.25147	.096	2.647	3	26	.070

a. Predictors: (Constant), Time Point 1 Anxiety Raw Score

b. Predictors: (Constant), Time Point 1 Anxiety Raw Score, CogmeccChange, NegemChange, PosemChange

c. Dependent Variable: Time Point 3 Anxiety

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.061	1	3.061	41.357	.000[a]
	Residual	2.146	29	.074		
	Total	5.207	30			
2	Regression	3.563	4	.891	14.086	.000[b]
	Residual	1.644	26	.063		
	Total	5.207	30			

a. Predictors: (Constant), Time Point 1 Anxiety Raw Score

b. Predictors: (Constant), Time Point 1 Anxiety Raw Score, CogmeccChange, NegemChange, PosemChange

c. Dependent Variable: Time Point 3 Anxiety

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.019	.078		.250	.804
	Time Point 1 Anxiety Raw Score	.634	.099	.767	6.431	.000
2	(Constant)	.122	.081		1.497	.146
	Time Point 1 Anxiety Raw Score	.579	.098	.701	5.902	.000
	NegemChange	.070	.028	.287	2.525	.018
	PosemChange	-.016	.031	-.060	-.523	.605
	CogmeccChange	-.016	.018	-.102	-.904	.374

a. Dependent Variable: Time Point 3 Anxiety

A.9.6 Psychological Distress (GSI; SCL-90-R)

A.9.6.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point Globa Severity Index	.7225	.46529	31
Time Point 1 Global Severity Index	.7956	.50150	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Global Severity Index[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point Globa Severity Index

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.707[a]	.499	.482	.33483	.499	28.932	1	29	.000
2	.741[b]	.550	.480	.33543	.050	.965	3	26	.424

a. Predictors: (Constant), Time Point 1 Global Severity Index

b. Predictors: (Constant), Time Point 1 Global Severity Index, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point Globa Severity Index

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.244	1	3.244	28.932	.000[a]
	Residual	3.251	29	.112		
	Total	6.495	30			
2	Regression	3.569	4	.892	7.931	.000[b]
	Residual	2.925	26	.113		
	Total	6.495	30			

a. Predictors: (Constant), Time Point 1 Global Severity Index

b. Predictors: (Constant), Time Point 1 Global Severity Index, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point Globa Severity Index

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.201	.114		1.761	.089
	Time Point 1 Global Severity Index	.656	.122	.707	5.379	.000
2	(Constant)	.252	.134		1.877	.072
	Time Point 1 Global Severity Index	.643	.137	.693	4.705	.000
	NegemChange	.009	.039	.032	.226	.823
	PosemChange	-.032	.041	-.107	-.777	.444
	CogmeccChange	-.033	.023	-.186	-1.395	.175

a. Dependent Variable: Time Point Globa Severity Index

A.9.6.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Global Severity Index	.5599	.44407	31
Time Point 1 Global Severity Index	.7956	.50150	31
NegemChange	-.7371	1.71059	31
PosemChange	.5777	1.55912	31
CogmeccChange	.4952	2.66126	31

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Global Severity Index[a]	.	Enter
2	Cogmecc Change, Posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Global Severity Index

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.761[a]	.580	.565	.29281	.580	40.002	1	29	.000
2	.767[b]	.589	.525	.30596	.009	.187	3	26	.904

a. Predictors: (Constant), Time Point 1 Global Severity Index

b. Predictors: (Constant), Time Point 1 Global Severity Index, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Global Severity Index

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.430	1	3.430	40.002	.000[a]
	Residual	2.486	29	.086		
	Total	5.916	30			
2	Regression	3.482	4	.871	9.299	.000[b]
	Residual	2.434	26	.094		
	Total	5.916	30			

a. Predictors: (Constant), Time Point 1 Global Severity Index

b. Predictors: (Constant), Time Point 1 Global Severity Index, CogmeccChange, PosemChange, NegemChange

c. Dependent Variable: Time Point 3 Global Severity Index

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.023	.100		.235	.816
	Time Point 1 Global Severity Index	.674	.107	.761	6.325	.000
2	(Constant)	.033	.122		.270	.790
	Time Point 1 Global Severity Index	.680	.125	.768	5.456	.000
	NegemChange	.012	.035	.045	.329	.744
	PosemChange	-.018	.037	-.063	-.483	.633
	CogmeccChange	.009	.021	.056	.439	.664

a. Dependent Variable: Time Point 3 Global Severity Index

A.10 Home-based Participant Information Sheet

An Investigation into the Relationship Between Writing and Health

A large number of individuals keep diaries as a means of organising their thoughts and feelings relating to the daily events they encounter. In order to understand how writing about stressful or traumatic events can help people to organize their thoughts, a study is being conducted that asks you to complete a selection of questionnaires relating to your general well-being, and write about a designated topic for 15 minutes in three separate sessions, over the next six weeks. Then at 2-weeks and again at 6-weeks following your final writing session you will be asked to complete a number of questionnaires relating to your general well-being. Initially you will be asked to complete a questionnaire booklet within this Research Methods and Practical session. Following this you will be asked to take home three writing booklets to be completed on three separate occasions and two further questionnaires. Completion of all phases of the study will amount to 1 hour and 45 minutes towards research credits.

Participation in this study is voluntary. Any information that you give will be treated confidentially. Individuals will not be identified in the results of this study, as all the data will be presented anonymously.

In this first session you will be asked to complete a consent form and a number of questionnaires relating to how you have felt in general over the last few weeks that will be worth 15 minutes of research credits. You will be given three envelopes that contain instructions for the writing sessions, space in which to write, and a general well-being questionnaire that has to be completed before and following your writing. You will also be given two further questionnaire packs to be completed at 2-weeks and again at 6-weeks following your final writing session.

It is important that you write about your designated topic on specified days therefore your selected date will be included on each writing booklet. These are as follows:

- **First writing session: Today at home.**
- **Second writing session: Week beginning 24th October**
- **Third writing session: Week beginning 7th November**
- **Second questionnaire pack: Week beginning 21st November**
- **Final questionnaire pack: Week beginning 12th December**

You will receive your research credits for each questionnaire pack (15 minutes each) and writing session (20 minutes each) when you return the completed questionnaires and writing booklets. These can be returned to either me or the demonstrator in your Research Methods and Practical seminars over the course of the study.

Due to the importance of writing at these designated times you will be sent reminders via e-mail to complete the writing tasks and the questionnaires and announcements will be posted on the Blackboard site. To maintain confidentiality a coding system will be used to match questionnaires and personal writing completed in the first session with those completed in subsequent sessions. To keep it simple and easy to remember, everybody's code will be made up of the first three letters of their mothers maiden name and the last three numbers of their telephone number i.e. if your mothers maiden name is Smith and your telephone number is 07932 678 678 then your code will be 'smi678'. Your own code, similar to this one, should be written in the available space at the top of each page on each questionnaire booklet and writing booklet.

If after taking part in this study you have any concerns, you will see that listed below are some useful contact numbers that you can contact if you feel that you need to talk to somebody.

Contact numbers:

Sheffield Hallam University Counselling Service: Tel:0114 225 2136
E-mail:counselling@shu.ac.uk

The Samaritans: 08457 90 90 90

Or your own GP

If you agree to take part in this study please complete and sign the consent form overleaf. If you require any additional information please feel free to contact me at {e-mail address}

A.11 Debriefing Information For Home-based Participants

Debriefing Information

Thank you for your participation in this study. This study has a number of aims. Firstly, it aims to replicate previous research showing that the expression of emotion through writing can be beneficial in improving both physical and psychological well being in healthy individuals (Pennebaker, 1997). Secondly, this study aims to investigate how methodological changes to the classic "Pennebaker Writing Task" can affect short and longer-term well-being in those people undertaking such a writing task. To address these questions the participants in this study were asked to do different things. Some people were asked to write about their experiences at home and others within the Research Methods and Practical session.

In addition to these methodological issues, the study asks a number of questions designed to obtain information relating to the processing of information connected to the event about which people wrote, and also a measure of how easy it is for people to express their emotions.

The results and information obtained from this study will be used to help examine the mechanisms that underlie the effects of writing about stressful experiences, and will help to determine how future writing studies should be designed to obtain optimum benefits for individuals who are experiencing chronic stress.

Thank you again for participating in this study. If you have any questions about the study please do not hesitate to contact me at: {e-mail address}

If you feel distressed due to your participation in this study please contact one of the following organisations:

Sheffield Hallam University Counselling Service: Tel:0114 225 2136

E-mail:counselling@shu.ac.uk

The Samaritans: 08457 90 90 90

Or your own GP

Thank you

A.12 SPSS Output for Hierarchical Regression Analysis – LIWC Variables as Predictors

A.12.1 Physical Symptoms (PSI)

A.12.1.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 2 Physical Symptoms Inventory	5.0843	2.78587	83
Time Point 1 Physical Symptoms Inventory	4.6506	2.48622	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Physical Symptoms Inventory[a]	.	Enter
2	Negem Change, posem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 2 Physical Symptoms Inventory

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.548[a]	.301	.292	2.34400	.301	34.830	1	81	.000
2	.549[b]	.302	.266	2.38674	.001	.042	3	78	.989

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Time Point 2 Physical Symptoms Inventory

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	191.369	1	191.369	34.830	.000[a]
	Residual	445.041	81	5.494		
	Total	636.410	82			
2	Regression	192.082	4	48.020	8.430	.000[b]
	Residual	444.328	78	5.697		
	Total	636.410	82			

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Time Point 2 Physical Symptoms Inventory

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.227	.548		4.061	.000
	Time Point 1 Physical Symptoms Inventory	.614	.104	.548	5.902	.000
2	(Constant)	2.267	.571		3.970	.000
	Time Point 1 Physical Symptoms Inventory	.610	.108	.544	5.672	.000
	posemChange	-.021	.180	-.011	-.115	.909
	NegemChange	.015	.130	.011	.115	.909
	CogmechChange	-.028	.092	-.030	-.310	.758

a. Dependent Variable: Time Point 2 Physical Symptoms Inventory

A.12.1.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Time Point 3 Physical Symptoms Inventory	4.4512	2.98619	82
Time Point 1 Physical Symptoms Inventory	4.5976	2.45382	82
posemChange	.3962	1.49430	82
NegemChange	-.2645	2.06196	82
CogmechChange	.2940	2.92476	82

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Time Point 1 Physical Symptoms Inventory[a]	.	Enter
2	posem Change, Negem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Time Point 3 Physical Symptoms Inventory

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.552[a]	.305	.297	2.50466	.305	35.139	1	80	.000
2	.554[b]	.307	.271	2.54939	.002	.072	3	77	.975

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Time Point 3 Physical Symptoms Inventory

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	220.438	1	220.438	35.139	.000[a]
	Residual	501.867	80	6.273		
	Total	722.305	81			
2	Regression	221.850	4	55.463	8.533	.000[b]
	Residual	500.454	77	6.499		
	Total	722.305	81			

a. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory

b. Predictors: (Constant), Time Point 1 Physical Symptoms Inventory, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Time Point 3 Physical Symptoms Inventory

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.360	.590		2.305	.024
	Time Point 1 Physical Symptoms Inventory	.672	.113	.552	5.928	.000
2	(Constant)	1.367	.614		2.227	.029
	Time Point 1 Physical Symptoms Inventory	.666	.117	.547	5.700	.000
	posemChange	.083	.192	.042	.435	.665
	NegemChange	.020	.140	.014	.141	.889
	CogmechChange	-.020	.099	-.019	-.199	.842

a. Dependent Variable: Time Point 3 Physical Symptoms Inventory

A.12.2 Intrusion (IES)

A.12.2.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Intrusion Time Point 2	9.1481	9.35696	81
Intrusion Time Point 1	10.3827	8.49642	81
posemChange	.4015	1.49729	81
NegemChange	-.2944	2.07835	81
CogmechChange	.1465	2.90889	81

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Intrusion Time Point 1[a]	.	Enter
2	posem Change, Negem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Intrusion Time Point 2

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.431[a]	.186	.176	8.49497	.186	18.059	1	79	.000
2	.482[b]	.232	.192	8.41306	.046	1.515	3	76	.217

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Intrusion Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1303.222	1	1303.222	18.059	.000[a]
	Residual	5701.000	79	72.165		
	Total	7004.222	80			
2	Regression	1624.972	4	406.243	5.740	.000[b]
	Residual	5379.250	76	70.780		
	Total	7004.222	80			

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Intrusion Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.216	1.496		2.818	.006
	Intrusion Time Point 1	.475	.112	.431	4.250	.000
2	(Constant)	4.462	1.517		2.941	.004
	Intrusion Time Point 1	.455	.111	.413	4.092	.000
	posemChange	.365	.634	.058	.576	.566
	NegemChange	.286	.461	.064	.622	.536
	CogmechChange	-.686	.329	-.213	-2.083	.041

a. Dependent Variable: Intrusion Time Point 2

A.12.2.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Intrusion Time Point 3	8.5823	9.48090	79
Intrusion Time Point 1	10.3165	8.52078	79
posemChange	.4287	1.51233	79
NegemChange	-.2842	2.09486	79
CogmechChange	.1966	2.92729	79

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Intrusion Time Point 1[a]	.	Enter
2	posem Change, Negem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Intrusion Time Point 3

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.482[a]	.232	.222	8.36293	.232	23.248	1	77	.000
2	.506[b]	.256	.215	8.39800	.024	.786	3	74	.505

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Intrusion Time Point 3

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1625.940	1	1625.940	23.248	.000[a]
	Residual	5385.275	77	69.939		
	Total	7011.215	78			
2	Regression	1792.259	4	448.065	6.353	.000[b]
	Residual	5218.957	74	70.526		
	Total	7011.215	78			

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, posemChange, NegemChange, CogmechChange

c. Dependent Variable: Intrusion Time Point 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.054	1.483		2.059	.043
	Intrusion Time Point 1	.536	.111	.482	4.822	.000
2	(Constant)	3.388	1.531		2.213	.030
	Intrusion Time Point 1	.514	.113	.462	4.569	.000
	posemChange	.219	.637	.035	.343	.732
	NegemChange	.397	.460	.088	.861	.392
	CogmechChange	-.455	.332	-.140	-1.370	.175

a. Dependent Variable: Intrusion Time Point 3

A.12.3 Avoidance (IES)

A.12.3.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Avoidance Time Point 2	10.6914	10.22086	81
Avoidance Time Point 1	10.7073	8.44926	81
posemChange	.4015	1.49729	81
NegemChange	-.2944	2.07835	81
CogmechChange	.1465	2.90889	81

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Avoidance Time Point 1[a]	.	Enter
2	Cogmech Change, posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Avoidance Time Point 2

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.549[a]	.301	.292	8.59720	.301	34.071	1	79	.000
2	.576[b]	.332	.296	8.57304	.030	1.149	3	76	.335

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmechChange, posemChange, NegemChange

c. Dependent Variable: Avoidance Time Point 2

ANOVA [c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2518.250	1	2518.250	34.071	.000[a]
	Residual	5839.034	79	73.912		
	Total	8357.284	80			
2	Regression	2771.515	4	692.879	9.427	.000[b]
	Residual	5585.769	76	73.497		
	Total	8357.284	80			

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmechChange, posemChange, NegemChange

c. Dependent Variable: Avoidance Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.581	1.548		2.314	.023
	Avoidance Time Point 1	.664	.114	.549	5.837	.000
2	(Constant)	3.787	1.584		2.391	.019
	Avoidance Time Point 1	.624	.117	.516	5.341	.000
	posemChange	.897	.657	.131	1.366	.176
	NegemChange	.233	.476	.047	.490	.626
	CogmechChange	-.470	.336	-.134	-1.399	.166

a. Dependent Variable: Avoidance Time Point 2

A.12.3.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Avoidance Time Point 3	9.9114	9.17241	79
Avoidance Time Point 1	10.5353	8.37585	79
posemChange	.4287	1.51233	79
NegemChange	-.2842	2.09486	79
CogmechChange	.1966	2.92729	79

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Avoidance Time Point 1[a]	.	Enter
2	Cogmech Change, Negem Change, posem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Avoidance Time Point 3

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514[a]	.264	.255	7.91914	.264	27.642	1	77	.000
2	.531[b]	.282	.243	7.98018	.018	.609	3	74	.611

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmechChange, NegemChange, posemChange

c. Dependent Variable: Avoidance Time Point 3

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1733.494	1	1733.494	27.642	.000[a]
	Residual	4828.886	77	62.713		
	Total	6562.380	78			
2	Regression	1849.812	4	462.453	7.262	.000[b]
	Residual	4712.567	74	63.683		
	Total	6562.380	78			

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmechChange, NegemChange, posemChange

c. Dependent Variable: Avoidance Time Point 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.982	1.437		2.770	.007
	Avoidance Time Point 1	.563	.107	.514	5.258	.000
2	(Constant)	4.396	1.492		2.946	.004
	Avoidance Time Point 1	.543	.112	.496	4.851	.000
	posemChange	-.096	.617	-.016	-.155	.877
	NegemChange	.580	.444	.132	1.306	.196
	CogmechChange	-.024	.316	-.008	-.075	.941

a. Dependent Variable: Avoidance Time Point 3

A.12.4 Depression (SL-90-R)

A.12.4.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Depression Time Point 2	1.0053	.72176	83
Depression Time Point 1	1.0398	.76096	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Depression Time Point 1[a]	.	Enter
2	Negem Change, posem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Depression Time Point 2

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.592[a]	.350	.342	.58537	.350	43.662	1	81	.000
2	.632[b]	.400	.369	.57336	.049	2.143	3	78	.102

a. Predictors: (Constant), Depression Time Point 1

b. Predictors: (Constant), Depression Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Depression Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.961	1	14.961	43.662	.000[a]
	Residual	27.756	81	.343		
	Total	42.717	82			
2	Regression	17.075	4	4.269	12.985	.000[b]
	Residual	25.642	78	.329		
	Total	42.717	82			

a. Predictors: (Constant), Depression Time Point 1

b. Predictors: (Constant), Depression Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Depression Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.422	.109		3.861	.000
	Depression Time Point 1	.561	.085	.592	6.608	.000
2	(Constant)	.472	.110		4.310	.000
	Depression Time Point 1	.527	.084	.556	6.239	.000
	posemChange	.030	.043	.062	.696	.488
	NegemChange	.054	.031	.155	1.729	.088
	CogmechChange	-.046	.022	-.187	-2.078	.041

a. Dependent Variable: Depression Time Point 2

A.12.4.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Depression Time Point 3	.8350	.76075	83
Depression Time Point 1	1.0398	.76096	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Depression Time Point 1[a]	.	Enter
2	Negem Change, posem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Depression Time Point 3

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.709[a]	.502	.496	.53999	.502	81.755	1	81	.000
2	.738[b]	.544	.521	.52660	.042	2.390	3	78	.075

a. Predictors: (Constant), Depression Time Point 1

b. Predictors: (Constant), Depression Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Depression Time Point 3

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.839	1	23.839	81.755	.000[a]
	Residual	23.619	81	.292		
	Total	47.457	82			
2	Regression	25.827	4	6.457	23.284	.000[b]
	Residual	21.630	78	.277		
	Total	47.457	82			

a. Predictors: (Constant), Depression Time Point 1

b. Predictors: (Constant), Depression Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Depression Time Point 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.098	.101		.976	.332
	Depression Time Point 1	.709	.078	.709	9.042	.000
2	(Constant)	.143	.101		1.423	.159
	Depression Time Point 1	.676	.078	.676	8.712	.000
	posemChange	.040	.040	.077	.997	.322
	NegemChange	.065	.029	.176	2.257	.027
	CogmechChange	-.033	.020	-.129	-1.648	.103

a. Dependent Variable: Depression Time Point 3

A.12.5 Anxiety (SCL-90-R)

A.12.5.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Anxiety Time Point 2	.5542	.58462	83
Anxiety Time Point 1	.6214	.59298	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Anxiety Time Point 1[a]	.	Enter
2	Negem Change, posem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Anxiety Time Point 2

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.616[a]	.380	.372	.46325	.380	49.595	1	81	.000
2	.705[b]	.498	.472	.42489	.118	6.095	3	78	.001

a. Predictors: (Constant), Anxiety Time Point 1

b. Predictors: (Constant), Anxiety Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Anxiety Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.643	1	10.643	49.595	.000[a]
	Residual	17.383	81	.215		
	Total	28.026	82			
2	Regression	13.945	4	3.486	19.310	.000[b]
	Residual	14.082	78	.181		
	Total	28.026	82			

a. Predictors: (Constant), Anxiety Time Point 1

b. Predictors: (Constant), Anxiety Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Anxiety Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.177	.074		2.391	.019
	Anxiety Time Point 1	.608	.086	.616	7.042	.000
2	(Constant)	.237	.070		3.398	.001
	Anxiety Time Point 1	.574	.080	.583	7.162	.000
	posemChange	-.013	.032	-.033	-.407	.685
	NegemChange	.081	.023	.285	3.487	.001
	CogmechChange	-.045	.016	-.227	-2.753	.007

a. Dependent Variable: Anxiety Time Point 2

A.12.5.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Anxiety Time Point 3	.5009	.59178	83
Anxiety Time Point 1	.6214	.59298	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Anxiety Time Point 1[a]	.	Enter
2	Negem Change, posem Change, Cogmech Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Anxiety Time Point 3

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.635[a]	.403	.396	.45993	.403	54.757	1	81	.000
2	.709[b]	.502	.477	.42816	.099	5.155	3	78	.003

a. Predictors: (Constant), Anxiety Time Point 1

b. Predictors: (Constant), Anxiety Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Anxiety Time Point 3

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.583	1	11.583	54.757	.000[a]
	Residual	17.134	81	.212		
	Total	28.717	82			
2	Regression	14.418	4	3.605	19.662	.000[b]
	Residual	14.299	78	.183		
	Total	28.717	82			

a. Predictors: (Constant), Anxiety Time Point 1

b. Predictors: (Constant), Anxiety Time Point 1, NegemChange, posemChange, CogmechChange

c. Dependent Variable: Anxiety Time Point 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.107	.073		1.460	.148
	Anxiety Time Point 1	.634	.086	.635	7.400	.000
2	(Constant)	.158	.070		2.246	.028
	Anxiety Time Point 1	.603	.081	.604	7.456	.000
	posemChange	.004	.032	.009	.109	.913
	NegemChange	.080	.023	.279	3.433	.001
	CogmechChange	-.039	.016	-.194	-2.361	.021

a. Dependent Variable: Anxiety Time Point 3

A.12.6 Psychological Distress (GSI; SCL-90-R)

A.12.6.1 Two week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Global Severity Index Time Point 2	.7192	.51870	83
Global Severity Index Time Point 1	.7528	.50553	83
posemChange	.3987	1.48533	83
NegemChange	-.2878	2.06033	83
CogmechChange	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Global Severity Index Time Point 1[a]	.	Enter
2	Cogmech Change, posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Global Severity Index Time Point 2

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.652[a]	.425	.418	.39579	.425	59.834	1	81	.000
2	.688[b]	.473	.446	.38611	.048	2.370	3	78	.077

a. Predictors: (Constant), Global Severity Index Time Point 1

b. Predictors: (Constant), Global Severity Index Time Point 1, CogmechChange, posemChange, NegemChange

c. Dependent Variable: Global Severity Index Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.373	1	9.373	59.834	.000[a]
	Residual	12.689	81	.157		
	Total	22.062	82			
2	Regression	10.433	4	2.608	17.496	.000[b]
	Residual	11.629	78	.149		
	Total	22.062	82			

a. Predictors: (Constant), Global Severity Index Time Point 1

b. Predictors: (Constant), Global Severity Index Time Point 1, CogmechChange, posemChange, NegemChange

c. Dependent Variable: Global Severity Index Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.216	.078		2.757	.007
	Global Severity Index Time Point 1	.669	.086	.652	7.735	.000
2	(Constant)	.253	.078		3.246	.002
	Global Severity Index Time Point 1	.635	.086	.619	7.387	.000
	posemChange	.015	.029	.043	.509	.612
	NegemChange	.034	.021	.136	1.618	.110
	CogmechChange	-.035	.015	-.197	-2.346	.021

a. Dependent Variable: Global Severity Index Time Point 2

A.12.6.2 Six week follow-up data

Descriptive Statistics

	Mean	Std. Deviation	N
Global Severity Index Time Point 3	.6092	.54534	83
Global Severity Index Time Point 1	.7528	.50553	83
posem Change	.3987	1.48533	83
Negem Change	-.2878	2.06033	83
Cogmech Change	.2431	2.94362	83

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Global Severity Index Time Point 1[a]	.	Enter
2	Cogmech Change, posem Change, Negem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Global Severity Index Time Point 3

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.691[a]	.477	.470	.39688	.477	73.822	1	81	.000
2	.718[b]	.516	.491	.38909	.039	2.092	3	78	.108

a. Predictors: (Constant), Global Severity Index Time Point 1

b. Predictors: (Constant), Global Severity Index Time Point 1, Cogmech Change, posem Change, Negem Change

c. Dependent Variable: Global Severity Index Time Point 3

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.628	1	11.628	73.822	.000[a]
	Residual	12.759	81	.158		
	Total	24.387	82			
2	Regression	12.578	4	3.145	20.771	.000[b]
	Residual	11.808	78	.151		
	Total	24.387	82			

a. Predictors: (Constant), Global Severity Index Time Point 1

b. Predictors: (Constant), Global Severity Index Time Point 1, CogmechChange, posemChange, NegemChange

c. Dependent Variable: Global Severity Index Time Point 3

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.048	.078		.617	.539
	Global Severity Index Time Point 1	.745	.087	.691	8.592	.000
2	(Constant)	.088	.079		1.120	.266
	Global Severity Index Time Point 1	.718	.087	.665	8.280	.000
	posemChange	-.002	.030	-.006	-.081	.936
	NegemChange	.040	.021	.153	1.893	.062
	CogmechChange	-.028	.015	-.149	-1.849	.068

a. Dependent Variable: Global Severity Index Time Point 3

A.13 Demographic Information Questionnaire Page

Information About You

Thank you for agreeing to take part in this study. I would like to ask you some general questions about you and your health. Please take the time to answer each of the questions before moving on to the next stage of the study.

1. Age

2. Gender

- ☐ Female
- ☐ Male

3. Marital Status

- ☐ Married
- ☐ Single
- ☐ Separated
- ☐ Divorced
- ☐ Cohabiting
- ☐ Widowed

4. Ethnicity

- ☐ White
- ☐ Mixed
- ☐ Asian
- ☐ Black
- ☐ Chinese or other ethnic group

5. What is your nationality?

6. Which of the following best describes your current occupational status?

- ☐ Full-time paid work (30 hours plus per week)
- ☐ Part-time paid work (under 30 hours per week)
- ☐ Full-time education at school, college or university
- ☐ Part-time education at school college or university
- ☐ Unemployed
- ☐ Permanently sick/disabled
- ☐ Fully retired from work
- ☐ Looking after the home
- ☐ Doing something else

7. Approximately how long do you spend on the internet a day? (in minutes not including work related use)

8. Approximately how often do you use Infertility related forums?

- ☐ Less than once a week
- ☐ 1 or 2 times a week
- ☐ 3 or 4 times a week
- ☐ More than 4 times a week
- ☐ Every day

9. How many infertility related forums do you use?

10. Do you tend to post on infertility forums or just read the posts?

- ☐ Post on the forums
- ☐ Just read the posts

11. If you post on these forums, what is your approximate post count (in total if you use different forums)?

12. Do you have any children? ☐ Yes ☐ No

13. If you have children, how many?

14. How long have you been trying to conceive (in months)?

15. Have you been given a diagnosis by a doctor? ☐ Yes ☐ No

16. If Yes, who has received the diagnosis?

- ☐ you
- ☐ your partner
- ☐ both of you
- ☐ undetermined

17. What is the specific diagnosis for you? (if relevant)

18. What is the specific diagnosis for your partner? (if relevant)

19. Are you currently undergoing fertility treatment? ☐ Yes ☐ No

20. If yes, what treatment are your receiving?

A.14 Ethics Proforma and Letter of Approval

A.14.1 Ethics Proforma

Faculty of Development and Society

Application for Research Ethics Approval Staff and Postgraduate Research Students

Section A

Important Note- If a previously submitted research proposal answers the methodology questions in this section, please include a copy of the proposal and leave those questions blank. You MUST however complete ALL of Section B

1. **Name of principal investigator: Katie Cutts**
   Faculty: Development and Society
   Email address: katie.cutts@shu.ac.uk

2. **Title of research:** Efficacy of a Web-based expressive writing intervention for individuals experiencing infertility.

3. **Supervisor if applicable:** Maddy Arden (Director of Studies)
   Email address: m.arden@shu.ac.uk

   Keith Hurst
   Email address: k.m.hurst@shu.ac.uk

   John Reidy
   Email address: j.g.reidy@shu.ac.uk

4. **ENT number if applicable: N/A**

5. **Other investigators (within or outside SHU)**

Title	Name	Post	Division	Organisation

6. **Proposed Duration of Project:**
   Start date: June 2008 End Date: October 2008

7. **Main purpose of Research:**
   X Educational qualification

☐ Publicly funded research
☐ Staff research project
☐ Other (Please supply details)

8. Background to the Study and Scientific Rationale (500 words)

Over the past fifteen years a number of researchers have examined the value of writing about emotional and traumatic experiences (e.g. Ullrich & Lutgendorf, 2002; Pennebaker, 1997). Disclosing emotional reactions to stressful and traumatic experiences has been shown to have beneficial influences on physical health (Greenberg & Stone, 1992), improved psychological well-being (Paez, Velasco & Gonzalez, 1999) and changes in physiological markers such as immunological responses (Petrie, Booth, Pennebaker, Davison & Thomas, 1995). The standard writing methodology developed by James Pennebaker (Pennebaker & Beall, 1986) involves participants being randomly assigned to one of two or more conditions, and being asked to write about either traumatic or stressful experiences (experimental group), or superficial topics (control group). Participants are typically instructed to write about their assigned topic for three to five consecutive days, for 15-20 minutes each day and are assessed on a number of psychological and physical well-being measures up to six months after the final writing session (Pennebaker & Seagal, 1999). In a review of 13 studies that have used a controlled writing paradigm to examine the associated benefits, Smyth (1998) reported that the overall effect size (α = .47) indicated an overall 23% improvement in long term health.

Expressive writing has been shown to have salutary effects in a number of patient groups, for example patients suffering from fibromyalgia saw improvements in psychological well-being, fatigue and pain after writing about past traumatic experiences (Broderick, Junghaenel, & Schwartz, 2005). Women who wrote about their experience of breast cancer reported fewer negative physical symptoms at three month follow-up than patients in the control group, distress levels also reduced in women who were low on cancer related avoidance (Stanton, Danoff-Burg, Sworowski et al., 2002). In cancer patients (gynaecological and prostrate) who reported a reluctance to express their negative thoughts and feelings relating to their cancer to family and friends, disclosure writing buffered the effects of social constraint on distress levels, suggesting that individuals who's environment precludes successful expression of emotion may benefit from emotional disclosure through writing (Zakowski, Ramati, Morton, Johnson & Flanigan, 2004).

Reproductive problems affect one in seven couples in the United Kingdom (Human Fertilization and Embryology Authority, HFEA, 2007). For most people having children is an essential part of adult life which is shaped by social, religious and cultural demands (Seibel, 1997). The negative psychological impact of infertility and resultant stress inherent in the treatment of fertility problems is well documented in the research literature (Greil, 1997). The social stigma associated with infertility means that this group of individuals often experience feelings of isolation (Andrews, Abbey & Halman, 1991) and whilst social relationships can be supportive for individuals experiencing fertility problems they can simultaneously be a source of stress (Wilson & Kopitzke,

2002). In consideration of the stressful nature of infertility, the HFEA (2004) specify that all patients seeking assisted reproductive treatments should be offered psychosocial counselling, however only eight to 12% of couples actually use the counselling services available to them, citing such reasons as time, cost and fear of being labelled as having a psychological problem for the poor utilization of these services (Boivin, Scanlan & Walker, 1999). Expressive writing could therefore be a useful medium through which individuals experiencing fertility problems can disclose their deepest feelings that is free from the social constraints and stigma that may deter infertile individuals from seeking face to face support from friends, family or counselling professionals.

9. Has the scientific / scholarly basis of this research been approved? (For example by Research Degrees Subcommittee or an external funding body.)

- ☐ Yes
- ☐ No - to be submitted
- ☐ Currently undergoing an approval process
- X Irrelevant (e.g there is no relevant committee governing this work)

10. Main Research Questions

Based on the above rationale the main aims of this study are to determine if individuals experiencing infertility who write about the stress associated with their fertility problems and fertility related treatments exhibit improvements in physical and psychological well-being compared to controls?

Subsidiary research Questions:

- ⇨ Does the location of a diagnosis of compromised fertility status (i.e. male factor/female factor/mixed etc.) affect the efficacy of the writing task?
- ⇨ Do other moderating variables affect the efficacy of the writing task (e.g. socio-demographic variables, time trying to conceive, positive expectancies)?
- ⇨ Do self-reported coping efforts change across the study period as a function of the writing task?
- ⇨ Is emotional expression or cognitive reappraisal evident within the writing task content?

11. Summary of Methods including Proposed Data Analyses

Participation is voluntary. A number of infertility specific websites and discussion forums have been identified from which participants will be recruited by placing an advert on these sites (see Appendix A for advert).

The study is quasi-experimental; participants will be randomly assigned to one of four conditions, intervention/expectancy group (expressive writing with positive expectancies), standard intervention group (expressive writing), a writing control group (infertility specific factual writing) or the control group (no writing) in order to make comparisons on psychological and physical well-being measures. There is some evidence to suggest that having positive expectancies about the emotional effects of writing plays a role in the positive outcomes seen in the literature (Langens & Schuler, 2007) therefore one group (intervention/expectancy group) will be told that writing has been shown to be effective in helping people cope and adjust better to stressful situations in order to test this hypothesis. After giving consent and completing the registration procedure (username and password allocation) all participants will complete a general information questionnaire. In order to determine if disclosure writing has any salutary effects in individuals experiencing fertility problems a number of standardized measures will be administered in order to explore, comprehensively, a range of potential positive outcomes and moderating variables. The following outcome measures will be administered and take approximately 15-20 minutes to complete: Twenty-Item Toronto Alexithymia Scale (TAS- 20; Bagby, Parker & Taylor, 1994), Depression, Anxiety and Stress Scales (DASS-21; Lovibond & Lovibond, 1995), Physical Symptoms Inventory (PSI; Spector & Jex, 1998), Fertility Problem Inventory (FPI: Newton, Sherrard & Glavac, 1999), Impact of Event Scale (IES: Horowitz, Wilner & Alvarez,1979) and the brief COPE (Carver, 1997).

On completion of the baseline outcome measures, individuals in the intervention groups and writing control group will be directed to the instructions for the first 15 minute writing session. Prior to and after completion of the writing task, participants will complete the immediate version of the Positive and Negative Affectivity Scale (PANAS; Watson, Clark & Tellegan, 1988) to assess current mood, and two brief writing evaluation questionnaires the Event Appraisal Questionnaire, derived from a study by Paez et al. (1999) and Essay Evaluations Questionnaire which is adapted from Greenberg and Stone (1992). The writing conditions will complete two further writing session 24 hours apart. Participants will receive automated reminder e-mails with a link to take them directly to the writing pages.

Four weeks after completion of the baseline measures, all participants will be contact via automated e-mail to ask them to log back into the study site to complete the follow-up questionnaires (as described previously). Upon completion of these measures participants will be directed to a debriefing page and thanked for their continued participation. Participants have the option to provide feedback for the study if they wish. (See Appendix B for writing instructions and Appendix C for outcome measures).

Proposed Analysis

Response to questionnaires across time and between groups will be analysed to determine the efficacy of the writing task in reducing self-reported distress and improving psychological functioning and physical health over the study period (i.e. ANOVA, t-tests, or non-parametric equivalents). The influence of

other demographic variables (i.e. gender, location of diagnosis) and ability to freely express emotions (alexithymia) will be examined using univariate analysis. Multiple regression analysis will also be used to reveal important predictors of the outcome effects of written disclosure.

Data from the writing sessions will be analyzed using a computerized text analysis programme, the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis & Booth, 2001). The LIWC searches text and calculates the proportion of words used that reflect such categories as negative emotions, positive emotions, causation and insight. The data generated from this analysis will then be subjected to univariate statistical analysis to determine the level of emotional expression and cognitive reappraisal that is evident across the writing sessions.

Section B

1. **Describe the arrangements for selecting/sampling and briefing potential participants.** (This should include copies of any advertisements for volunteers or letters to individuals/organisations inviting participation.)

Participants will be recruited from internet forums specifically developed to provide emotional support and information for individuals who are experiencing infertility. Research has shown that a considerable proportion of individuals are making use of the internet to seek emotional support for their fertility problems (Haagen et al., 2003). The growth of internet resources over the last decade has provided a domain through which individuals who are experiencing fertility problems can access information about diagnosis and treatment, receive support and share their stories (Epstein, Rosenberg, Grant & Hemenway, 2002). In a study by Haagen et al. (2003) of patients attending a fertility clinic 72 couples of 134 couples questioned reported using the internet for fertility-related problems. Seventy-two percent of couples reported using the internet to gain information in order to understand their fertility problem better, whilst 41% used the internet to seek emotional support. The forums through which participants will be recruited are based within the United Kingdom, North America, Canada, Australia, New Zealand and South Africa although they vary in content and number of registered members they are all homogenous in that they are publicly accessible forums that provide both emotional support and information for individuals who are having difficulties conceiving, no matter what stage of their fertility career (i.e. newly diagnosed, undiagnosed but concerned and those receiving fertility treatment). All sites chosen are open to research requests.

The information provided to potential participants will direct them to click on the link if they are interested in taking part in the study. At the first information page, all participants will be provided details of the inclusion criteria for the study; (a) Have been trying to conceive for a period of no less than 12 months, (b) Able to

read and write in English, (c) over the age of 18 and (d) be willing to answer questions about their physical and emotional health and write about their experiences.

Participants are then instructed to click on another link to obtain the full study information. It is at this stage that participants are randomised into condition and the information they receive pertains to their specific involvement (condition) in the study. This allows them to give informed consent. (See Appendix D for information pages).

2. **What is the potential for participants or third parties to benefit from the research?**

Individuals who are assigned to the experimental intervention group have the potential to experience improvements in both their psychological and physical well-being after the implementation of the intervention. Whilst those in the control groups are not expected to receive any immediate benefits from their involvement in the study it is hoped that the results from the study will be useful for informing future written disclosure interventions that have the potential to be utilised within primary care settings for individuals experiencing infertility.

No monetary or material incentives will be offered for involvement in this research.

3. **Describe any possible negative consequences of participation in the research along with the ways in which these consequences will be limited.**

Participants may find it distressing to write about their fertility problems and the treatments that they are undergoing. Participants will be advised of this at the time of recruitment. Participants will be informed that if at any stage of their involvement in the study they can withdraw, however they will be advised that any data they have previously submitted will not be removed from the study unless it has been submitted within the preceding week.

Contact details for the researcher are clearly stated on the participant information sheet which they will be advised to print off at the point of recruitment and they will be advised to contact the researcher if they feel that they need to discuss their involvement in the study. The information sheet also contains information on infertility specific support groups. In the event that participants contact the researcher and express that the study has caused then distress they will be advised to cease participation in the study and provided with the contact details of relevant support organisations.

4. **Describe the arrangements for obtaining participants' consent.** (This should include copies of the information that they will receive & written consent forms where appropriate. If children or vulnerable people are to

be participants in the study details of the arrangements for obtaining consent from those acting in *loco parentis* or as advocates should be provided.)

After participants have read the detailed information page (in Appendix C). Potential participants have the option to give consent or refuse consent. Participants also have the option to ask for further information, if they choose to ask further questions they are directed to an e-mail page in which they can request further information form the researcher. If at this stage participants decide that they are happy to continue they can check the consent option and are then directed to the registration page.

5. **Describe how participants will be made aware of their right to withdraw from the research.** (This should also include information about participants' right to withhold information.)

   Information on the right to withdraw is included in the information sheet/consent form. Participants have the option to withdraw from the study at any time by choice of not returning to complete the writing sessions or questionnaires. They can also choose not to submit their question answers and close the internet browser at any time. In this case their data is not submitted.

6. If your data collection requires that you work alone with children or other vulnerable participants have you undergone **Criminal Records Bureau screening**? Please supply details.

   N/A

7. **Describe the arrangements for debriefing the participants.** (This should include copies of information that participants will receive where appropriate.)

   Debriefing information will be presented to participants when they have completed the final stage of the study (See Appendix E).

8. **Describe the arrangements for ensuring participant confidentiality.** (This should include details of how data will be stored to ensure compliance with data protection legislation and how results will be presented.)

   When participants consent to participate they are directed to a registration page in which they provide their e-mail and choose a username. Participants are then sent, via e-mail, their registration details which include a self-selected username and a password that they must use to access the site each time they return. All their study data submitted to the website is retained under their chosen username so that future data points can be matched to previous data points. No usernames will be used in the presentation or publication of results.

9. **Are there any conflicts of interest in you undertaking this research?** (E.g. Are you undertaking research on work colleagues; or in an organisation where you are a consultant?) Please supply details.

None

10. **What are the expected outcomes, impacts and benefits of the research?**

It is anticipated that participants in the experimental intervention groups will experience improvements in their psychological and/or physical well-being as a result of their participation in the study. The potential impact of these findings is that a written emotional expression intervention could be useful for individuals experiencing fertility problems by reducing the stress associated with their fertility status and treatment. If the implementation of the intervention is successful the findings from this study could be used to inform the implementation of a writing intervention within primary care settings. The results from this study could provide support to further investigate the utility of a writing intervention that is relatively cost effective and can be used outside of the traditional clinical setting.

Please give details of any plans for dissemination of the results of the research

The results of the project will be submitted for publication to an appropriate peer-reviewed journal (e.g. Fertility and Sterility) and the completed PhD thesis will be placed in Sheffield Hallam University library.

SECTION C

RISK ASSESSMENT FOR THE RESEARCHER

7. Will the proposed data collection take place on campus?

☐ Yes (Please answer questions 4 and 6 only)
X No (Please complete all questions)

8. Where will the data collection take place?
(Tick as many as apply if data collection will take place in multiple venues)

☐ Own house/flat ☐ ☐Residence of participant

☐ School ☐ ☐Business/Voluntary Organisation

☐ Public Venue (e.g. Youth Club; Church; etc)

X☐ Other (Please specify) __Via the Internet

9. How will you travel to and from the data collection venue?

☐ On foot ☐ By car ☐ Public Transport

X☐ Other (Please specify) N/A - all data is collected online

Please outline how you will ensure your personal safety when travelling to and from the data collection venue:

10. How will you ensure your own personal safety whilst at the research venue? As the data is collected online there will be no face-to-face contact with participants.

11. If you are carrying out research off-campus, you must ensure that each time you go out to collect data you ensure that someone you trust knows where you are going (without breaching the confidentiality of your participants), how you are getting there (preferably including your travel route), when you expect to get back, and what to do should you not return at the specified time. Please outline here the procedure you propose using to do this:

N/A

12. Are there any potential risks to your health and wellbeing associated with either (a) the venue where the research will take place and/or (b) the research topic itself?

X None that I am aware of

☐ Yes (Please outline below)

7. Does this research project require a health and safety risk analysis for the procedures to be used? Yes /**No**

If YES current status of Health and Safety Risk Assessment.

I confirm that this research will conform to the principles outlined in the Sheffield Hallam University Research Ethics policy.

I confirm that this application is accurate to the best of my knowledge.

Principal Investigator's signature	
Date	

Supervisor's signature (if applicable)	
Date	

A.14.2 Approval Letter

Our Ref AM/SW/18-2008

23 June 2008

Katie Cutts
The Lodge
Collegiate Cresecent

Dear Katie

Request for Ethical Approval of Research Project

Your research project entitled "Efficacy of a Web-based expressive writing intervention for individuals experiencing infertility" has been submitted for ethical review to the Faculty's rapporteurs and I am pleased to confirm that they have approved your project.

However, they have raised the following issues which you should address during the research project:

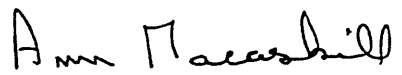
I no ethical problems with this research, it has the potential to find some results useful to individual/couples with fertility problems in the long term, and the proposers seem to have all the ethical bases covered (write to withdraw, referral to appropriate support and so on). I do have a methodological question however which I think needs addressing. Given that participants are being recruited from an Internet forum it suggests that at least some of these participants post to the forum. My question is to what extent variations in amount and type of posting to these forums might affect the experimental manipulation? For example, heavy posters might be writing expressively on the forum and thereby obtaining the benefits of the manipulation whichever experimental group they are assigned to. One solution might be to request that participants don't post for the duration of the study, but this brings its own problems. A person is gaining benefit from using Internet discussion by offloading their emotional baggage (as it were) and were assigned to the control condition and then asked to stop posting on the Internet one might find their well-being declined from baseline.

The questionnaire does have questions relating to how much each participant posts which could be used to partly control for this. But it only asks how many forums they use, whether they post or just read and how many posts they make (note, the questionnaire asks for no time frame is given for this last question: posts per week, per month, per day, etc. this should be fixed). Maybe an additional question could be added which asks to what extent their posts are generally factual or are emotional/expressive in content. This could be factored in as a variable as part of a multiple regression, or used as a criterion to allocate individuals to groups.

As I say this is a methodological question rather than an ethical one, I hope no one minds me raising it as I consider it to be important to the success of the study. My ethical approval is not conditional on this point being considered.

I wish you every success with your research project.

Yours sincerely



Professor A Macaskill
Chair
Faculty Research Ethics Committee

A.15 E-mail to Infertility Forum Administrators/List Owners

Dear {name of site or site contact},

I am a researcher from Sheffield Hallam University, as part of a PhD I am conducting a study looking at the experience of individuals coping with infertility and how this affects their physical and emotional well-being. I am currently conducting a web-based questionnaire study specifically focused on individuals who use infertility forums and would like to request your permission to place the following research request on {name of sub-forum} for participants. If you require any further information please do not hesitate to contact me at {e-mail address}.

Kindest Regards

Katie Cutts (BSc)

A.16 Advert Placed on Infertility Forums

Coping with Infertility

I would like to invite you to take part in a study currently being conducted that is looking at the experience of individuals coping with infertility and how this affects their physical and emotional well-being. The study is internet-based and is being conducted over a number of weeks.

If you would like to know more about taking part in the study please click the link below and you will be directed to the study site:

{Link to study site}

The project has received ethical approval from Sheffield Hallam University Faculty Ethics Committee and is being conducted as part of a PhD. Thank you in advance for your help with this project and please do not hesitate to contact me if you need additional information.

Regards

Katie Cutts

Psychology
Faculty of Development & Society
Sheffield Hallam University
England
e-mail: {address}
Tel: {number}

A.17 Information and Consent Pages

A.17.1 Information and Consent for Writing Control Condition

Study Information and Consent Form

Project: Well-Being and Infertility
Researcher: Katie Cutts

You are invited to participate in a research study looking at personal experiences of infertility. Please read the following information carefully and ask any questions you may have before agreeing to be in the study.

Purpose of the Study: Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will investigate these different experiences and how this is related to physical and psychological well-being.

Procedure: The study has a number of stages and requires you to complete various questionnaires and to write about the facts relating to your fertility difficulties and treatment. If you agree to participate in this study you will be asked to complete a series of questionnaires on two separate occasions that ask questions about your personality, psychological well-being, physical symptoms and how you cope with your fertility experiences. It will take you approximately 15-20 minutes to complete the questionnaires. Today, you will be asked to complete the first set of questionnaires and then write about your own personal experience of infertility for a further 15 minutes. You will be asked to write about your experiences again, tomorrow and the day after, each time for 15 minutes. In four weeks time you will be contacted again to complete the second set of questionnaires, again taking approximately 15-20 minutes. You will be contacted by e-mail at each stage to remind you to continue with the study and be provided with a link to take you directly to the study page that you need to complete.

Possible Advantages and Disadvantages of Participation: It is possible that some people may feel uncomfortable or distressed in writing about their personal experiences and answering some of the questions. There is support available for you if you feel distressed or just want to obtain further information. There are a list of names, addresses and phone numbers at the end of this information page showing the relevant support services available to you. You are advised to print this page if you decide to participate in the study and keep this contact information for future reference. The information gained from this study may help us to develop further the information and services provided for people experiencing reproductive difficulties and assisted reproductive intervention treatments.

Anonymity and Confidentiality: Your responses will be kept secure and private, using current Internet security technology. Your anonymity will be preserved; your name will not be associated with your responses or with any of the results of this study. In order to maintain anonymity you will be asked to devise a username and will be assigned a password that you will use to access the website when you return to complete the different stages. Only the researcher will have access to the data; any printouts or disks containing the data will be stored in a locked file. In any report that may be published, no information will be included that will make it possible to identify you individually. All information collected during the course of the study will be kept strictly confidential.

Voluntary Nature of the Study: Participation in the study is entirely voluntary. You may refuse to answer any question asked and may discontinue participation at any time. If you decide to take part you are still free to withdraw at any time without giving a reason. You have the right to withdraw any data up to a week after the data has been submitted.

Ethical Review of The Study: This study is being funded by Sheffield Hallam University and has been subject to ethical review by the Faculty Research Ethics Committee of Sheffield Hallam University to ensure that the study is conducted in an ethically appropriate manner.

Contacts and Questions: You may ask any questions you have now by checking the 'I would like to ask the researcher a question?' box at the bottom of this page. If you have questions later, you may contact Katie Cutts at {e-mail address}

For support or advice:

Infertility Network: Web:http://www.infertilitynetworkuk.com or contact on Tel: 08701 188 088:

Fertility Friends: Web: http://www.fertilityfriends.co.uk

Fertility Connect: Web: http://www.fertilityconnect.com

Statement of Consent: (select one of the options below)

☐ **I consent to participate in the study.** I am at least 18 years of age. I have read the above information and understand what I will be asked to do in this study. If I had questions, I have already asked them and have received answers. If I wanted a copy of the consent form for my records, I already downloaded or printed it from this web page.

☐ **I do not consent to participate in the study.** I have read the above information, but I do not wish to participate. I understand that my decision will not affect my current or future relations with the University. [Click here if you are younger than 18 years old.]

☐ **I would like to ask the researcher a question.** I have read the above information, but I have more questions about the research before I consent to participate in the study. I would like to e-mail the researcher now to get more information.

If you wish to keep a copy of this form for your records, you can do so now by selecting the File ->Print option from the pulldown menu on Netscape or Explorer.

A.17.2 Information and Consent for Non-Writing Control Condition

Study Information and Consent Form

Project: Well-Being and Infertility
Researcher: Katie Cutts

You are invited to participate in a research study looking at personal experiences of infertility. Please read the following information carefully and ask any questions you may have before agreeing to be in the study.

Purpose of the Study: Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will investigate these different experiences and how this is related to physical and psychological well-being.

Procedure: The study requires you to complete questionnaires relating to your well-being and infertility on two separate occasions. If you agree to participate in this study you will be asked to complete the first series of questionnaires that ask questions about your personality, psychological well-being, physical symptoms and how you cope with your fertility experiences today and again in four weeks time. It will take you approximately 15-20 minutes to complete the questionnaires. You will be contacted by e-mail to remind you to complete the second series of questionnaire and be provided with a link to take you directly to the study page that you need to complete.

Possible Advantages and Disadvantages of Participation: It is possible that some people may feel uncomfortable or distressed in answering some of the questions. There is support available for you if you feel distressed or just want to obtain further information. There are a list of names, addresses and phone numbers at the end of this information page showing the relevant support services available to you. You are advised to print this page if you decide to participate in the study and keep this contact information for future reference. The information gained from this study may help us to develop further the information and services provided for people experiencing reproductive difficulties and assisted reproductive intervention treatments.

Anonymity and Confidentiality: Your responses will be kept secure and private, using current Internet security technology. Your anonymity will be preserved; your name will not be associated with your responses or with any of the results of this study. In order to maintain anonymity you will be asked to devise a username and will be assigned a password that you will use to access the website when you return to complete the different stages. Only the researcher will have access to the data; any printouts or disks containing the data will be stored in a locked file. In any report that may be published, no information will be included that will make it possible to identify you individually. All information collected during the course of the study will be kept strictly confidential.

Voluntary Nature of the Study: Participation in the study is entirely voluntary. You may refuse to answer any question asked and may discontinue participation at any time. If you decide to take part you are still free to withdraw at any time without giving a reason. You have the right to withdraw any data up to a week after the data has been submitted.

Ethical Review of the Study: This study is being funded by Sheffield Hallam University and has been subject to ethical review by the Faculty Research Ethics Committee of Sheffield Hallam University to ensure that the study is conducted in an ethically appropriate manner.

Contacts and Questions: You may ask any questions you have now by checking the 'I would like to ask the researcher a question?' box at the bottom of this page. If you have questions later, you may contact Katie Cutts at {e-mail address}

For support or advice:

Infertility Network: Web:http://www.infertilitynetworkuk.com or contact on Tel: 08701 188 088:

Fertility Friends: Web:http://www.fertilityfriends.co.uk

Fertility Connect: Web: http://www.fertilityconnect.com

Statement of Consent: (select one of the options below)

☐ **I consent to participate in the study.** I am at least 18 years of age. I have read the above information and understand what I will be asked to do in this study. If I had questions, I have already asked them and have received answers. If I wanted a copy of the consent form for my records, I already downloaded or printed it from this web page.

☐ **I do not consent to participate in the study.** I have read the above information, but I do not wish to participate. I understand that my decision will not affect my current or future relations with the University. [Click here if you are younger than 18 years old.]

☐ **I would like to ask the researcher a question.** I have read the above information, but I have more questions about the research before I consent to participate in the study. I would like to e-mail the researcher now to get more information.

If you wish to keep a copy of this form for your records, you can do so now by selecting the File ->Print option from the pulldown menu on Netscape or Explorer.

A.17.3 Information and Consent for Disclosure Condition

Study Information and Consent Form

Project: Well-Being and Infertility
Researcher: Katie Cutts

You are invited to participate in a research study looking at personal experiences of infertility. Please read the following information carefully and ask any questions you may have before agreeing to be in the study.

Purpose of the Study: Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will investigate these different experiences and how this is related to physical and psychological well-being.

Procedure: The study has a number of stages and requires you to complete various questionnaires and to write about your feelings and thoughts relating to your fertility difficulties. If you agree to participate in this study you will be asked to complete a series of questionnaires on two separate occasions that ask questions about your personality, psychological well-being, physical symptoms and how you cope with your fertility experiences. It will take you approximately 15-20 minutes to complete the questionnaires. Today, you will be asked to complete the first set of questionnaires and then write about your own personal experience of infertility for a further 15 minutes. You will be asked to write about your experiences again, tomorrow and the day after, each time for 15 minutes. In four weeks time you will be contacted again to complete the second set of questionnaires, again taking approximately 15-20 minutes. You will be contacted by e-mail at each stage to remind you to continue with the study and be provided with a link to take you directly to the study page that you need to complete.

Possible Advantages and Disadvantages of Participation: It is possible that some people may feel uncomfortable or distressed in writing about their personal experiences and answering some of the questions. There is support available for you if you feel distressed or just want to obtain further information. There are a list of names, addresses and phone numbers at the end of this information page showing the relevant support services available to you. You are advised to print this page if you decide to participate in the study and keep this contact information for future reference. The information gained from this study may help us to develop further the information and services provided for people experiencing reproductive difficulties and assisted reproductive intervention treatments.

Anonymity and Confidentiality: Your responses will be kept secure and private, using current Internet security technology. Your anonymity will be preserved; your name will not be associated with your responses or with any of the results of this study. In order to maintain anonymity you will be asked to devise a username and will be assigned a password that you will use to access the website when you return to complete the different stages. Only the researcher will have access to the data; any printouts or disks containing the data will be stored in a locked file. In any report that may be published, no information will be included that will make it possible to identify you individually. All information collected during the course of the study will be kept strictly confidential.

Voluntary Nature of the Study: Participation in the study is entirely voluntary. You may refuse to answer any question asked and may discontinue participation at any time. If you decide to take part you are still free to withdraw at any time without giving a reason. You have the right to withdraw any data up to a week after the data has been submitted.

Ethical Review of the Study: This study is being funded by Sheffield Hallam University and has been subject to ethical review by the Faculty Research Ethics Committee of Sheffield Hallam University to ensure that the study is conducted in an ethically appropriate manner.

Contacts and Questions: You may ask any questions you have now by checking the 'I would like to ask the researcher a question?' box at the bottom of this page. If you have questions later, you may contact Katie Cutts at {e-mail address}

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Fertility Friends: Web:http://www.fertilityfriends.co.uk

Fertility Connect: Web: http://www.fertilityconnect.com

Statement of Consent: (select one of the options below)

☐ **I consent to participate in the study.** I am at least 18 years of age. I have read the above information and understand what I will be asked to do in this study. If I had questions, I have already asked them and have received answers. If I wanted a copy of the consent form for my records, I already downloaded or printed it from this web page.

☐ **I do not consent to participate in the study.** I have read the above information, but I do not wish to participate. I understand that my decision will not affect my current or future relations with the University. [Click here if you are younger than 18 years old.]

☐ **I would like to ask the researcher a question.** I have read the above information, but I have more questions about the research before I consent to participate in the study. I would like to e-mail the researcher now to get more information.

If you wish to keep a copy of this form for your records, you can do so now by selecting the File ->Print option from the pulldown menu on Netscape or Explorer.

A.17.4 Information and Consent for Expectancy Condition

Study Information and Consent Form

Project: Well-Being and Infertility
Researcher: Katie Cutts

You are invited to participate in a research study looking at personal experiences of infertility. Please read the following information carefully and ask any questions you may have before agreeing to be in the study.

Purpose of the Study: Health care professionals appreciate how stressful it can be for people who are experiencing difficulties in having a child. The experience of infertility can differ from person to person. For some, pregnancy is eventually achieved naturally but for others these difficulties can only be resolved through assisted conception. This study will investigate the stressful nature of infertility and how writing about the feelings and emotions associated with infertility can help people to better cope with their experience. This research will expand on previous research that has found writing to be effective in improving the way people feel.

Procedure: The study has a number of stages and requires you to complete various questionnaires and to write about your feelings and thoughts relating to your fertility difficulties. If you agree to participate in this study you will be asked to complete a series of questionnaires on two separate occasions that ask questions about your personality, psychological well-being, physical symptoms and how you cope with your fertility experiences. It will take you approximately 15-20 minutes to complete the questionnaires. Today, you will be asked to complete the first set of questionnaires and then write about your own personal experience of infertility for a further 15 minutes. You will be asked to write about your experiences again, tomorrow and the day after, each time for 15 minutes. In four weeks time you will be contacted again to complete the second set of questionnaires, again taking approximately 15-20 minutes. You will be contacted by e-mail at each stage to remind you to continue with the study and be provided with a link to take you directly to the study page that you need to complete.

Possible Advantages and Disadvantages of Participation: It is possible that some people may feel uncomfortable or distressed in writing about their personal experiences and answering some of the questions. There is support available for you if you feel distressed or just want to obtain further information. There are a list of names, addresses and phone numbers at the end of this information page showing the relevant support services available to you. You are advised to print this page if you decide to participate in the study and keep this contact information for future reference. The information gained from this study may help us to develop further the information and services provided for people experiencing reproductive difficulties and assisted reproductive intervention treatments.

Anonymity and Confidentiality: Your responses will be kept secure and private, using current Internet security technology. Your anonymity will be preserved; your name will not be associated with your responses or with any of the results of this study. In order to maintain anonymity you will be asked to devise a username and will be assigned a password that you will use to access the website when you return to complete the different stages. Only the researcher will have access to the data; any printouts or disks containing the data will be stored in a locked file. In any report that may be published, no information will be included that will make it possible to identify you individually. All information collected during the course of the study will be kept strictly confidential.

Voluntary Nature of the Study: Participation in the study is entirely voluntary. You may refuse to answer any question asked and may discontinue participation at any time. If you decide to take part you are still free to withdraw at any time without giving a reason. You have the right to withdraw any data up to a week after the data has been submitted.

Ethical Review of the Study: This study is being funded by Sheffield Hallam University and has been subject to ethical review by the Faculty Research Ethics Committee of Sheffield Hallam University to ensure that the study is conducted in an ethically appropriate manner.

Contacts and Questions: You may ask any questions you have now by checking the 'I would like to ask the researcher a question?' box at the bottom of this page. If you have questions later, you may contact Katie Cutts at {e-mail address}

For support or advice:

Infertility Network: Web:http://www.infertilitynetworkuk.com or contact on Tel: 08701 188 088:

Fertility Friends: Web:http://www.fertilityfriends.co.uk

Fertility Connect: Web: http://www.fertilityconnect.com

Statement of Consent: (select one of the options below)

☐ **I consent to participate in the study.** I am at least 18 years of age. I have read the above information and understand what I will be asked to do in this study. If I had questions, I have already asked them and have received answers. If I wanted a copy of the consent form for my records, I already downloaded or printed it from this web page.

☐ **I do not consent to participate in the study.** I have read the above information, but I do not wish to participate. I understand that my decision will not affect my current or future relations with the University. [Click here if you are younger than 18 years old.]

☐ **I would like to ask the researcher a question.** I have read the above information, but I have more questions about the research before I consent to participate in the study. I would like to e-mail the researcher now to get more information.

If you wish to keep a copy of this form for your records, you can do so now by selecting the File ->Print option from the pulldown menu on Netscape or Explorer.

A.18 Debrief Information

Study Debriefing

Thank you for your participation in this study we very much appreciate that you have taken the time to return to complete the series of questionnaires and writing tasks. I would like to take this opportunity to provide you with some information about the study and what we hope to find.

In order to make comparisons participants were assigned to complete different tasks. Some participants were asked to write about their feelings towards their difficulties trying to conceive, in addition to completing questionnaires; others were asked to write about their daily activities and others were asked only to complete the series of questionnaires.

It is widely understood that infertility can be a stressful experience and that couples have to deal not only with the psychological demands associated with fertility investigations and treatment procedures but also with the broader situation in which they find themselves – that is, the inability to conceive, or cause conception.

Previous research has shown that writing about thoughts and feelings relating to distressing events can help alleviate the distress associated with the event and improve the general-well being of the individual. It is hoped that a writing intervention can also be effective for alleviating distress for individuals experiencing fertility problems. This study has sought to investigate this and it is hoped that participants who wrote about their experiences showed some improvement in the way they felt. If this type of writing intervention proves to be effective it could be a useful tool through which individuals can express their feelings in a way that is free from social constraints and is time effective.

These results will help to inform future research into the development of interventions that can help alleviate the distress associated with infertility and its associated medical interventions. Thank you again for participating in this study. If you have any questions about the study please do not hesitate to contact me at {e-mail address}

Thanks Again

Katie Cutts

A.19 SPSS Output for Hierarchical Regression Analysis – LIWC Variables as Predictors

A.19.1 Physical Symptoms (PSI)

Descriptive Statistics

	Mean	Std. Deviation	N
Physical Symptom Inventory Time Point 2	6.4286	3.36759	14
Positive Symptom Inventory Time Point 1	6.6429	3.02826	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Positive Symptom Inventory Time Point 1[a]	.	Enter
2	Cogmec Change, Negem Change, Posem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Physical Symptom Inventory Time Point 2

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.740[a]	.548	.510	2.35642	.548	14.551	1	12	.002
2	.803[b]	.645	.488	2.41043	.097	.823	3	9	.514

a. Predictors: (Constant), Positive Symptom Inventory Time Point 1

b. Predictors: (Constant), Positive Symptom Inventory Time Point 1, CogmecChange, NegemChange, PosemChange

c. Dependent Variable: Physical Symptom Inventory Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	80.796	1	80.796	14.551	.002[a]
	Residual	66.633	12	5.553		
	Total	147.429	13			
2	Regression	95.137	4	23.784	4.094	.037[b]
	Residual	52.291	9	5.810		
	Total	147.429	13			

a. Predictors: (Constant), Positive Symptom Inventory Time Point 1

b. Predictors: (Constant), Positive Symptom Inventory Time Point 1, CogmecChange, NegemChange, PosemChange

c. Dependent Variable: Physical Symptom Inventory Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.960	1.566		.613	.551
	Positive Symptom Inventory Time Point 1	.823	.216	.740	3.815	.002
2	(Constant)	1.311	1.814		.723	.488
	Positive Symptom Inventory Time Point 1	.766	.231	.689	3.322	.009
	NegemChange	.048	.433	.023	.112	.914
	PosemChange	-.959	.753	-.275	-1.273	.235
	CogmecChange	.153	.358	.090	.427	.679

a. Dependent Variable: Physical Symptom Inventory Time Point 2

A.19.2 Intrusion (IES)

Descriptive Statistics

	Mean	Std. Deviation	N
Intrusion Time Point 2	26.5714	5.70714	14
Intrusion Time Point 1	25.6429	6.82312	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Intrusion Time Point 1[a]	.	Enter
2	Negem Change, Posem Change, Cogmec Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Intrusion Time Point 2

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.306[a]	.094	.018	5.65542	.094	1.239	1	12	.287
2	.452[b]	.204	-.150	6.11917	.111	.417	3	9	.745

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, NegemChange, PosemChange, CogmecChange

c. Dependent Variable: Intrusion Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39.624	1	39.624	1.239	.287[a]
	Residual	383.805	12	31.984		
	Total	423.429	13			
2	Regression	86.430	4	21.608	.577	.687[b]
	Residual	336.998	9	37.444		
	Total	423.429	13			

a. Predictors: (Constant), Intrusion Time Point 1

b. Predictors: (Constant), Intrusion Time Point 1, NegemChange, PosemChange, CogmecChange

c. Dependent Variable: Intrusion Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.010	6.086		3.288	.006
	Intrusion Time Point 1	.256	.230	.306	1.113	.287
2	(Constant)	25.152	9.422		2.670	.026
	Intrusion Time Point 1	.104	.332	.125	.314	.761
	NegemChange	-.739	1.076	-.206	-.687	.509
	PosemChange	.035	2.087	.006	.017	.987
	CogmecChange	-.923	1.029	-.322	-.897	.393

a. Dependent Variable: Intrusion Time Point 2

A.19.3 Avoidance (IES)

Descriptive Statistics

	Mean	Std. Deviation	N
Avoidance Time Point 2	19.0000	8.15239	14
Avoidance Time Point 1	19.5714	5.03395	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Avoidance Time Point 1[a]	.	Enter
2	Cogmec Change, Negem Change, Posem Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Avoidance Time Point 2

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.437[a]	.191	.123	7.63327	.191	2.828	1	12	.118
2	.594[b]	.353	.066	7.87998	.162	.753	3	9	.548

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmecChange, NegemChange, PosemChange

c. Dependent Variable: Avoidance Time Point 2

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	164.797	1	164.797	2.828	.118[a]
	Residual	699.203	12	58.267		
	Total	864.000	13			
2	Regression	305.153	4	76.288	1.229	.364[b]
	Residual	558.847	9	62.094		
	Total	864.000	13			

a. Predictors: (Constant), Avoidance Time Point 1

b. Predictors: (Constant), Avoidance Time Point 1, CogmecChange, NegemChange, PosemChange

c. Dependent Variable: Avoidance Time Point 2

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.157	8.480		.608	.554
	Avoidance Time Point 1	.707	.421	.437	1.682	.118
2	(Constant)	4.917	9.081		.542	.601
	Avoidance Time Point 1	.838	.451	.518	1.856	.096
	NegemChange	1.830	1.393	.358	1.314	.221
	PosemChange	-1.948	2.508	-.231	-.777	.457
	CogmecChange	-.736	1.170	-.180	-.630	.545

a. Dependent Variable: Avoidance Time Point 2

A.19.4 Fertility Problem Stress (FPI)

Descriptive Statistics

	Mean	Std. Deviation	N
Fertility Global Stress Time Point 2 (FPI)	133.1429	32.21767	14
Fertility Global Stress (FPI) Time Point 1	134.9286	36.29678	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Fertility Global Stress (FPI) Time Point 1[a]	.	Enter
2	Negem Change, Posem Change, Cogmec Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Fertility Global Stress Time Point 2 (FPI)

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.904[a]	.817	.802	14.34407	.817	53.582	1	12	.000
2	.922[b]	.850	.783	15.01066	.033	.653	3	9	.601

a. Predictors: (Constant), Fertility Global Stress (FPI) Time Point 1

b. Predictors: (Constant), Fertility Global Stress (FPI) Time Point 1, Negem Change, Posem Change, Cogmec Change

c. Dependent Variable: Fertility Global Stress Time Point 2 (FPI)

ANOVA [c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11024.686	1	11024.686	53.582	.000[a]
	Residual	2469.028	12	205.752		
	Total	13493.714	13			
2	Regression	11465.836	4	2866.459	12.722	.001[b]
	Residual	2027.878	9	225.320		
	Total	13493.714	13			

a. Predictors: (Constant), Fertility Global Stress (FPI) Time Point 1

b. Predictors: (Constant), Fertility Global Stress (FPI) Time Point 1, Negem Change, Posem Change, Cogmec Change

c. Dependent Variable: Fertility Global Stress Time Point 2 (FPI)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24.888	15.278		1.629	.129
	Fertility Global Stress (FPI) Time Point 1	.802	.110	.904	7.320	.000
2	(Constant)	32.667	17.406		1.877	.093
	Fertility Global Stress (FPI) Time Point 1	.738	.132	.831	5.598	.000
	NegemChange	.015	2.674	.001	.006	.996
	PosemChange	-5.160	4.653	-.155	-1.109	.296
	CogmecChange	1.240	2.447	.077	.507	.624

a. Dependent Variable: Fertility Global Stress Time Point 2 (FPI)

A.19.5 Depression ($DASS_{21}$)

Descriptive Statistics

	Mean	Std. Deviation	N
Depression Time Point 2 (DASS)	18.2857	13.14668	14
Depression Time Point 1 (DASS)	17.1429	12.76327	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Depression Time Point 1 (DASS)[a]	.	Enter
2	Posem Change, Negem Change, Cogmec Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Depression Time Point 2 (DASS)

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.893[a]	.797	.780	6.16456	.797	47.125	1	12	.000
2	.947[b]	.896	.850	5.08717	.099	2.874	3	9	.096

a. Predictors: (Constant), Depression Time Point 1 (DASS)

b. Predictors: (Constant), Depression Time Point 1 (DASS), PosemChange, NegemChange, CogmecChange

c. Dependent Variable: Depression Time Point 2 (DASS)

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1790.836	1	1790.836	47.125	.000[a]
	Residual	456.022	12	38.002		
	Total	2246.857	13			
2	Regression	2013.943	4	503.486	19.455	.000[b]
	Residual	232.914	9	25.879		
	Total	2246.857	13			

a. Predictors: (Constant), Depression Time Point 1 (DASS)

b. Predictors: (Constant), Depression Time Point 1 (DASS), PosemChange, NegemChange, CogmecChange

c. Dependent Variable: Depression Time Point 2 (DASS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.521	2.826		.892	.390
	Depression Time Point 1 (DASS)	.920	.134	.893	6.865	.000
2	(Constant)	6.046	2.993		2.020	.074
	Depression Time Point 1 (DASS)	.801	.120	.778	6.677	.000
	NegemChange	-2.166	.946	-.262	-2.290	.048
	PosemChange	-2.250	1.565	-.165	-1.437	.184
	CogmecChange	-1.087	.773	-.165	-1.405	.194

a. Dependent Variable: Depression Time Point 2 (DASS)

A.19.6 Anxiety ($DASS_{21}$)

Descriptive Statistics

	Mean	Std. Deviation	N
Anxiety Time Point 2 (DASS)	8.7143	10.54243	14
Anxiety Time Point 1 (DASS)	8.7143	6.68441	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Anxiety Time Point 1 (DASS)[a]	.	Enter
2	Posem Change, Negem Change, Cogmec Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Anxiety Time Point 2 (DASS)

Model Summary[c]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.630[a]	.396	.346	8.52434	.396	7.884	1	12	.016
2	.797[b]	.635	.473	7.65392	.239	1.962	3	9	.190

a. Predictors: (Constant), Anxiety Time Point 1 (DASS)

b. Predictors: (Constant), Anxiety Time Point 1 (DASS), PosemChange, NegemChange, CogmecChange

c. Dependent Variable: Anxiety Time Point 2 (DASS)

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	572.885	1	572.885	7.884	.016[a]
	Residual	871.972	12	72.664		
	Total	1444.857	13			
2	Regression	917.614	4	229.404	3.916	.041[b]
	Residual	527.243	9	58.583		
	Total	1444.857	13			

a. Predictors: (Constant), Anxiety Time Point 1 (DASS)

b. Predictors: (Constant), Anxiety Time Point 1 (DASS), PosemChange, NegemChange, CogmecChange

c. Dependent Variable: Anxiety Time Point 2 (DASS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.060	3.833		.016	.988
	Anxiety Time Point 1 (DASS)	.993	.354	.630	2.808	.016
2	(Constant)	1.445	3.832		.377	.715
	Anxiety Time Point 1 (DASS)	1.420	.369	.900	3.847	.004
	NegemChange	-.964	1.392	-.146	-.693	.506
	PosemChange	-1.934	2.355	-.177	-.821	.433
	CogmecChange	-3.029	1.272	-.573	-2.382	.041

a. Dependent Variable: Anxiety Time Point 2 (DASS)

A.19.7 Stress ($DASS_{21}$)

Descriptive Statistics

	Mean	Std. Deviation	N
Stress Time Point 2 (DASS)	21.2857	8.89623	14
Stress Time Point 1 (DASS)	18.7143	10.60064	14
NegemChange	-.3693	1.59299	14
PosemChange	.2157	.96681	14
CogmecChange	1.6643	1.99251	14

Variables Entered/Removed [b]

Model	Variables Entered	Variables Removed	Method
1	Stress Time Point 1 (DASS)[a]	.	Enter
2	Negem Change, Posem Change, Cogmec Change[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Stress Time Point 2 (DASS)

Model Summary [c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.756[a]	.572	.536	6.05833	.572	16.032	1	12	.002
2	.807[b]	.651	.495	6.32044	.079	.675	3	9	.589

a. Predictors: (Constant), Stress Time Point 1 (DASS)

b. Predictors: (Constant), Stress Time Point 1 (DASS), NegemChange, PosemChange, CogmecChange

c. Dependent Variable: Stress Time Point 2 (DASS)

ANOVA [c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	588.417	1	588.417	16.032	.002[a]
	Residual	440.440	12	36.703		
	Total	1028.857	13			
2	Regression	669.325	4	167.331	4.189	.035[b]
	Residual	359.532	9	39.948		
	Total	1028.857	13			

a. Predictors: (Constant), Stress Time Point 1 (DASS)

b. Predictors: (Constant), Stress Time Point 1 (DASS), NegemChange, PosemChange, CogmecChange

c. Dependent Variable: Stress Time Point 2 (DASS)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.409	3.379		2.784	.017
	Stress Time Point 1 (DASS)	.635	.159	.756	4.004	.002
2	(Constant)	10.770	4.652		2.315	.046
	Stress Time Point 1 (DASS)	.621	.179	.740	3.466	.007
	NegemChange	1.387	1.118	.248	1.240	.246
	PosemChange	-1.595	1.946	-.173	-.819	.434
	CogmecChange	-.153	.993	-.034	-.154	.881

a. Dependent Variable: Stress Time Point 2 (DASS)

A.20 Ethics Proforma and Approval Letter

A.20.1 Ethics Proforma

Faculty of Development and Society

Application for Research Ethics Approval Staff and Postgraduate Research Students

Section A

Important Note- If a previously submitted research proposal answers the methodology questions in this section, please include a copy of the proposal and leave those questions blank. You MUST however complete ALL of Section B

1. **Name of principal investigator:** Katie Cutts
   Faculty: Development & Society
   Email address: katie.cutts@shu.ac.uk

2. **Title of research:** A content analysis of message board posts on online forums for individuals experiencing unwanted childlessness: Emotional expression, advice and support.

3. **Supervisor if applicable:** Maddy Arden (Director of Studies)
   Email address: m.arden@shu.ac.uk

   Keith Hurst
   Email address: k.m.hurst@shu.ac.uk

   John Reidy
   Email address: j.g.reidy@shu.ac.uk

4. **ENT number if applicable:** N/A

5. **Other investigators (within or outside SHU)**

Title	Name	Post	Division	Organisation

6. **Proposed Duration of Project:**
   Start date: N/A End Date:
   Data to be collected is archival and will be downloaded once approval is received.

7. **Main purpose of Research:**

- X Educational qualification
- ☐ Publicly funded research
- ☐ Staff research project
- ☐ Other (Please supply details)

8. **Background to the Study and Scientific Rationale** (500 words)

Reproductive problems affect one in seven couples in the United Kingdom (Human Fertilization and Embryology Authority, HFEA, 2006/7). For most people having children is an essential part of adult life which is shaped by social, religious and cultural demands (Seibel, 1997). The negative psychological impact and resultant stress inherent in the treatment of fertility problems is well documented in the research literature (Greil, 1997). The social stigma associated with infertility means that this group of individuals often experience feelings of isolation (Andrews, Abbey & Halman, 1991) and whilst social relationships can be supportive for individuals experiencing fertility problems they can simultaneously be a source of stress (Wilson & Kopitzke, 2002).

Research has shown that a considerable proportion of individuals are making use of the internet to seek emotional support for their fertility problems (Haagen et al., 2003). The growth of internet resources over the last decade has provided a domain through which individuals who are experiencing fertility problems can access information about diagnosis and treatment, receive support and share their stories (Epstein et al., 2002). In a study by Haagen et al. (2003) of patients attending a fertility clinic 72 couples of 134 couples questioned reported using the internet for fertility-related problems. Seventy-two percent of couples reported using the internet to gain information in order to understand their fertility problem better, whilst 41% used the internet to seek emotional support.

Epstein et al. (2002) surveyed users of an internet forum run by an international fertility organisation and found that for some the internet was the only source of outlet they had for talking about their fertility problems. Users reported that they found the internet forum valuable for sharing news about their treatment, receiving support and helpful when feeling depressed. Comparisons were made between internet users who identified themselves as having alternative outlets and those who identified the internet as their only outlet. Epstein et al. (2002) found that users without alternative outlets were significantly more likely to report these benefits than users who had other outlets. Both groups reported that they got a great deal of useful medical information from the forums.

Online groups provide a combination of information and emotional support and so can provide a medium through which individuals can interact with others who share common problems. It is evident from the findings of previous studies that individuals experiencing fertility problems are one such group of people that seek out information and support through this medium (Epstein et al., 2002;

Haagen et al., 2003). Whilst a few studies have utilised questionnaires to gain information on the internet usage of individuals experiencing fertility problems, to date no studies have reported analysing the content of infertility specific forums to examine the reasons for participation.

9. Has the scientific / scholarly basis of this research been approved? (For example by Research Degrees Subcommittee or an external funding body.)

- ☐ Yes
- ☐ No - to be submitted
- ☐ Currently undergoing an approval process
- X Irrelevant (e.g there is no relevant committee governing this work)

10. Main Research Questions

Based on the findings of previous research relating to internet use amongst individuals experiencing fertility problems and the well documented negative psychological sequel of experiencing unwanted childlessness this study will examine the content of messages posted on online infertility forums in order to examine the reasons for posting messages on these forums (i.e. advice regarding treatment, symptoms or emotional support) and to also examine the extent to which messages on a infertility forum reflect the psychosocial challenges that this group of individuals face. The present study is also interested in examining the expression of emotions through this medium with the objective of implementing an emotional expression intervention in this group of internet users.

11. Summary of Methods including Proposed Data Analyses

Archival data from nine internet forums will be downloaded and analysed. These specific sites have been selected as they are either specifically developed to provide support and advice for individuals experiencing unwanted childlessness or have a sub-forum within a larger site that relates to unwanted childlessness and are UK based.

Due to the dynamic nature of these message boards, data collection will involve downloading archived posts that have been posted within a one week period, though this time period may be extended depending on the available data on these sites.

Content analysis methods will be used to catalogue the range of topics in the threads with particular reference to the expression of emotions, seeking advice and seeking support. The content analysis programme, Linguistic Inquiry and Word Count (LIWC: Pennebaker, Francis & Booth, 2001) will be also be used to analyse individual levels of emotional and cognitive word usage.

Section B

1. **Describe the arrangements for selecting/sampling and briefing potential participants.** (This should include copies of any advertisements for volunteers or letters to individuals/organisations inviting participation.)

Messages posted over a one-week period will be sampled from a nine internet forums specifically devoted to individuals experiencing fertility problems. These forums range in size from one that has just over 650 users and 22 boards to one that has over 33,500 users and 47 boards. All threads that have been started within the selected one-week time period will be included in the analysis along with any posts replying to these threads that are posted beyond this week period up to the day of data collection.

2. **What is the potential for participants or third parties to benefit from the research?**

There are no direct benefits for those participants whose posts are included in the analysis, however, the results of this study will inform the development of an intervention study that has the potential to improve the psychological well-being of individuals who are experiencing unwanted childlessness and who will be recruited from the internet forums from which the data in the present study will be taken.

3. **Describe any possible negative consequences of participation in the research along with the ways in which these consequences will be limited.**

There will be no direct contact with participants in the current study as data collection of archived material is non-reactive and therefore no negative consequences are anticipated.

4. **Describe the arrangements for obtaining participants' consent.** (This should include copies of the information that they will receive & written consent forms where appropriate. If children or vulnerable people are to be participants in the study details of the arrangements for obtaining consent from those acting in *loco parentis* or as advocates should be provided.)

The forums to be observed are all public forums and although registration is required to post messages, all posted messages are accessible by any person with access to the internet. In accordance with the guidelines of the Association of Internet Researchers (http://www.aoir.org/reports/ethics.pdf) it is suggested that "the greater the acknowledged publicity of the venue, the less obligation there may be

to protect individual privacy, confidentiality, right to informed consent etc" (p. 5).

In the present study it is acknowledged that although the internet sites are accessible by the public without the need for registration, infertility is a socially sensitive topic and whilst the messages posted are publicly accessible the content is often sensitive and emotional. Therefore although consent will not be sought for the use of the data, the individual privacy of the posters will be maintained.

5. **Describe how participants will be made aware of their right to withdraw from the research.** (This should also include information about participants' right to withhold information.)

N/A

6. If your data collection requires that you work alone with children or other vulnerable participants have you undergone **Criminal Records Bureau screening**? Please supply details.

N/A

7. **Describe the arrangements for debriefing the participants.** (This should include copies of information that participants will receive where appropriate.)

8. **Describe the arrangements for ensuring participant confidentiality.** (This should include details of how data will be stored to ensure compliance with data protection legislation and how results will be presented.)

Pseudo-names will be treated as real names for the purpose of the study and will be replaced with numbers to aid identification.
To maintain confidentiality and anonymity of the members of groups used in this study any details that may be used to identify members of the group will be removed from the posts prior to storing the data, these include headers, signatures, any citations of names or pseudo-names and any references to the type or name of the group.

No published documents will include specific reference to the location or name of the forums observed. Direct quotations will not be included in any published work in order to maintain anonymity of the individual posters. The data will be stored on a university password protected computer and any paper copies of the data will be stored in a locked filling cabinet in the office of the researcher.

9. **Are there any conflicts of interest in you undertaking this research?** (E.g. Are you undertaking research on work colleagues; or in an organisation where you are a consultant?) Please supply details.

None

10. **What are the expected outcomes, impacts and benefits of the research?**
The results of this study will inform a web-based intervention study that will recruit individuals from these forums. The future study is concerned with exploring the potential benefits of a written emotional disclosure intervention for individuals who are experiencing unwanted childlessness.

11. **Please give details of any plans for dissemination of the results of the research**

The results of the study will be used to inform the development and interpretation of findings from a future intervention study. The findings of the current study will be included as a chapter in a PhD thesis and it is anticipated that the findings will also be submitted for publication to an appropriate peer-reviewed journal.

SECTION C

RISK ASSESSMENT FOR THE RESEARCHER

13. Will the proposed data collection take place on campus?

X☐ Yes (Please answer questions 4 and 6 only)
☐ No (Please complete all questions)

14. Where will the data collection take place?
(Tick as many as apply if data collection will take place in multiple venues)

☐ Own house/flat
☐ School
☐ Residence of participant
☐ Business/Voluntary Organisation
☐ Public Venue (e.g. Youth Club; Church; etc)
X☐ Other (Please specify) Data collection is conducted via the internet

15. How will you travel to and from the data collection venue?

☐ On foot ☐ By car ☐ Public Transport
☐ Other (Please specify) _____

Please outline how you will ensure your personal safety when travelling to and from the data collection venue:

16. How will you ensure your own personal safety whilst at the research venue? **N/A**

17. If you are carrying out research off-campus, you must ensure that each time you go out to collect data you ensure that someone you trust knows where you are going (without breaching the confidentiality of your participants), how you are getting there (preferably including your travel route), when you expect to get back, and what to do should you not return at the specified time. Please outline here the procedure you propose using to do this:

    N/A

18. Are there any potential risks to your health and wellbeing associated with either (a) the venue where the research will take place and/or (b) the research topic itself?

    X☐ None that I am aware of
    ☐☐ Yes (Please outline below)

7. Does this research project require a health and safety risk analysis for the procedures to be used? Yes /**No**

    If YES current status of Health and Safety Risk Assessment.

    I confirm that this research will conform to the principles outlined in the Sheffield Hallam University Research Ethics policy.

    I confirm that this application is accurate to the best of my knowledge.

Principal Investigator's signature	
Date	

Supervisor's signature (if applicable)	
Date	

A.20.2 Letter of Approval

Our Ref AM/HE

Katie Cutts
INTERNAL
45 Broomgrove Rd
Collegiate Campus

Dear Katie,

Request for Ethical Approval of Research Project

Your research project entitled "A content analysis of message board posts on online forums for individuals experiencing unwanted childlessness: Emotional expression, advice and support" has been submitted for ethical review to the Faculty's rapporteurs and I am pleased to confirm that they have approved your project.

However, they have raised the following issues which you should address during the research project:

- Although users of such internet sites are making their concerns public, they may not be fully aware of who will use the information. It is suggested that you post your research intentions on the message boards in question.

- You are reminded to ensure that participant anonymity is very thorough.

I wish you every success with your research project.

Yours sincerely

Professor A Macaskill Chair Faculty Research Ethics Committee

Office address:

Research Support Team
Faculty of Development & Society
Sheffield Hallam University
Unit 1, Sheffield Science Park
Howard Street Sheffield
S12LX
Tel: 0114-2253670
Fax: 0114-2253673
E-mail: h.j.english@shu.ac.uk