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A Longitudinal Exploration of Infants' Social Looks in Naturalistic Settings

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**A LONGITUDINAL EXPLORATION OF INFANTS' SOCIAL
LOOKS IN NATURAL SETTINGS**

Silvia Panella-Peral

A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University
for the degree of Doctor of Philosophy

August 2020

Candidate Declaration

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2. None of the material contained in the thesis has been used in any other submission for an academic award.
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Abstract

Most social referencing studies have examined how infants use non-verbal, affective information from an adult to disambiguate an uncertain object, an event or situation in order to regulate their behaviour (Campos & Stenberg, 1981; Feinman, 1982, 1992) using experimental designs within laboratory settings. Clyman, Emde, Kempe & Harmon, (1986) – responding to these highly contrived social referencing paradigms - conducted a semi-naturalistic study of social referencing and social looks to examine types of social looks functioning as infants' gathering information from the adult. The authors created a typology of 8 types of social looks using a modified version of the 'Stranger Situation' paradigm. Despite Clyman et al.'s attempts to shift social referencing research into qualitative approaches, the study encountered some pragmatic and conceptual difficulties that affected the reliability of the typology.

This thesis is an extension of the work conducted by Clyman et al., (1986) by longitudinally exploring social looks in naturalistic settings at three different developmental time points (Time 1=12-14 months; Time 2=15-17 months; Time 3=24-26 months). Through coding analysis of behavioural observations, a typology of 14 descriptive looking concepts was created, embedded within six different social dimensions. The novel typology was applied to a small cohort of infants at-risk of being autistic (n=2). Quantitative analysis provided additional information related to patterns of social looks amongst infants across time points as well as in comparison with the two infants at-risk.

Results showed that infants used looking as both direct and indirect forms of social participation. Additionally, infants' elicitation of social looks is characterised by being socially mediated by adults and highly influenced by the context, providing the necessary interpersonal information to make meaning of social interactions as well as macro-structural knowledge of norms and expectations of the setting. Distribution of looks showed that the two most prevalent categories across the three-time points corresponded to 'Watching an Adult' and 'Glancing'. These findings differ from those of the Clyman et al., (1986) study, where 'Initiates Bids for Interaction' category – both short and long - represented the most frequent look. This thesis found similar results concerning social referencing looks, as represented one of the least frequent categories. Infants at-risk presented a different pattern of looking as 'Glancing' constituted the most prominent look followed by 'Watching the Adult'.

This thesis constitutes the first longitudinal study that conceptualises infants' social looks within naturalistic settings, contributing to knowledge on attentional processes and how they might influence infants' social development. Additionally, it provides preliminary data of possible differences in social looking in infants at-risk of being autistic.

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Contents

Chapter 1 Introduction	1
1.0 Introduction	1
1.1. Social referencing and social looks.....	2
1.2. Research questions underpinning this research.....	6
(A) Research Inquiry 1:	6
(B) Research Inquiry 2.	7
(C) Research Inquiry 3.	8
Chapter 2 Literature Review	12
2.0. Introduction	12
2.1. Joint attention	14
2.2. The subcomponent of responding to joint attention	15
2.2.1. Orientations	16
2.3. The subcomponent of initiations of joint attention	20
2.4. The ontological nature of social referencing	24
2.5. The uncertainty component in social referencing	24
(a) The 'Visual Cliff' paradigm.....	25
(b) The 'Stranger Situation' paradigm.....	31
(c) The Classic Social Referencing Paradigm	37
2.6. Qualitative studies of infants at-risk	45
2.7. The typology of social looks.....	50
2.7.1. Methodological issues	51
2.8. A description of social referencing looks.....	55
2.9. Conclusion.....	58
Chapter 3 Methodology	60
3.0. Introduction	60
3.1. Paradigms and the constructivist approach	60
3.2. Constructivism as an ontological framework.....	65
3.3. Social partners as mediators of social meanings.....	68
3.4. Contexts as facilitators of meanings	69
3.5. The Epistemological stance	71
3.5.1. Interpretivism.....	71
3.6. Qualitative methods in naturalistic settings.....	73

3.7. Observations as a method for the study of social looks.....	75
3.7.1. The ‘observer effect’	76
3.7.2. The use of video cameras as a tool for collecting data.....	81
3.8. Ethical Considerations	82
3.8.1. Research with children	82
3.8.2. Infants, gatekeepers and negotiating consent	83
3.8.3. Anonymity and Confidentiality	86
3.9. Conclusion.....	87
Chapter 4 Methods	88
4.0. Introduction	88
4.1. The pilot study	90
4.1.1. Conceptual considerations	93
4.1.2. Pragmatic elements.....	97
4.2. The main study	99
4.3. Time 1 Study	100
4.3.1. Data collection	101
4.3.2. Remaining unobtrusive.....	103
4.3.3. Data analysis.....	103
4.3.4. Concepts, goals and definitions.....	105
4.4.1. The use of the software NVivo	108
4.4.2. Stage one: Inductive analysis.....	110
4.4.3. Comparison processes.....	112
4.4.4. Stage two: deduction and concept development.....	114
4.5. Reliability issues leading to qualitative research criteria	116
4.6. Conclusion.....	119
Chapter 5 Category Development	121
5.0. Introduction	121
5.1. The categories of social looks.....	121
5.2. Novel categories of social looks	123
5.2.1. Watching an Adult Perform an Action.....	124
5.2.2. Watching others interact.....	124
5.2.3. Watching the adult.....	125
5.2.4. Responding to joint attention	126
5.2.5. Responding to name	127
5.2.6. Child emotionality	128

5.2.7. Glancing	129
5.2. The pre-existing social looks categories	130
5.3.1. Orienting to a Voice	131
5.3.2. Orient to an action	132
5.3.3. Watching others communicate	133
5.3.4. Pre-Action social referencing.....	134
5.3.5. Post-action social referencing	136
5.3.6. Initiates bids for social interaction (short and long).....	137
5.3.7. Gaze aversion	138
5.3.8. Categorical summary.....	138
5.3. The inter-coder reliability test.....	139
5.4. Conclusion	143
Chapter 6 Time 2 and 3 Studies	144
6.0. Introduction	144
6.1. Time 2 Study.....	144
6.2. Analytical coding and category development.....	145
6.4. Time 3 Study.....	153
6.5. Conclusion.....	154
Chapter 7 Quantitative Data Analysis	156
7.0. Introduction	156
7.1. Results.....	156
7.2. Similarities and differences in looking patterns between semi- and naturalistic studies	157
7.3. Changes in social looks over time.....	160
7.3.1. Changes in social looking patterns between Time 1 and Time 2	162
7.3.2. Changes in social looking patterns between Time 2 and Time 3	164
7.4. Developmental patterns within dimensions and across stages.....	166
7.4.1. Observational dimension	166
7.4.2. Joint Attentional Dimension	168
7.4.3. Social Referencing Dimension	170
7.5. Conclusion	172
Chapter 8 Infants at-risk	173
8.0. Introduction	173
8.1. Recruitment.....	173

8.2. Data gathering and analysis	174
8.3. Quantitative data analysis.....	176
8.4. Conclusion.....	178
Chapter 9 Discussion	180
9.0. Introduction.....	180
9.1. A novel typology of social looks.....	180
9.1.1. Research Inquiry 1	180
9.1.1.1. Observation of adults' behaviours	182
9.1.1.2. Observations of adults' performing actions.....	184
9.1.1.3. Observations of adults' joint attentional engagements	186
9.1.1.4. Joint attentional processes	188
9.1.1.5. Responses to Name	197
9.1.1.6. Orientations	199
9.1.1.7. Social Referencing	201
9.1.1.8. Emotionality within attentional processes	205
9.1.1.9. Monitoring components of social looking.....	207
9.1.2. Research Inquiry 2.....	208
9.1.2.1 Intra-associations of social looking within timelines.....	210
(a) Intra-associations of looks at Time 1 (12-14 months).....	210
(b) Intra-associations of looks Time 2 (15-17 months).....	213
9.1.2.2. Dimensional associations across timelines.....	218
(a) Observational dimension.....	218
(b) Joint attentional dimension.....	220
(c) Orienting, affective and monitoring dimensions.....	221
(d) Social referencing dimension	222
9.1.3. Research inquiry 3.....	223
9.2. Original contribution to knowledge.....	228
9.3. Limitations of this research	231
9.4. Implications for further research	234
9.5. Conclusion.....	236
Chapter 10 Conclusion	237
10.0. Introduction.....	237
10.1. Study conclusions.....	238
Appendices	273
1. Pre-existing Typology of Social Looks	272

2. Consent Form	273
3. Consent Form for Spanish Nurseries	278

List of Figures

3.1. Diagram of the Inquiry Model	64
4.1. Overview of the qualitative study of social looks	89
4.2. Table with the Additional Social Looks Categories	96
4.3. Extract of the Inductive Coding Analysis in NVivo	112
4.4. Diagram of the Social Dimension of the Social Looks Categories.....	113
5.1. Diagram of the Initial Social Looks Classification	137
7.1. Table with the Total Number of Looks (n=11) across the Three Time	159
7.1. Figure of the Total Number of Looks across the Three Time Points	159
7.2. Table of the Distribution of the Observational Dimension looks Over Time	163
7.2. Figure of the Inter-categorical analysis of the Observational Dimension looks.....	165
7.3. Table of the Distribution of Joint Attentional Dimension looks Overtime	167
7.3. Figure of the Inter-Dimensional Analysis of Joint Attentional Looks	167
7.4. Distribution of Social Referencing Looks Overtime	169
7.5. Measures of Glancing Looks	170
8.1. Measures of Looks for the At-Risk group Compared to Typically Developing Cohort	175

Chapter 1

Introduction

1.0 Introduction

This thesis reports a longitudinal, observational study of infants' social looks within naturalistic settings, based on the premise that infants' social and cognitive development is a process involving social interactions occurring in natural environments (Bodrova & Leon, 2007; Hedegaard & Fleeer, 2008; Hoff, 2006; Rogoff, 1990, 2003; Wang, 2018). This research aims to create an in-depth typology of social looks that permits the evaluation of how infants learn from and about their social realities. The qualitative nature of the study is the driving force for this research, allowing the exploration of social looks as they unfold naturally; the longitudinal component permits the observation as well as the assessment of looking behaviours across time, facilitating the identification of possible changes in infants' looking patterns.

This thesis serves as an extension of the work conducted by Clyman, Emde, Kempe & Harmon (1986) on social referencing and social looks, and as a response to the issues raised in their study about methodological approaches to examining social referencing. The authors' position to move referential looking studies out of laboratory settings and into naturalistic environments was one of the aims of their research. The research position undertaken in this thesis shares the same epistemological views advocated by Clyman et al., (1986), based on the belief that infants' development and specifically, social looking behaviours, requires to be investigated naturally. This research takes a psychological constructivist approach (Richardson, 2003) to study social looks, treating infants' use of looking behaviours as an actively constructed process, mediated by interactions with others within social environments.

1.1. Social referencing and social looks

Social referencing is a process whereby infants, during situations or events of uncertainty, look at the adult's face to disambiguate that situation and to regulate their behaviour (Campos, 1983; Dickstein et al., 1984; Feinman, 1992; Hornick & Gunnar, 1988; Sorce, Emde, Campos & Klinnert, 1985). Research in this area has contributed to understanding elements of infants' social and emotional development by examining the process of gathering information from others (Hornick & Gunnar, 1988; Schieler, Koenig & Buttellmann, 2018), the use of others' affective messages to appraise situations, events or objects and infants' regulatory behaviours (Klinnert, Emde, Butterfield & Campos, 1983; Sorce, Emde, Campos & Klinnert, 1985; Walden & Baxter, 1985; Zabatany & Lamb, 1985).

Social referencing has been studied almost entirely within laboratory settings, using controlled procedures presented sequentially: (1) infants are exposed to an ambiguous toy or person to elicit referential looks to the adult (Stenberg & Hagekull, 2007; Walden & Baxter, 1989; Walden & Ogan, 1988), (2) the adult is instructed to display a specific emotional expression of happy/fearful (Dickstein et al., 1984; Feinman & Lewis, 1983; Gunnar & Stone, 1984) and (3) infants, following the adult's affective message, regulate their behaviour accordingly (Carver & Vaccaro, 2007; Hornik, Risenhoover & Gunnar, 1987; Stenberg & Hagekull, 2007; Walden & Ogan, 1988). During trials, the sequential components are singularly elicited as isolated variables; thus, infants' affective appraisals are conducted in a mono-processing form, i.e. decoding one piece of information at the time. This tightly controlled sequence allows the establishment of information exchanges between the adult and the infant, based on a 'means- to- an- end' process of gathering and providing information, and not as a socially mediated act, where shared meanings and experiences become embedded within dynamic, contextual settings.

Two isolated studies (Clyman et al., 1986; Hornick & Gunnar, 1988) have attempted to examine social referencing away from the artificiality and highly contrived conditions of laboratory environments. Hornick & Gunnar (1988)

conducted a semi-naturalistic study exploring differences in infants' regulatory behaviours by measuring - amongst other variables - different types of referencing looks. The study mirrored some components of social referencing studies' designs and procedures by manipulating the introduction of a toy and restricting mothers' affective and communicative responses in order to measure infants' regulatory behaviours.

Clyman et al., (1986) pointed out a lack of examination of referential looks within natural environments and the need for research approaches to examine enquiries in such settings, away from highly controlled experiments. This notion was subsequently highlighted by Feinman (1992:403), citing:

A related need is for studies in which referencing can be observed without experimental manipulation of messages or other conditions. We have not, as of yet, observed the nature of social referencing which transpires when infants and their caregivers are left in their own devices.

Clyman et al., (1986) conducted a semi-naturalistic study to conceptualise social referencing within a broader theoretical framework through the creation of a typology of looks that provided a more defined differentiation between social referencing looks and other types of looking behaviours. Methodologically, the study intended to serve as a bridge between empirical studies and qualitative approaches such as home settings, where variables are less contrived.

In their study, a social look was defined as 'infants' looks to an adult's face' (p.79), sharing conceptual similarities with referential looks propositions (both require the infant to look at the adults' face to gather (affective) information) but differ in the requirement for uncertainty, as for referential looks. The study provided eight different categories of social looks, including two pertinent to the dimension of social referencing. Despite the authors' intentions to push social referencing research into a more qualitative arena, the study faced some reliability difficulties, i.e., a less-contrived experimental design produced instances of 'mild uncertainty' (p.82), which affected conceptual definitions of social referencing looks. Additionally, difficulties reliably defining some social

looks resulted in the creation of propositions based on single looking functions, despite data analysis showing examples of multi-functional looking behaviours occurrences (A more in-depth explanation of the conceptual rationale as well as the methodological difficulties of the study are detailed in chapter 2).

Besides the methodological and reliability difficulties, these two studies constituted first attempts to examine social referencing and social looks away from the artificiality of laboratory settings and into environments with less variable control. The outcomes of both research studies provided distinct conceptual classifications of referential and social looks within (broader¹) parameters of information gathering functions.

Furthermore, subsequent social looks studies have focused on the exploration of looking behaviours within the social domain of humour (Mireault et al., 2014), the transition from crawling to walking (Clearfield, Osborne & Mullet, 2008) and with 3-year-olds (Martin, Crnic & Belsky, 2003). However, there are no studies that have examined infants' use of looking behaviours longitudinally.

How infants' use social looks in socially mediated interactions that are embedded in naturalistic contexts, is still not clear. It is plausible that contexts and social partners provide the necessary social information for infants to understand situations and interactions. Non-contrived contexts – unlike laboratory settings - function as facilitators of aspects such as norms and rules (Emde, 2009; Hedegaards & Fleeer, 2008) that allow infants to appraise situations and take action within dynamic contexts (Tamis-Lemonda et al., 2017), contributing to infants' understanding of social realities. How differential types of social looks influence this mediated, social process in naturalistic settings is yet to be investigated. Moreover, how looking patterns change over time, influencing social development and contributing to the understanding of individual differences in attentional processes, is yet to be explored.

In order to address these gaps, this thesis explores social looks at the intersection between the infant and the adult within natural contexts and

¹ In the case of Clyman et al., (1986) study

across three different time points (T1= 12-14 months; T2= 15-17 months and T3= 24-26 months). I choose a qualitative approach to provide an alternative ontological framework to social looking research, emphasising real-life situations and interactions away from 'classic' paradigms studies of social referencing. In this thesis, infants' looking acts are explored within natural engagements embedded in social contexts of early years practices, providing dense, rich data not otherwise available in laboratory settings. As Hedegaard & Flear (2008) noted: 'how a child participates in these different institutional practices, and what he or she learns from these experiences can lead to developmental changes in a child' (p.15). Additionally, the exploration of looking patterns across timelines provides additional, quantitative information pertinent to possible changes in infants looking and permits the evaluation of how social looks inform social and emotional development in infancy.

This thesis also aims to compare types and patterns of social looks with infants at-risk of being autistic, by virtue of having an older sibling already identified as autistic. Examining the onset of the autism phenotype permits the exploration and understanding of differences in social processes between infants at-risk, later identified as autistic, and typically developing and at-risk infants who do not develop the condition. Few studies have examined social referencing in autistic children. Findings show a tendency to orient more to objects than faces (Dawson, Meltzoff, Osterling, Rinaldi & Brown, 2004; Maestro et al., 1999; Osterling & Dawson, 1994; Zwaigenbaum et al., 2005), longer latency times to disengage from a stimulus (Landry & Bryson, 2004), differences in face processing patterns (Klin & Jones, 2008; Speer et al., 2007), and differential responses to affective cues (Yirmaya, Sigman, Kasari & Mundy, 1992).

Infants at-risk research, aiming to identify possible differences in social-behavioural markers, has been limited and has not yet provided clear evidence of qualitative differences in social-behavioural development and presentation. For instance, infants at-risk showed no differences in the development of gaze following behaviours compared to low-risk infants but displayed marginal differences in attentional engagement, i.e., the amount of attention time allocated to objects (Bedford et al., 2012).

Additionally, 6-month-old infants at-risk showed no differences in responding to their names being called, but by 12 months, 80% of infants at-risk failed to respond to their names, demonstrating a lack of developmental homogeneity of infants at-risk to not to respond to adults' name-calling (Miller et al., 2017). Finally, a study of social referencing in infants at-risk demonstrated slower rates of information-seeking behaviours compared to typically developing infants (Cornew et al., 2017). These studies have provided with useful information about social behaviours that are related to attentional processes responsible for the development of joint attention (Mundy, 2016). Still, they used experimental methods to measure specific, isolated behaviours. According to Mundy (2016), the lack of advancement in the field of infants at-risk research emerges from the lack of test-re-test reliability measures and standardised psychometric test that provide 'identification of group-level but not individual-level risk' (p.60).

This research, therefore, is the first to provide a broader and non-contrived conceptualisation of attentional processes in infants at-risk of being autistic, providing preliminary data of possible differences in social looks for this specific population.

1.2. Research questions underpinning this research

In this thesis, I ask the questions:

1. What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?
2. What patterns of social looking behaviours do infants display across three different time points?
3. Are there any differences in social looks between typically developing infants and infants at-risk of being autistic?

(A) Research Inquiry 1:

What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?

This question was designed to identify and descriptively conceptualise types of social looks within the context of early years settings. The aim of this enquiry is theoretical as much as epistemological. The focus remains on broader conceptualisations of social looks (not exclusively social referencing), including social interactions² within specific social contexts. It follows a qualitative methodology approach using behavioural observations as procedures for data gathering and analysis.

As Hedegaard & Fleeer (2008:4) noted:

childhood research should be explicitly anchored in historical settings. We argue that we must also have a methodology that will allow both theory and research about child development to be generated. Such a methodology should be anchored in a concrete historical setting and at the same time contribute towards and understanding of the 'general conditions that support child development.

The little evidence gathered on classifications of social looks permitted the formulation of the leading research question into studying social looks.

(B) Research Inquiry 2.

What patterns of social looking behaviours do infants display across different developmental timelines?

This question was formulated in order to examine aspects of nominal data quantitatively. Measures pertinent to patterns, frequency and prevalence of social looking were analysed from the qualitative coding analysis and applied within quantitative visual methods, in the form of numerical graphs. This objective aimed to assess possible longitudinal commonalities and differences in social looks patterns, used by infants across developmental timelines that informed how social looking behaviours influence and help infants construct social knowledge. The study conducted by Clyman et al., (1986) showed that

² Social interactions are conceptualised in this thesis as any type of socially mediated dyadic and triadic engagements that does not (solely) rely on information transferring processes (much like social referencing paradigms), this is causal exchanges between infants seeking information and adults displaying (emotional) cues.

the most prevalent look was attributed to those functioning as initiations of social interactions; Subsequent studies corroborate the same findings (Clearfield, Osborne & Mullen, 2008; Mireault et al., 2014). This question was formulated in a way that allowed for a detailed comparison of findings between semi-naturalistic and natural designs to see if there are any discrepancies in the way looking behaviours emerged when methodologies were approached and studied differently.

(C) Research Inquiry 3.

Are there any differences in social looks between typically developing infants and infants at-risk of being autistic?

This final question was designed to explore and compare patterns and types of social looking amongst two different cohorts: typically developing infants and those at risk of being autistic. This enquiry intended to serve as an exploratory endeavour to examine whether infants at-risk of being autistic, by virtue of having an autistic sibling, displayed similar or different types and patterns of social looks in comparison with typically developing infants.

As mentioned previously, the at-risk studies show no apparent differences with the onset of social processes within the group that later received a positive autism identification (Bedford et al., 2012; Elsabagg et al., 2012). In contrast, existing literature on autistic children does show established differences in social-attentional behaviours, more specifically, a reduction of orienting behaviours to social stimuli (Dawson et al., 2004; Elsabbagh et al., 2009; Zwaigenbaum et al., 2005), fewer and slower latency of referential looks (Bacon et al., 1998; Cornew et al., 2007; Brim, Townsend, DeQuinzio & Poulson, 2009) as well as differences in components of joint attention (including the use of eye-contact³), such as gaze shifting (Mundy, 2016; 2018; Mundy, Sigman & Kasari, 1994). These studies have been conducted in

³ The Early Social-Communication Scale Manual (Mundy et al., 2003, 2013) includes measures of eye-contact as a social component within the dimensions of Joint Attention Behaviours, specifically Initiating Joint Attention (IJA), Social Interaction Behaviours within the social dimension of Responding to Social Interaction (RSI) and Behavioural Requests pertinent to Initiating Behavioural Requests (IBR).

laboratory settings to measure children's behavioural reaction to socially manipulated stimuli.

This question was formulated to examine naturally occurring social looking in infants at-risk. The aim was to provide preliminary nominal data of attentional processes that, compared to typically developing infants, contribute to the understanding of how infants use social looks to make meaning of their social realities.

1.3. Structure of this thesis

A summary of the key points included in the different chapters are presented here: chapter 2 contextualises this study concerning two main paradigms: joint attention and social referencing. The chapter provides a detailed review of the different components of the social referencing model as well as the different paradigms used to examine the association between referential looks and behaviour regulation as well as details joint attention. This chapter discusses how empirical research methods have provided knowledge of social-emotional components in laboratory settings. It provides an argument also for the importance of examining social looks within naturalistic settings, where essential features of the phenomenon can be identified and conceptualised.

This study's theoretical position leads to chapter 3, where descriptions of the methodology applied in this study and the research decisions underpinning this thesis are presented. More specifically, the chapter describes the paradigmatic hierarchy stated by Morgan (2007), positions this thesis epistemologically, as well as explains the methods used to conceptualise looking behaviours. This chapter describes the use of observations as a valid method within qualitative approaches as well as the use of video recordings as a field-based method of data collection. To conclude this chapter, explanations of ethical considerations and reflections when conducting qualitative research are outlined.

Naturalistic approaches are not exempted of methodological difficulties, which are identified and explained in chapter 4; the chapter begins with a detailed explanation of the pilot study conducted prior to undertaking the Time 1 research project. The pilot study represented a valuable exploratory tool to

gain conceptual and practical knowledge prior to embarking in this thesis' longitudinal research as well as providing scope for considerations and reflections that were utilised prior and whilst conducting the primary study.

Chapter 5 describes the procedures undertaken to develop the different operationalised social looks concepts. Specifically, it explains the different analytical stages undertaken to create the typology of social looks and the use of a qualitative analysis software package, NVivo, to store and organise observational data into concept categories. Most pertinently, this chapter explains how the analytical process resolved some of the reliability issues encountered in the previous study by Clyman et al., (1986) by emphasising components of research criteria to acquire the different conceptual definitions of social looks. This chapter delineates the main research enquiry by reporting the conceptual framework of each of the 13 categories that emanated from the coding analysis. The chapter ends with the description of the reliability test conducted to gain knowledge of the percentage of agreement reached amongst observers of the different categories of social looks. The analytical stance culminates with the development of the typology of social looks, which is described in more depth in chapter 6.

Chapter 6 illustrates the subsequent studies conducted at Time 2 and Time 3, providing longitudinal status to this research methodology. The chapter begins with explanations of the ethical steps undertaken to gain consent and the analytical additions and considerations emanated from the data. The chapter ends with the detailed description of the second inter-coders examination and the disparity in agreement found between the initial and the final test.

Chapter 7 provides quantitative information related to patterns of looking behaviours amongst participants and across timelines. The chapter highlights the individual differences in social looks and extrapolates key findings of how infants used social looks across the different developmental ages.

Chapter 8 focuses on the two participants at-risk recruited to provide knowledge of how social looking patterns might be different in infants at-risk, by virtue of having an autistic sibling. The chapter recounts the recruitment

difficulties encountered during the research project and provides information on findings for these two at-risk participants.

Chapter 9 provides a critical discussion of this research's findings linked to the three lines of enquiry aimed for this thesis. The chapter reflects on how the naturalistic nature of this research used to explore social looks, has permitted the creation of an in-depth typology of social looks. Conceptually, the different definitions show how infants use looking behaviours to learn about others and the social context. Findings demonstrate that infants apply attentional processes for observational purposes and not for joint attentional engagements exclusively. The chapter ends with some significant limitations to the study.

The last chapter, chapter 10, provides the summary and conclusions of this thesis, emphasising future lines of enquiry that might follow from this research project.

Chapter 2

Literature Review

2.0. Introduction

This chapter contextualises the research undertaken for this project. It details the theoretical framework underpinning this study, divided into three sections: (1) joint attention, characterised by a triadic social engagement involving the child, the adult, and an object, (2) social referencing, alluding to the (reactive) process of infants seeking information from the adult when introduced to uncertainty. Explanations of the phenomenon include methodological approaches used as well as the depiction of the different sequential components embedded within each paradigm, and (3) the study of social looks, conceptualised here as infants' attentional experiences that are socially mediated and influenced by the cultural setting. Social looks represent broader attentional components embedded within different social dimensions⁴. In comparison, joint attentional engagements emerge within frameworks of adult-infant social interactions, whereas social referencing processes constitute infants' reactions to (manipulated) situations of uncertainty.

A brief explanation of research undertaken within the population of infants at-risk of being autistic - by virtue of having an autistic sibling - is provided also. More specifically, the first section provides the theoretical framework of social referencing as well as joint attention, its two related subcomponents and associated behaviours. The last section constitutes a review of the Clyman et al., (1986) study of social looks, revising the methodological issues encountered that provided the framework for this research.

The relatively small number of studies presented in the social referencing section of this thesis is due to a lack of consistent investigation examining the phenomenon. Much of the research in the field was conducted primarily during the 80s and 90s, due to scholarly interest in examining infants' social learning

⁴ The social dimensions include – but are not exclusive – to joint attentional and social referencing processes.

- as opposed to infants' perceptual and cognitive processes. This shift in theoretical focus prompted the conduction of a significant volume of research on social referencing (Feinman, 1992) to the extent that it became 'overuse and misuse' (Feinman, 1992:7). As this scholar (1992:7) argued:

By the mid-80s, there was a need to be concerned that some person or another would cry "referencing!" every time an infant looked toward another person.

The body of literature on social referencing was primarily based on empirical studies that examined the different components of the phenomenon, specifically, referential looks, infants' emotional understanding and behaviour regulation. Over the past decade, few studies have been conducted, which have explored referential looks within distinct stages of child development (Clearfield, Osborne & Mullen, 2008; Martin, Crnic, & Belsky 2008; Mireault et al., 2014). Thus, in recent years, a relatively small body of research has been conducted exploring cognitive aspects of the phenomenon, for instance, whether gathering emotional information from the adult is a form of affective social learning (Clément & Duke, 2017) or the selectivity aspect when infants seeking information from an adult (Schieler, Koeling & Buttermann, 2018; Stenberg, 2016). The seeming lack of interest in social referencing might derive from the assumption that referencing is a well-established empirical model, and that the distinct components have been already sufficiently studied and understood, despite the lack of investigation of the phenomenon in naturalistic settings. Prior to contextualising this research, it is necessary to provide an overview of the aim and purpose of this research, serving as a background for understanding the rationale of this thesis and the theoretical framework that led to the emergence of this study.

This thesis is a naturalistic examination of infants' looking behaviours providing a methodological diversion to social referencing research conducted experimentally in laboratory settings (Boccia & Campos, 1983; Mumme, Fernald & Herrera, 1996; Klinnert et al., 1983; Sorce, Emde, Campos & Klinnert, 1985; Zaratany & Lamb, 1983).

The following sections provide the pertinent contextual and theoretical information conceptualising this thesis, related to two social-cognitive components: joint attention and social referencing, forming the definitional basis of the typology of social looks.

2.1. Joint attention

Joint attention is considered a triadic process involving the interconnection between (1) the child, (2) the social partner attending to (3) an object and represents a dimension of social cognition that places the 'joint' within attentional and mental processes (Mundy, 2016), which it is believed to facilitate the development of language and social cognition (Mundy et al., 2007; Mundy & Sigman, 2006; Slaughter & McConnell, 2003; Vaughan Van Hecke et al., 2007). These components require infants' coordination and share of interpersonal experiences whilst simultaneously processing information about a common referent (Mundy, 2016, 2018). According to Mundy (2017), the primary function of joint attention is to 'share experiences with other people' (p.2).

Developmentally, joint attention requires infants to initially learn to coordinate their visual attention on objects and with social partners. Practices with coordinating joint attention with others about an external object facilitate the development of more complex socio-cognitive abilities pertinent to what Mundy (2016:8) refers to as 'social relatedness':

social relatedness is built around shared experiences with others, and the opportunity to repeatedly process information about a common reference, such an event, with other people during episodes of joint attention is essential in sharing experiences.

The developmental trajectory of infants' coordination was examined in a study by Adamson & Bakeman (1984). Using observational methods, the authors identified and conceptualised six different joint engagement stages attention during parent/peer play interactions: (1) unengaged, (2) onlooking, (3) person engagement, (4) object engagement, (5) Passive joint engagement and (6) coordinated joint engagement. This study was the first to show that infants'

social engagements progressively shifted from non-participatory to joint attentional, highlighting not solely the social nature of attention but the mediatic role that adults play also. Additionally, it provided evidence of attentional states other than infants' participatory roles. A subsequent study by Perra & Gattis (2012) - using Adamson & Bakeman's typology - indicated the existence of a critical transitional period at three months of age, responsible for facilitating joint attentional processes. This transition permits infants to shift from 'Unengaged' states into 'Passive Joint Engagements'⁵.

Once infants are able to engage in triadic forms of attention, a fundamental cognitive skill required is the ability to shift attention between the adult and the object (Bruinsma, Kogel & Kogel, 2004; Mundy, 2016). This attention deployment is established through active involvement within two subcomponents of joint attention: (1) 'Responding to Joint Attention' (RJA), which is characterised by displays of gaze following as well as pointing gestures, and (2) 'Initiating Joint Attention' (IJA), pertinent to eye-contact alongside gestures such as pointing and showing (Mundy et al., 2003; Seibert, Hogan & Mundy, 1987). Both constructs possess same attentional control and executive functions - through shifts of attention - but constitute distinct behavioural manifestations (Mundy, 2016; 2018).

2.2. The subcomponent of responding to joint attention

The dimension of 'Responding to Joint Attention' is characterised by infants' behavioural responses to adult's initiations for interaction. The ability of infants to respond to joint attention becomes firmly established from 6 months of age (Mundy, 2016), when infants demonstrate some understanding of other's gaze as directional, through gaze following processes (Brooks & Meltzoff, 2002; Butterworth & Jarret, 1991; Kuroki, 2007; Mundy, 2016; 2018; Van Hecke et al., 2012). For infants to respond to joint attention, they require to socially orient to the adult (or their names being called) in order to follow the adult's

⁵ The definition of the conceptual category of 'Passive Joint Engagement' proposed by Bakeman & Adamson (1984) refers to the attentional stage that infants apply onto an object that is the focus of attention of the adult also. This developmental phase does not require that infants attend to both object and adult simultaneously, dismissing the infant's ability to shift gaze between both.

gaze. This causal process relies on cognitive executive functions, i.e. infants' capabilities to disengage from their attentional focus and to engage in an adult's referential focus.

2.2.1. Orientations

Orientations constitute an important behavioural element in infants' responses to adult's initiations, permitting infants to 'track the locations and actions of other people' (Mundy, 2016:159). In paradigms such as social referencing, for instance, orientations are necessary in order to attend to and process visual information as well as to interpret affective facial expressions displayed by the adult (Klennert et al., 1983). Mundy (2016:26) makes a conceptual distinction between the terms orienting and those denoting attention:

the term attention is often confused with the related term orienting. Orienting refers to processes whereby we direct our sensory organs towards a stimulus. However, attention refers to the active process of information processing that occurs once we have oriented to a stimulus.

There is a conceptual (and cognitive) distinction between orienting and attending (Mundy, 2016); whereas orienting refers to the physical (behavioural) motion of directing oneself towards an external stimulus, attention requires infants to process visual information related to that stimulus more actively. According to the theoretical construct of 'Responding to Joint Attention', infants' elicitation of orienting behaviours serves as an entry point to establishing joint engagements in order to (process) share meanings about an object or event (Mundy, 2017; 2018). As mentioned previously, orientations are one subcomponent in the sequential process of infants' executive control behaviours, which are initially applied within dyadic interactions with the adult to subsequently develop into triadic social engagements (Johnson, Posner & Rothbart, 1991; Tronick et al., 1998). In the Clyman et al., (1986) study, the authors identified orientations as distinct components of how infants directly react to social and non-social stimuli, specifically to adults' voices or movements. The direct association between infants' emotional reactions to adults' actions and verbal input align with some attachment theories

(Ainsworth, 1992; Bandura, 1992; Bowlby, 1980). Based on this conceptual framework, orientations are viewed as biologically determined and based on the premise that ambiguous, external stimuli evoke feelings of fear, danger or threat in the infant, requiring the need to orient to the significant other to gain reassurance and comfort.

This postulation provides a subjective analysis of infants' internal perceptions. Still, it does not bring definitional clarity as to what constitutes the sudden, external stimuli causing infants to orient to the adult's face. Thus, this causal relation is postulated with the exclusion of any other influencing variables, such as the environment and how it influences infants' attention. Social contexts might determine infants' orienting behaviours as they provide important macro-structural information allowing the interpretation of some external stimuli, such as unexpected actions, as non-congruent, unusual, or unexpected based on cultural frameworks (Vygotsky, 1962; Bodrova & Leong, 2007; Emde, 2009). How contexts influence looking behaviours, more pertinently orientations to external stimuli, are yet to be examined.

Within the current literature, infants' responses to joint attention are examined and measured by infants' ability to follow an adult's gaze (Mundy, 2018), dependant on infants' ability to understand the relationship between another person's gaze direction and the object of attention (Brooks & Meltzoff, 2002, 2005; Goswami, 2006; Itier & Batty, 2009; Kuroki, 2007). In joint attentional engagements, gaze following permits the development of self-regulatory and social-cognitive skills (Mundy, 2016) through attention shifting behaviours. A longitudinal and experimental study conducted by Gredeback, Fikker & Melinder (2010) demonstrated that these mental processes become more efficient as infants become more proficient in engaging in joint attentional engagements. In their study, infants' responses to joint attention were examined at the ages of 2, 4, 6 and 8 months where infants' gaze following to the mother (Mother Condition) and an unfamiliar adult (Stranger Condition) were measured. Results showed an increase in infants' gaze following behaviours between the ages of 2 and 4 months and a reduction of gazes for 4 and 6-month-old infants, when evaluated within the Stranger Condition. What this and Perra & Gattis's (2012) results show is that an important

qualitative change occurs between 2-4 months, allowing infants to engage in early attentional and social processes. That, in the Gredeback, Fikker & Melinder's study, rates of gaze following decreased over time demonstrate that infants become more competent (and possibly faster) in responding to adults' behaviours within the context of infants' gaze following. Adults' influence infants' development of social and cognitive abilities (Vygotsky, 1962; Bodrova & Leong, 2007) but these relations are commonly examined outside cultural influences.

During gaze following tasks, the increase of infants' attentional control competencies - by attention inhibition/activation - is associated with a steady developmental growth of 'Responding to Joint Attention' measures also (Ghazvini, Rafiee, Yadegari & Pourshahbaz, 2015; Mundy, 2016), which contributes to infants' cognitive development (Vaughan Van Hecke et al., 2012). But according to Carpenter et al., (1998), the examination of joint attention processes based on infants' gaze following reactions does not *per se* constitute a reliable form of measuring and understanding infants' responses to joint attention. The authors argued that the interpretation of infants' responses to joint attention - based on behavioural variables such as infants' attention engagement/disengagement - show infants' reactions to adult's behaviours but does not constitute episodes of shared attention. As Carpenter & Liebal, (2011:161) noted:

Gaze alternation alone is not enough to establish the existence of joint attention. There are many situations in which one might look back and forth between an object and a social partner without coordinating attention with him or her.

The authors proposed the notion that shared meanings and understandings are established through shared communication, displayed verbally or non-verbally in the form of communicative looks. Most specifically, Carpenter & Liebal asserted that communicative looks constitute 'real communication' (p.170) and are better indicators of true joint attention, compared to other forms of looking such as 'checking' looks (Hobson & Hobson, 2007). This approach emphasises the referential and intentional sharing nature of looks -

beyond visual processes - in the establishment of shared meanings responsible for the development of true joint attention. Carpenter & Liebal (2011) distinguished between three types of looks embedded within mutual interactions: (1) initiation looks, which are dyadic and function as attempts to gain attention from the other person, (2) referential looks, often accompanied by pointing gestures serving as intentional communicative attempts to draw attention to an external referent and (3) sharing looks, characterised by its bidirectionality and function as a form of attentional maintenance of joint engagements.

This conceptualisation of joint attention, therefore, emphasises the creation of shared and mediated experiences, providing with what Tomasello, Carpenter & Liszkowski (2007) refer to as 'common ground' (p.707). This common ground requires the active role of both partners for the establishment of attentional frames, permitting interactions to become 'joint'.

Tomasello, Carpenter & Liszkowski's (2007) rejection of measures of gaze following as markers for joint attention (specifically within the subcomponent of 'Responses to Joint Attention) in favour of attentional acts serving as intentional tools, provides an alternative - but equally reductionist - approach to joint attentional processes. Conceptualisations of joint attention are defined based on infants' sole ability to understand intentionality during triadic attentional encounters, as demonstrated by Adamson & Bakeman's study. It is plausible that early social-cognitive skills require and include other components besides gaze following, that contribute to the establishment of joint attention through infants' direct practices in interpersonal encounters, evolving from dyadic into triadic forms of shared attention (Mundy, 2017).

Moreover, Tomasello, Carpenter & Liszkowski's rejection of 'Checking' looks (Hobson & Hobson, 2007) due to their 'dry, cognitive, recursive approach to joint attention' (p. 169), limits attentional processes to a singular social dimensionality, where adult and infant engage in goal-directed actions and intentions, to the dismissal of other cognitive elements. Nonetheless, the theoretical approach presented by Tomasello, Carpenter & Liszkowski (2007)

values initiations as an essential component in the development of joint attention, representing a pivotal starting point for social engagements.

2.3. The subcomponent of initiations of joint attention

Infants' ability to spontaneously and intentionally direct adult's attention towards objects or experiences – through behaviours such as eye-contact, showing or pointing - is conceptualised as 'Initiating Joint Attention' (Mundy, 2018; Mundy et al., 2003; Mundy et al., 2007). Initiations require infants to establish social-attentional coordination with the adult, providing differential learning experiences than those included in 'Responses to Joint Attention' (Mundy et al., 2007). These interactional frames are embedded within infants' motivation to engage in social engagements with the adult, made explicit through various forms of pre-linguistic communicative behaviours such as handouts, showing and/or pointing.

Conceptually, the definition of what constitutes initiations of joint attention is based on observable measures of infants' showing and pointing gestures (Mundy et al., 2007), which provides somewhat levels of developmental generality within the definition. The argument for this lack of descriptive specificity resides in the conceptual inclusion of prelinguistic forms of communicative intents, particularly showing and pointing, inside the same dimensional continuum, which is used interchangeably. Language research shows that their emergence follows a developmental progression whereby showing gestures constitute a precursor as well as a facilitator of deictic pointing (Boundy, Cameron-Faulkner & Tomasello, 2016; Boundy, Cameron-Faulkner & Theakston, 2019; Cameron-Faulkner, Theakston, Lieven & Tomasello, 2015). According to Carpenter et al., (1998), showing gestures represent a simpler form of cognition, that include some degree of sociability by the establishment of some physical contact with the object in an attempt to engage the adult in active joint attentional engagements. Conversely, pointing gestures represent referential processes requiring infants' understanding of others' referential, social and communicative intentions (Liszkowski, 2011), for the establishment of attention coordination with the adult about an object (Csibra, 2003; Mundy, 2016; Tomasello, Carpenter & Liszkowski, 2007).

Despite the social-cognitive differences found between early presentations and later manifestations of infants' gestures, conceptualisations of initiations of joint attention have not reflected this gradual and qualitative transition, as both prelinguistic behaviours are cited interchangeably. This broader contextualisation neglects the social structures, whereby episodes of joint attention occur. Most prominently dismisses the socially embedded system between the infant and the adult, which provides the basis for joint attentional encounters.

Infants' elicitation of joint attentional acts requires the coordination of attentional control processes through eye-contact (Mundy et al., 2003; Mundy, 2016). Eye-contact, therefore, functions as a behavioural marker within joint attentional engagements, alongside prelinguistic gestures. Some postulations have attributed positive arousal properties to infants' awareness of others' eye-contact that effectively increases attentional focus and higher information processing (Senju & Johnson, 2009). The inclusion of eye-contact as a behavioural measure in initiations is operationalised based on adults' providing direct eye-contact to the infant. Still, little is known about how the eye-contact effect unfolds when the infant, not the adult, elicits attention to the adult.

The effect that positive affective states have in infants' attentional control, specifically gaze shifting, was examined in a study by Kuroki (2007). Participants were observed in a laboratory setting at three different developmental ages: 6, 9 and 12-month-olds whilst playing with a toy. A familiar adult sat on the floor at an angle that required participants to orient to the social partner by turning their heads and gazing at the adult's face. Measures pertinent to gaze direction and infants' facial expressions – ranging from negative, neutral to positive - were coded and analysed. Findings of the study showed that infants displayed more gaze shifts when showing positive emotional expressions than any other affective state and that positive affect facilitated attention disengagement from the toy. Thus, qualitative differences in the direction of attention were noted in younger infants compared to 12-month-olds; 6- and 9-month-old infants did not show preferences for social

stimuli, but 12-month-old infants selected the adult as the focus of their attention more frequently than the toy.

The results of this study show a link between 12-month-old infants' positive arousal affect and the desire to look at social partners with the intention to share experiences. Thus, the production of smiles influenced and increased the frequency of gaze shifting and social attention. This quality is associated with the dimension of initiations of joint attention and not responses (Mundy et al., 2007) within the context of an experimental setting and in the absence of adult-child social interactions. One question that has not yet been answered is how naturalistic contexts influence levels of positive arousal activation that ultimately motivate infants to initiate looks to engage in interpersonal encounters. Also, how infants' social attentional preferences prevail in highly stimulating environments. Naturalistic settings allow communicative acts and intentions to be shared and modelled (Tomasello & Farrar, 1986; Slaughter & McConnen, 2003), permitting attention to emerge and merge within social-contextual information (Wass & Leong, 2016). The intertwined of these social components might impact on infants' arousal levels and ultimately provide variance to a possible link between positive affect and initiations to joint attention. The 'eye-contact effect' theory (Senju & Johnson, 2009) has provided some evidence of this postulation by demonstrating that infants do respond more positively to mutual gaze due to the rewarding experience of being the adult's focus of attention. In their semi-naturalistic study, Clyman et al., (1986) included a social look category pertinent to infants' initiations of social interaction. Their concept included infants' offering a toy or infant raising their arms as behavioural markers. The authors attributed emotional reactions to infants' initiations also, but as Kuroki (2007), omitted interpersonal components embedded in joint attention by placing the 'social' within unilateral parameters of infants' affective responses (by including handout gestures) and excluding infants' intentionality (Carpenter, Nagell & Tomasello, 1998; Tomasello et al., 2005) by narrowing gestures to showing and not pointing. The absence of pointing in the Clyman's definition, nonetheless, can be attributed to a developmental characteristic and not a conceptual issue, as participants in their study were 12-month-old infants.

Despite the developmental characteristics of initiations, the category lacks the definitional clarity as to how infants seek social engagement with the adult spontaneously. It is plausible to assume that an inter-dimensional association between responses and initiations exists, whereby behavioural components such as gaze following and orientations, facilitate the emergence of 'Initiations of Joint Attention'. Thus, it culminates in infants' ability to point (and develop intentionality) and ultimately establish joint attention (Carpenter, Nagell & Tomasello, 1998). How both subcomponents dynamically interact is yet to be explored outside manipulated environments. Experimental studies have indicated that measures of 'Initiations to Joint Attention' show lower frequencies between the ages of 12 to 15 months followed by an increase at 18 months of age (Mundy, 2016; Mundy et al., 2007). This trajectory represents a different age-related pattern than 'Responses to Joint Attention', where measures are more consistent and present a linear growth distribution between the ages of 9 to 18 months (Mundy, 2016).

In summary, the construct of joint attention as an active, inter-relational process that shares a commonality with this thesis as both place infants as creators of meaning about social realities. The ontological assumption proposed here is that joint attentional processes occur not solely through active participation in social interactions but by the influence of the setting also. Interpersonal relations, therefore, provide the practice and experience for infants to develop joint attentional skills. Still, according to Mundy (2016), such joint attentional experiences are cognitive in nature, which might explain why the definition of 'Responding to Joint Attention' does not include the role of the adult, describing infants' gaze following abilities exclusively.

This positionality was congruent with Clyman et al.,'s aims to describe infants' information gathering behaviours and not joint attentional processes. Information gathering processes involve infants' ability to seek information from the adult - as it is the case of social referencing - about an uncertain object or event. These contrasting and relational elements are anchored in cognitive processes of information exchanges and meanings (Mundy, 2016), described in the absence of macro-structural influences such as cultural contexts. Social referencing, nonetheless, is considered an early form of joint

attention (Feinman, 1992) as referencing models include triadic components in the form of a familiar adult, the infant and an uncertain event, object and/or situation.

2.4. The ontological nature of social referencing

Social referencing constitutes a paradigm used to explain how infants seek and use non-verbal information from an adult to disambiguate a situation and/or event (Campos et al., 1983; Klinnert et al., 1983; Fienman, 1992; Sorce, Emde, Campos & Klinnert, 1985).

Despite some variation within experimental approaches and designs used to study social referencing, paradigms require the emergence of specific sequential elements that permit the elicitation of infants' referential looks for the examination of regulatory behaviours. Such components are (1) observation of an event or object⁶, (2) an experience of uncertainty, (3) a look, and (4) an intention to seek information (Clyman et al., 1986). How these different elements have been studied empirically are detailed in the next sections, providing information as to how different paradigms have informed social referencing processes.

2.5. The uncertainty component in social referencing

The social referencing paradigm relies on the presence of uncertainty to evoke referential looks to the adult. The study of this phenomenon has used the so-called 'ambiguity postulate' (Feinman, 1992) to create situational uncertainty to evoke infants' referential looks to the adult's face to gather affective information. The postulate is based on the following assertions (Kim & Kwak, 2011): (1) that ambiguity results in a higher number of infants' social looks to the adult and (2) that ambiguous contexts have greater influence in infants' behaviour regulation following adults' affective messages than in non-ambiguous contexts.

⁶ Infants' observation of an event results from their exposure and/or introduction to an ambiguous toy, event and/or situation

Feinman (1992) considers social referencing a process that supports children in the reduction of stress following the introduction of ambiguity. According to this scholar, infants' ambiguities are divided twofold: subjective or situational⁷ depending on the referent eliciting uncertainty. Most often, both types of experiences co-occur, but when they do not emerge at unison, subjective uncertainty seems to be of higher prevalence over situational ambiguity. As Feinman (1992:40) noted:

when situational and subjective uncertainty do not coincide - such as when an infant can barely be restrained from eagerly approaching a toy which elicits uncertainty in all of her peers - it is the subjective feeling rather than the 'objective reality' which predicts her response.

Three different paradigms, (1) the 'Visual Cliff', (2) the Classic Social Referencing and (3) the 'Stranger Situation' have been used to examine social referencing. Similarities amongst these three paradigms are noted as they are designed to elicit uncertainty in infants to prompt referential looks in order to gather information from the adult to regulate behaviour.

(a) The 'Visual Cliff' paradigm

The 'Visual Cliff' is an experimental design used in social referencing studies to elicit ambiguity and to examine how infants gather affective information from the adult to regulate their behaviour. Initially created to study visual depth in rats (Gibson & Walk, 1960, 1961), this artificial design was subsequently adopted to examine infants' perception of affordances (Gibson et al., 1987; Schmuckler & Gibson, 1989) and ultimately, as an experimental model to study social referencing.

The design procedure requires infants to be placed in the middle of a platform that provides an apparent (not actual) visual illusion of a 30cm drop from one surface to another, the height intended to create ambiguity. A desirable toy is placed at the other side of the cliff to encourage the infant to crawl across the

⁷ Situational ambiguity refers to the seeking of information through referential looks to inform behavioural regulation; the infant is not sure how to behave and looks at the adult for guidance. Subjective ambiguity comprises a 'high-order concept' (Feinman, 1992:40) and refers to the infant's inner 'feelings' of uncertainty (Feinman, 1992).

platform. Infants, at the start of each trial, are encouraged to approach the toy in order to encounter the perceived apparent drop and to reference the adult for information. The adult is placed on the other side of the visual cliff apparatus and provides binary, affective messages (happy/fearful), following infant's looks; infants' regulatory behaviours, following adult's affective messages, are subsequently examined (Bradshaw, Goldsmith & Campos, 1987; Gibson et al., 1987; Vaish & Striano, 2004).

One of the first studies using this paradigm was conducted by Sorce, Emde, Campos & Klinnert (1985) to explore how 12-month-old infants gathered and appraised social information from the adult and how they regulated their own behaviour. Mothers were instructed to stand on one side of the glass cliff and to display binary emotional expressions of either fear and/or happiness. Their study conclusions indicated that affective signals had a significant effect on behaviour regulation as infants congruently refrained from crossing the cliff in the fearful condition and - for the happy condition - most of the infants crossed the apparent drop. On first glance, this research was the first to provide methodological innovation to the study of how infants used mothers' affective guidance to inform their behaviour. Still, despite its reputation as a landmark paradigm (Adolph & Kretch, 2012), the study operated under the assumption that infants' social learning - in an uncertain situation - is based on the association between adults' emotional displays and their behaviour regulation. This proposal fails to consider other elements such as the role of the environment (the visual cliff), multi-modal forms of feedback as well as infants' motor and psychological development as variables influencing behavioural responses.

According to Adolph & Hoch (2019), infants' motor skills are developmentally determined (and influenced) by psychological processes embedded within social environments. In the Sorce's study, the interconnection between infants' physical developmental stage, i.e., their ability to crawl rather than walk and the peculiarities of the environment (infants' confinement to a glass structure), were not taken into account. Instead, the focus was solely on perceptual affordances elicited via the 'Visual Cliff' design, an unusual and highly manipulated setting. The experiment restricted infants' social learning

opportunities such as spontaneous exploration, imitation, and observations of others' actions by placing infants inside the glass structure and measuring reactions to the apparent drop. These restrictions increase infants' necessity to reference the adult to seek information about the (ambiguous) situation. In less restricted environments, infants are able to use motion to process information from the environment, which results in infants needing to look less at adult's faces and spending more time exploring their surroundings as the study by Franchak, Kretch, Soska & Adolph (2016) indicated.

The assumption held in experiments using the 'Visual Cliff' paradigm is based on the notion that infants' require adult's interpretation of the situation in order to discern how to proceed, i.e., whether to crawl or to refrain from crossing. Alternatively, it is plausible that infants do conduct their own cognitive appraisals of the ambiguous situation and what infants experienced is an incongruent disparity between the perceptual information received and their perceived goal of approaching/reaching the toy. Due to experiencing this dissonance, further evaluations might be required for infants to make meaning of the event; hence the elicitation of referential looks to the adult prior to undertaking any action.

Klinnert et al., (1983)⁸ held a contrary view, asserting that social referencing is a process of 'secondary appraisal' (p.64), whereby infants - unable to use their own appraisals to evaluate an ambiguous event - require affective information from a trusted individual in order to interpret the event and regulate their own behaviour accordingly. According to the authors, social referencing 'augments infants' appraisal capacities' (p. 77). Based on Klinnert et al.,'s view, behaviour regulation constitutes an associative effect established under the premise that interpretation precedes action (Feinman, 1992). Feinman (1992) considers infants' behaviour regulation responses as possessing a function of 'allow[ing] the infant to anticipate what will happen and what to do when a particular referent occurs' (p.374).

⁸ The authors' research was based on previous empirical studies showing how infants modified their own behaviour as a result of the emotional signals displayed by the adults (Carr et al., 1975; Klinnert, 1981, 1983),

Feinman's postulation, nonetheless, is inconsistent with findings of a study by Walden & Ogan (1988), proposing that how infants appraise a situation (and regulate their behaviour) is dependent on their developmental age, rather than constituting a cognitive and anticipatory mechanism when faced with uncertainty. In their longitudinal study, which examined the trajectory of social referencing, 6-9-month-old infants did not change their regulatory behaviours significantly, following the parent's affective message. But 10-13-month-olds and 14-22-month infants, did respond to adults' affective messages according to the social referencing postulate, by modifying their responses accordingly. Additionally, whilst 10-13-month-olds showed more approaching/withdrawal behaviours towards the ambiguous toy based on congruent positive/negative signals, older infants presented incongruent behaviours within the fear condition, smiling more in the negative condition.

Infants' developmental trajectory plays a role in how they evaluate messages and regulate their behaviour. Still, a component that is consistently neglected in the literature is infants' interpretation of perceived ambiguity when crossing the cliff. As mentioned previously, Feinman (1992) distinguishes between situational and subjective uncertainty, and based on this distinction, it can be asserted that infants in Sorce's study experienced situational ambiguity, as they referenced the mother prior to regulating their own behaviour. All infants within the fearful condition refrained from crossing the cliff following emotional feedback from the mother.

That situational uncertainty was the underlying effect in experiments using the visual cliff was further corroborated in a final study conducted by Sorce, Emde, Campos & Klinnert (1985). The authors used a modified version of the visual cliff, in which the structure of the glass table was altered, to provide a different sensory illusion. Their study showed that infants displayed very little referencing to their mothers. Those infants who did reference the adult dismissed the fearful message displayed and crossed the cliff so to reach the toy. The experimental design might have created an experience of induced perceptual uncertainty by manipulating conflicting sensory information, i.e., visual and tactile. This level of ambiguous artificiality and subsequent sensory dissonance is rare in non-contrived environments, where multi-modal

information is readily available to the infant, providing a perhaps less situational ambiguity and an increased in subjective uncertainty or a combination of both. It is questionable, therefore, the generalisability of this paradigm's outcomes in naturalistic environments.

Ambiguity in the 'Visual Cliff' experiment results in infants referencing the mother in order to gather information and regulate behaviour. Little is known about the qualitative function of referential looks within this paradigm. It is plausible that infants' looks are elicited in order to appraise actions and not (ambiguous) situations. More specifically, referential looks could function as valuations of appropriate consequences (behavioural actions), serving as a vehicle to evaluate whether to continue crawling or to refrain from crossing the cliff. This possibility is formulated under the consideration that, at the start of each trial, mothers used smiles to encourage infants to crawl towards the toy and ignore the apparent drop. The incongruency between mothers' expectations and infants' subjective appraisals of the situation might have created levels of confusion that required clarification.

Emde (2009) refers to valuations as 'expectations (that) are internalised about rules and the way the world should be' (p. 8). These valuations have a moral component that functions outside the parameters of gathering information and are included within social-contextual variables besides ambiguity. Contexts become an essential component for infants to learn about congruent and incongruent events, people and/or objects, not accounted for in social referencing studies. Naturalistic settings - unlike laboratory rooms - are spaces bound by specific behavioural rules which might elicit infants' regulatory behaviours based on violations of such contextual expectations and not by the presence of uncertainty. In those instances, social referencing looks might still occur in the absence of uncertainty and/or ambiguity and retain the function of seeking of information, in this instance, pertinent to social and behavioural consequences, and not to gathering affective, non-verbal information.

Whereas it is improbable that, in their everyday situations, infants are faced with situations similar to the visual cliff, infants may seek information from the adult also once they have conducted a specific action. This type of information

gathering was identified as a social look category by Clyman et al., (1986), which provided a different conceptualisation to the classic social referencing model; one that emphasises valuations rather than disambiguation of a situation and/or event. The post-action referencing would be influenced by the characteristics of the setting, creating ambiguity that, based on infants' initial appraisals, involve physical and negative consequences if crossing the cliff.

Post-action referential looks function as a component of social learning rather than constituting a simple and unidirectional act of seeking information from the adult. Clément & Dukes (2017) make this distinction, merging social appraisals and social referencing as components of affective social learning. They cite (2017:257):

we believe that the original framing of the term social appraisal was intended not only to include occasions when emotion is intentionally communicated by someone as in social referencing but also when affective expressions are simply observed.

Other authors have suggested that the ambiguity component within the 'Visual Cliff' paradigm constitutes infants' interpretations of the apparent drop as dangerous. Fear of heights, therefore, and not uncertainty about what to do, provides a different perspective of social referencing, one based on attachment relations and not a cognitive process of seeking appraisal of ambiguous events (Ainsworth, 1992; Emde, 1992). This theory postulates that infants' perception of an apparent drop evokes feelings of danger and generates anxiety, and, as a result, infants reference the mother to gain proximity and gather reassurance. Adults' emotional feedback provides information regarding safety/danger in executing locomotor actions. According to this view, social referencing is a process of checking mothers' emotional availability, not gathering information. As Ainsworth (1992:359) argues: 'even though the visual cliff experiment highlights social referencing, it by no means conflicts with the contention that maternal availability is the chief issue for an infant in an ambiguous situation'.

The relationship with the adult and the messages displayed does have an impact on social referencing processes, particularly on differences in infants'

looking linked to behaviour regulation (Feinman, 1992). For instance, a study by Möller, Majdandžić, & Bögels (2014), examined possible differences in affective displays between mothers and fathers to establish a possible relation with the behaviour regulation components in anxious infants, using the 'Visual Cliff' paradigm. Results showed that fathers' expressions of anxiety provoked greater avoidance effects in anxious infants as they did not cross the visual cliff.

A different paradigm: the 'Stranger Paradigm' has been used to study how affective signals influence elements of attachment relations and behaviour regulation.

(b) The 'Stranger Situation' paradigm

Uncertainty has also been elicited through the exposure of the infant to an unfamiliar adult, the presence of a stranger intended to create fear and/or wariness so to elicit referential looks to the adult (Feinman & Lewis, 1984; Dickstein et al., 1984; Clyman et al., 1986; De Rosnay, Cooper, Tsigaras & Murray, 2006). Infants unfamiliarity with the adult, therefore, rather than perceptual dissonance, forms the basis of this paradigm and represents the main source of uncertainty.

This paradigm was first introduced by Ainsworth (1964) as an observational tool to assess the security of attachments in infants. The experimental procedure requires the implementation of sequential components divided into two distinct sequences of events (Ainsworth, 1992; Braungart & Stifer, 1999). The first event is considered the first reunion and consists of the following elements, (1) a habituation phase, where mother and infant are alone in the laboratory room, (2) a stranger (usually the examiner) enters the room, talks to the parent and then interacts with the infant, (3) during stranger-infant interactions, the mother leaves the room, (4) the mother returns and the stranger leaves the room. The second phase requires that: (5) the mother exits the room, leaving the infant alone, (6) the stranger re-enters the room and (7) for the mother to return, producing the second reunion event. Infants' behavioural manifestations such as attachment and exploratory behaviours,

fear and/or attitude towards the stranger are then measured and classified within three attachment categories: (a) insecure-avoidant, (b) secure or (c) insecure-resistant (Ainsworth, 1992). Social referencing research has used this experimental procedure to examine how infants gather information from the adult within the context of the parent-child relationship. For instance, some studies have shown that infants' attachment style, more specifically insecure infants, displayed the highest number of referential looks to the mother when the stranger entered the room and showed more proximal behaviours to the parent than secure-attached infants (Dickstein et al., 1984; Feinman & Lewis, 1983).

The 'Stranger Situation' model relies on a crucial episode - the mother's return after leaving the room - as the catalyst for the elicitation of referential looks. This component forms the quantifiable index measure to evaluate infants seeking information preferences, related to attachment bonds. Studies have claimed the existence of a selectivity process whereby mothers constitute infants' preferred source of information when faced with uncertainty - hence the prevalence of mothers - selected as referees - in most social referencing research (Boccia & Campos, 1983; Gunnar & Stone, 1984, Hornick & Gunnar, 1988; Sorce, Emde, Campos & Klinnert, 1985). Nonetheless, the evidence so far is inconclusive, for instance, some studies have shown that when both parents are present, and the stranger enters the room, infants prefer to access information from the mother than the father (Ainsworth, 1992; Lamb, 1976). Other findings indicate that infants do access information from both - fathers and mothers - equally (Dickstein & Parke, 1988; Hirshberg & Svedja, 1990). When the study involves the mother and a familiar stranger, outside the 'Stranger Situation' paradigm design, infants look at both adults in equal measure (Zarbatany & Lamb, 1985).

The incongruent results stem from a lack of consideration that infants do form bonds with other adults besides the mother (Ainsworth, 1992) and in more than one context, which might explain this seemingly absence of infants' selectivity process found in the literature. A few studies have explored the effect of contexts in infants' preferential looking, and findings show similar

inconclusive results. Skarin (1977) assessed different experimental variables within the social referencing model and found that 10-12-month-old infants reacted more fearfully to the stranger based on contextual variables such as the characteristics of the setting (home vs laboratory), the experimental condition (mother present/absent) and the gender of the stranger (female vs male). Conversely, Schieler, Koenig & Buttleman (2018) found no contextual differences between home and laboratory environments in infants' exploratory behaviours. Still, when parent vs stranger introduced a toy to the infants, differences in duration of play were detected. Infants played more with the toy presented by the parent and not the experimenter, resulting in claims of similar strong selectivity effect found at home than in laboratory settings.

Contexts did not seem to influence infants' looking times as they looked longer at the experimenter in both familiar and unfamiliar contexts. An alternative explanation is plausible, pertinent to infants' longer looking times to the experimenter attributed to infants' attempts to learn about what to do with the presented box rather than intending to gather information about (an implicit) ambiguous item. That both familiar and unfamiliar adults provided verbal information alongside affective displays about the object, prior to the infants' acting upon the box, denotes how adults were conducting emotional appraisals for the infant, i.e., the content of messages explicitly expressed emotion about the box. Based on the premise that the experimenter constituted a better source of information than the parent, latency of looks might not have been operating under a selectivity postulate effect, rather, it might have reflected a process of gathering information and learning about the unfamiliar person, as infants looked longer at the box when the parent provided the message.

Taken together, the commonality of these studies (and the majority of the social referencing literature) is the conceptualisation of contexts as physical spaces. This social reductionism prevents infants from accessing information pertinent to broader dimensions of the cultural context, such as social standards and expectations that inform infants' acquisition of more accurate appraisals about the unfamiliar person and ultimately the situation. The

absence of cultural knowledge within experimental designs of the phenomenon creates a situation - albeit artificial – that results in infants' needing direct feedback from the adult. Thus, adults function as providers of information about another person and/or object based on infants' reactions to the situation and not as social partners influencing and scaffolding infants' internal experiences (Bodrova & Leong, 2007). The manipulated affective messages delivered by adults do limit infants' availability and accessibility of information from other social partners.

How infants gather information from extended familiar adults in a naturalistic early years setting was examined in a study by Camras & Sacks (1991). In this classic social referencing study, infants were presented with an ambiguous toy in a nursery room, and caregivers posed a specific positive/negative facial expression. Results showed that - in naturalistic contexts - smiles were more prominent than negative emotions, although caregivers' positive affect did not correlate with social referencing episodes. A significant finding of this study is the prominence of positive affect that suggests possible correlations between positive affect and social looking (in this case, infants' referential looks). Feinman (1992) claims that social referencing is a mediated process where adults' exaggerated facial expressions increase infants' arousal levels, influencing their emotional interpretation and reactions. Most social referencing studies examine how adults' affective displays influence infants' behaviours but do not explore how infants' internal arousal levels facilitate and mediate attentional processes.

In the 'Stranger Situation' model, ambiguity constitutes an associative concept based on the assumption that the presence of an unfamiliar adult elicits feelings of fear, prompting infants to obtain information from the trusted adult (Dickstein et al., 1984; Feinman & Lewis, 1983; Feinman, 1992; Clyman et al., 1986). It is plausible that the novelty of an unfamiliar adult, and not fear and/or wariness, constitutes the underlying characteristic explaining infants' seeking information processes. Novelty as the primary emotional component would not possess the negative affective valence commonly attributed to infants experiencing fear of the stranger; rather, would constitute a more positive

internal state. This postulation would alter the functionality of the social referencing process, shifting from a gathering of information to decrease uncertainty to positively appraising the unfamiliar person. As a result, the distinct components of the paradigm would move from a relation of causation, conceptualised here as 'an extensional relation between events'⁹ (Lowe, 2009:167), to functioning within boundaries of probabilistic causation. More specifically, within the contributory cause of causation (Lowe, 2009) where the exposure to each component contributes to, but does not, determine the probability of the emergence of the subsequent components.

Some scholars have adopted the postulation that the 'Stranger Situation' paradigm is not based on affective ambiguity (Ainsworth, 1992; Emde, 2009), conceptualising this paradigm as one that evaluates how adults - specifically their emotional availability and sensitivity - affect infants' behaviours. This interpretation argues that adults' emotional availability and not uncertainty constitutes the main component of this paradigm. Based on this theoretical assertion, studies have shown that when mothers are instructed to be non-communicative and/or unavailable infants do access information from the experimenter instead (Bingham et al., 1988; Bradshaw, Goldsmith & Campos, 1987; Klinnert et al., 1986; Stenberg, 2003). Sorce & Emde (1981) demonstrated that a mother's emotional availability was directly associated with infants' exploratory behaviours. The scholars designed a study to evaluate how mothers, who presented themselves either as available or unresponsive, affected infants' exploratory behaviours in particular experimental conditions: (1) an unfamiliar setting, (2) mothers changing seating position, (3) the present of a stranger observing infants and (4) an ambiguous toy. Results showed that infants displayed less exploratory behaviours, initiated fewer social looks and remained close to their mothers in the unresponsive condition compared with mothers' congruent responses to infants. The conclusion that adults' availability directly influences infants' regulatory behaviours provides some conceptual knowledge about how infants

⁹ Extensional relation viewed as the cause of one event being directly linked to the previous event.

seek information about what to do rather than how to feel (Ainsworth, 1992) in experimental environments, where access to social information is restricted to the messages from the adult. Nonetheless what the scholars neglect to acknowledge is the infants' unfamiliarity with the context that, combined with mothers' unresponsiveness, might have affected their appraisals of the situation, and ultimately, their ability to make meaning of expectations and cultural norms. Infants' withdrawal behaviours could be interpreted as an avoidance of negative consequences, perhaps due to a lack of access to information related to broader social components, and not as a reduction of fear and/or wariness by the presence of the stranger.

The manipulation of the adult's availability, according to Ainsworth (1992), creates a shift in social referencing functionality from information seeking (instrumental referencing) to attachment (affective referencing). Nonetheless, an alternative function can be argued also, one where infants' looks constitute a form of gathering information about cultural elements of the context, influencing infants' actions and behaviours. Individual differences found in infants' selectivity - through referential looks - might denote contextual influences and infants' abilities to discriminate and identify the most suitable referent from which to gather information.

In naturalistic environments, social and contextual information are not narrowed to infants seeking but adults spontaneously providing information also. In this thesis, settings allude to nursery environments where different adults (and peers) are readily available to infants. This characteristic diverts from some studies using the 'Stranger Situation' where mothers are instructed to not engage with the infant (Bingham et al., 1988; Bradshaw, Goldsmith & Campos, 1987; Klinnert et al., 1986; Stenberg, 2003). This scenario, according to Ainsworth (1992), creates a shift in social referencing functionality and the infants' intention to gather information, shifting from information seeking purposes (instrumental referencing) to attachment (affective referencing) processes.

Overall, the use of referential looks as an index measure to examining how infants gather information from attachment figures might provide explanations for studies' incongruous results using the 'Stranger Situation' paradigm. In manipulated environments, the use of quantitative methods to measure infants' looking in order to inform interpersonal relations and selectivity effects, provide little descriptive and in-depth information about the intricacies and complexities of interpersonal relations within social contexts. Thus, it poses research limitations of representability and generalisability of findings within naturalistic settings. Additionally, the creation of ambiguity based on infants' unfamiliarity with the stranger presents some problems as it assumes an invariant negative association between the unfamiliar adult and infants' feeling of wariness. A more pertinent approach to exploring attentional processes, through the identification of types of social looks, might provide more in-depth data on how infants appraise situations, regulate behaviour, and access and use information from others.

(c) The Classic Social Referencing Paradigm

The classic social referencing model operates under the notion that the introduction of a 'novel' toy provokes feelings of uncertainty in infants, resulting in their need to gather information from the adult. As Feinman cites (1992:40): 'the ambiguity postulate suggests not only that referencing will be enhanced in situations which are experienced as unclear by most infants but also that, for any given stimulus, infants who are uncertain will be more receptive to referencing messages'.

During experimental trials of social referencing, the creation of ambiguity is elicited through infants' exposure to a number of novel and/or unusual toys that move and make noises (Feinman, 1992; Hornik et al, 1987; Stenberg, 2016; Stenberg & Hagekull, 2007; Walden & Baxter, 1989; Walden & Ogan, 1988; Walden & Kim, 2005) to explore the association between infants' gathering information from the adult – through referential looks - and the regulation of their own behaviour. For instance, two studies, one by Kim, Walden & Knieps (2010) and another by Kim & Kwak (2011) showed that

infants looked more and showed greater latency looks in situations of uncertainty. Additionally, infants changed their behaviour when fearful messages were displayed, even when their initial appraisals were positive, compared to a lack of behavioural differences when introduced to non-ambiguous stimuli, which provided validity to this postulate.

Theoretically, several presuppositions can be inferred concerning this classic paradigmatic approach. First, there seems to be a dissonance between conceptual meaning and qualitative properties related to situations of expectancy and affective uncertainty. This paradigmatic design assumes that the toy generates feelings of uncertainty in infants, based on a novelty quality. This characteristic attaches property of dual functionality (fission) and dual affect (Lowe, 2009), this is, the attribution of two different affective values pertinent to uncertainty/non-uncertainty that operates within specific conditions; in experimental settings, the object would have intrinsic qualitative properties of uncertainty – by virtue of a novelty effect - not attributed to the same item outside empirical parameters. The characteristics of the experimental design rather than the familiarity of infants with the objects might be responsible for infants referencing looks to the adult. Little is known whether objects might hold similar binary properties outside experimental walls, where infants' appraisals of the object (due to contextual knowledge) result in the alteration or even the eradication of this fission effect.

Second, if assumed that the *introduction/exposure* of infants to the toy and not the toy itself elicits uncertainty, then novelty rather than ambiguity might be the affective valance behind infants' referential looking. The paradigm, however, limits affective appraisals to causal relations between the object and infants' internal states, assuming that infants experience some degree of emotional distress or even uneasiness and that this emotional turmoil elicits looks to the adult to reduce stress (Feinman, 1992). Research has found that some infants appraise novelty as positive and find the toy exciting as in a study by Sroufe et al., (1974) where infants appraised the novel object sometimes with fear but sometimes with laughter. Infants' appraisals, therefore, might be influenced by

variables not necessarily associated with the toy, but pertinent to temperament, previous interpersonal experiences, and adults' messages.

Third, this paradigm relies on strong associations between adults' affective displays and infants' behaviour regulation. Emotion signals are, therefore, a necessary component in the sequential stages of the social referencing process that influence the manner in which infants understand messages and regulate their behaviour (Feinman, 1992). As Bandura (1992) cited, 'affective modelling is the major vehicle for conveying information in the process of social referencing' (p.178).

In the classic referential paradigm, research studies have shown that adults' positive messages result in infants approaching behaviours towards stimuli whereas withdrawing behaviours follow fearful facial expressions (Sorce, Emde, Campos & Klinnert, 1985; Walden & Baxter, 1989; Walden & Ogan, 1988). As mentioned previously, experiments apply mostly binary and polarised emotional expressions (happy/fear)¹⁰ to provide non-verbal feedback to infants' referential looks. These different emotional categories provide the affective contrast necessary to measure regulatory behaviours in infants. Some social referencing studies have introduced a third, neutral condition to function as a baseline to assess whether infants are able to discriminate amongst affective facial expressions and to use the (supposedly) neutral effect as behavioural comparison (Dickstein et al., 1984; Feinman & Lewis, 1983; Gunnar & Stone, 1984; Hornick, Risenhoover & Gunnar, 1987). This added condition assumes that the third addition functions as measures of zero within the value of affective valance. Thus, a positivity bias effect (Fiske & Taylor, 2017) may be operating instead as infants' emotional arousal might present a more positive baseline than the zero implied by such studies. According to Fiske & Taylor (2017), there is a significant difference in how positive and negative affect operate. As the authors cite (2017:371):

not only do [positive and negative emotions] differ in their operating characteristics, but the two valences differ in complexity. Negative

¹⁰ As mentioned previously, some studies incorporate a neutral, affective condition.

emotions, analysed separately, seem to have more complex dimensional structure than positive emotions analysed separately.

This difference in emotional structure can present a difficulty when it comes to affective messages delivered within the confined walls of the classic paradigm. The issue associated with adults' display of (instructed) facial expressions is the assumption that infants (naturally) detect, recognise, and associate perceptual patterns in the face as representations of emotions, detached of any contextual and social influence. But emotion perception and interpretation include the use of multi-modal signals embedded in social interactions and influenced by cultural settings (Barrett, 2011, 2013, 2017), facilitating emotional guidance and behavioural regulation. It is likely that, in naturalistic settings, the affective information available through facial expressions is more ambiguous and variable, where low-intensity emotional signals are more prevalent than posed, exaggerated facial expressions (Emde, 1992). Thus, natural-occurring affective messages contain multi-modal communicative components intended to enhance content and establish shared understandings rather than posing discrete emotional facial expressions.

A study by Vaish & Striano (2004) – using the 'Visual Cliff' paradigm - examined the influence of multi-modal versus single-mode messages in infants' behaviour regulation within three different experimental conditions: (1) facial-only, (2) facial cues combined with vocal signals and (3) vocal-only messages. Findings showed that infants crossed the cliff faster in the two-modality cues and vocal-only condition than when the message was provided exclusively through facial expressions, perhaps due to a lack of ambiguity contained in the vocal cues and the directness of verbal input. Messages provided through multi-communicative channels are more effective for infants to interpret and to act accordingly as they resemble real-life experiences where content include broader and richer meanings, aiding infants' interpretation of social-communicative intends and situations.

Emde (1992) criticised the affective delivery of adults' messages within the paradigm as being 'faked emotion' (p.81) that constitutes a form of 'deception' (p.81). This thesis shares Emde's views and considers infants' reactions to the

contrived message as responses to isolated cues based on non-associative social episodes. The generalisability of infants' reactions - in the form of behaviour regulation - might take different forms outside experimental settings. Furthermore, social referencing studies do not include contextual information, limiting infants' ability to discriminate amongst different emotions (Cunningham, 2013; Barrett, 2006, 2009, 2017; Lindquist et al., 2012).

Infants' ability to understand others' affective information as social signals requires moving beyond perceptual facial features and responding to what Walter-Andrews (1997) calls 'the sign of emotion' (p.438), i.e., to respond to the internal state of others. According to this scholar, infants' self-regulatory behaviours do not inform their interpretation of affective signals, but their cognitive ability to discern whether other's actions and behaviours proceed that specific affective expression. This interpersonal feedback's approach places emphasis on the social aspects of affective information and the meaning behind affective displays, much as social looking acts.

This thesis considers the notion that appraisals of emotional information, during naturally occurring social referencing episodes, do not emerge exclusively as referential acts exempted of any contextual component, but as a result of infants (socially) looking at the partner, permitting the construction of internal experiences. Social frameworks and social partners provide variance as to how infants access non-verbal and verbal information that influence regulatory behaviours. As Feinman (1992) cited, 'the most basic prediction about social referencing is that it will influence infants' interpretation of responses to events, objects and people' (p.16).

Whilst no social referencing studies have been conducted in naturalistic settings, other disciplines such as language research, have made use of ecological environments to examine infants' language experiences (Bronfenbrenner, 1977; Dickinson, 2012; Vernon-Feagas et al., 2013; Greenwood et al., 1991; Hoff, 2006, 2012). These studies have shown how institutionalised contexts such as preschools settings, facilitate language development through teachers' scaffolding (Dickinson, 2012) and how dyadic, maternal interactions in the home environment correlate with predictions of

language. Within language models, natural environments provide a less contrived and restricted framework for the elicitation of language where social-contextual variables, such as adult's spontaneous, directed speech as well as activities and materials, allowing richer, more in-depth language input data to surface.

A similar view can be ascertained when considering research into attentional processes in naturalistic settings. The broader components of the environment as well as dynamic social interactions permit communicative acts and intentions to be shared and modelled, creating mediated experiences of joint attentional nature (Mundy, 1997, 2016; Osório et al., 2011; Tomasello et al., 2005; Tomasello & Farrar, 1986; Slaughter & McConnen, 2003). As Chomsky (2000:105) postulated:

the critique of naturalistic approaches [in the study of language] also seems to me to be flawed. There is, I think, good reason to examine closely doctrines that have been assumed too casually, and if they do not withstand such analysis, to ask why they seem so compelling.

Chomsky's rejection of the philosophical dualism underpinning most ontological theories of language, by arguing against the constraints that methodologies - applying 'rule-following' (p.98) norms - posit to the understanding of language, can be extended to epistemological approaches also. Different methodological models to social phenomena influence research findings, as evidenced in a study conducted by Tamis-LeMonda et al., (2017). The study compared experimental methods - in the form of structured play - against naturalistic observations, specifically infants' language input, to evaluate how different epistemological perspectives impact infants' language experiences. Results showed that structured play facilitated infants' production of higher frequency words within parent-child conversations and greater language diversity than in naturalistic observations. The quality of language observed in the naturalistic condition was characterised by its dynamicity, presenting intervals of rich language input interspace with silences. Additionally, ecological environments facilitated natural occurring incidences of transitions and periods with less language production.

The richness involving naturalistic environments to the examination of social phenomena was the motive that prompted the conduction of this research study. Similar to Tamis-LeMonda's study, the selection of nursery settings as cultural spaces permitted the observation of looks in dynamic environments. The characteristics of the setting combined both structured and non-structured activities and included the direct and indirect influence of social partners also. Additionally, naturalistic environments are normative institutions governed by cultural norms, rules, and expectations, that influence infants' attentional processes and inform their social realities. It is unclear, nonetheless, whether natural environments might contribute to similar paradigmatic causality associations found in experimental designs of social referencing, as there are no studies that have venture into qualitative arenas to examine the phenomenon.

In summary, social referencing research has informed aspects of infants' social and emotional development, specifically pertinent to social learning from adults about an uncertain event, object and/or situation, attachment relations and behaviour regulation. Feinman et al., (1992) stated that the social referencing paradigm creates [ambiguous] situations 'where the child is not required to interact but to attend to a novel event, person or object' (p. 33). This assertion provides critical insight into some of the limitations of these paradigms and forms the basis of this thesis. Firstly, studies examining social referencing consider infants' seeking information from the adult as a unilateral process based on causal relations between infants' exposure to so-called uncertainty and the affective feedback received from the parent. This cause-effect relation is based on information-exchanged processes rather than on shared experiences of interpersonal nature.

Bandura (1992) claims that adults' facial expressions serve as a vehicle for 'vicarious activation' (p.179) i.e., they possess arousal properties of mediated modelling. Nonetheless, it is the view of this thesis that exaggerated and isolated affective expressions are not representative of common responses in naturalistic environments. Rather emotional expressions are combined with other non-verbal and verbal communicative signals that unfold in social contexts, which provide rich and dynamic forms of mediated social interaction

experiences (Mundy, 1997, 2016; Osório et al., 2011; Slaughter & McConnen, 2003; Tomasello et al., 2005; Tomasello & Farrar, 1986).

The inquiry to be addressed in this thesis is centred around how infants use social looks to construct meaning of their social realities. This question requires the exploration of attentional processes beyond referential looks and into broader scopes of looking behaviours. Additionally, based on the premise that infants actively engage in a constructivist process that is influenced by the context and social partners, the inquiry establishes the need to explore social looks outside experimental designs and into real-life experiences. The role of the infant outside laboratory walls is characterised as being active and more participative, features that are not entirely reflected in referencing studies, where infants merely seek and receive restricted affective information from a single source. Thus, contexts are used as physical spaces and not as social structures that provide infants with broader social knowledge. How social looks facilitate infants' processes to, not solely disambiguate situations and objects without experimental restrictions, but to construct social knowledge also has not been explored. Thus, some aspects of social referencing, such as the generalisability of uncertainty, the representability of what constitutes ambiguity and the functionality of social referencing in non-contrived environments, is still not clear due to the lack of studies venturing referencing into real-life situations.

Lastly, social referencing is considered a phenomenon that ultimately helps infants regulate their behaviour when ambiguity is present. As Feinman (1992) cites, 'the purpose of [social referencing is] constructing an understanding of the world through the mutual influence of adults' (p.372). The classical postulation views referencing as a cognitive form of learning and not as a socially mediated experience, influenced by other variables besides affective messages.

This thesis is an expansion of the study conducted by Clyman et al., (1986); thus, this project is concerned with how social looks help construct an understanding of social realities in populations other than typically developing infants, in particular with infants at-risk of being autistic by virtue of having an

identified older autistic sibling. Possible differences in patterns and types of looking behaviours in infants at-risk of being autistic contribute to knowledge pertinent to how attentional processes might present qualitative changes resulting in possible developmental differences in how at-risk infants acquire social knowledge.

To date, the existing body of literature has examined differences in autistic children related to perceptual abilities (Dawson, Meltzoff, Osterling, Rinaldi & Brown 2004; Landry & Bryson, 2004; Maestro et al., 1999; Osterling & Dawson, 1994; Zwaigenbaum et al., 2005) and referential processes (Bacon et al, 1998; Brim, Townsend, DeQuinzio & Poulson, 2009; DeQuinzio, Poulson, Townsend & Taylor, 2016), but fewer studies have explored social-cognitive differences in the at-risk population. The following sections provide contextual information related to findings of studies of infants at-risk informing social development within this population.

2.6. Qualitative studies of infants at-risk

Research with infants at risk of being autistic permits the early identification of variability of social-attentional components that can inform of potential differences in the onset and developmental progression of infants at-risk, compared to low risk and/or typically developing infants. The exploration of such discrepancies facilitates later identification and possibly early intervention of infants at high risk of being autistic (Campbell et al., 2015; Mundy, 2016). Nonetheless, few studies have embarked in the exploration of such social-attentional elements in infants at-risk. As Mundy cites (2016:59):

the hope [of infant sibling research] was to identify a behaviour or biological marker of ASD that could be used to identify ASD in the first if not 6 months of life. However, after nearly 17 years of effort, this line of research has not revealed a clear marker of ASD in the first half of the first year.

Mundy's discouragement with the lack of advancement of research in this area is not unjustified. Research findings within the at-risk population have been inconclusive, with research examining social engagements in infants at-risk

that have produced incongruent results. Despite the diversity in study outcomes, this line of research has contributed to the understanding of how some social components present a distinct developmental diversion compared to typically developing infants. Most pertinently, the use of naturalistic methodologies (Ozonoff et al., 2010) in this area of research, has enriched knowledge related to differences between infants at-risk - later identified as autistic - and high-risk participants that did not meet the autism threshold.

Evidence shows that infants at-risk of being autistic show significant differences in social engagements compared with typically developing infants (Campbell et al., 2015; Nichols, Ibañez, Foss-Feig & Stone 2014; Ozonoff et al., 2010). Rozga et al., (2011) conducted a naturalistic study observing high/low-risk 6-month-olds' infants whilst interacting with their mothers. These dyadic interactions were subsequently compared to social interactions with an examiner at 12 months, showing that participants from the high-risk cohort - later identified as autistic - presented differences in social engagement within structured, joint attentional tasks with the examiner, compared to high-risk infants that were not later identified and the low-risk cohort. The lack of significant differences in social engagements noted at 6 months, implies a somewhat typical social-developmental trajectory amongst high-risk infants within the first 6 months of life. It is plausible, therefore, that structured social engagements might provide the necessary frameworks, or as Tomasello, Carpenter & Liszkowski (2007) described as the '*common ground*' (p. 707), for infants to effectively and successfully interact with another adult. Still, it is not clear the peculiarities and subtleties of social engagements that permit young infants at-risk to not show any differential behaviours, compared to low risk.

Findings of the study by Bakeman & Adamson (1984), described in previous sections, might provide some explanation as for the lack of developmental differentiation, based on the developmental trajectory of attentional processes in typically developing infants, and the shift from dyadic to triadic joint attention. When interactions are not mediated by adults but consist in structured trials of object presentation, 6-month-olds infants at-risk seem to present differences in the use of visual, oral and exploratory skills as demonstrated in a study by Koterba, Leezenbaum & Iverson (2014).

The authors observed high-risk/low-risk infants in their home in order to examine infants' object exploration, measuring visual, oral and manual behaviours in 6- and 9-months' infants. Participants were provided with objects intended to elicit exploratory, mouthy and looking behaviours, and created a design procedure of fixed-order, structured trials of object presentation, altering for each condition some salient components of the object, i.e., the elimination of the sound in the rattle. Findings showed that 6 months-olds high-risk infants looked and explored (manually and orally) less at the non-sounding rattles than low-risk infants. By 9 months of age, results showed no differences in oral exploration amongst both groups but looking times differed, with high-risk infants spending more time looking at the object than low-risk participants. The growth pattern displayed by high-risk infants suggests early differences in joint attentional processes. That at-risk infants presented lesser looking times to the non-sounding rattles, might be attributed to a reduction in visual fixation processes, which resulted in slower information processing. This postulation is consistent with a study by Jones & Klin (2013) showing a decline in fixation behaviours in high-risk infants between the ages of 2-6 months. Additionally, the longer looking times displayed by high-risk infants at 9 months, show greater effort with executive function processes to attend to and process information.

That high-risk infants present difficulties with executive functions such as orientating behaviours as well as their ability to disengage from stimulus was further evidenced by another study examining differences in infants at risk - later identified as autistic - to disengage attention from visual stimuli and to display communicative gestures (Bryson et al., 2007).

Taken together, it seems that infants at-risk of being autistic present some qualitative differences in attentional processes. These differences are characterised by higher latency of fixation as well as differing patterns of joint attentional engagements, that manifest at around 9 months. This developmental age is known for the emergence of gaze following processes also (Brooks & Meltzoff, 2002, 2005; Goswami, 2006; Itier & Batty, 2009; Moll & Tomasello, 2004), it is responsible for the development of communicative and linguistic skills and joint attentional processes (Brooks & Meltzoff, 2005;

Carpenter et al., 2005; Mundy, 2018; Senju & Csibra, 2008). Differences in early attentional skills might directly impact on how infants at-risk attend to and process social information.

Nonetheless, evidence from these studies is based on how infants at-risk engage in structured activities with social partners and engagements with objects, the latter within experimental designs that involved narrowed order presentations of objects, as in the Koterba, Leezenbaum & Iverson's (2014) study. Structured activities represent one form of social interaction and learning that are characterised by being adult-led, which prevent infants from engaging in self-initiated, spontaneous activities.

To examine social engagement in high/low infants at risk in non-structured activities, Campbell et al., (2015), conducted a research study of parent-child dyads of 11-month-old high-risk and low-risk infants engaged in free play. They aimed to identify (and unify) possible discrepancies in social manifestation. Findings showed that high-risk infants, later identified as autistic, displayed fewer social engagements, specifically a reduction in the number of declarative gestures pertinent to show and give, and demonstrated less social engagement. In infants at-risk of being autistic, the lower measures of pre-linguistic gestures might demonstrate differences in social interactional experiences, and ultimately social learning, that could influence joint attentional engagements, in particular, those pertinent to initiations of interactions (Mundy, 2017). Winder, Wozniak, Paradé & Iverson (2013) found that high-risk participants showed less communicative intends, including declarative gestures and verbal expressions than the low-risk group. These findings align with those of Campbell et al., (2015) nonetheless, a previous study by Wan et al., (2013) showed different results showing differences in social engagement within the high-risk group at 6 months, specifically infants presented themselves as less socially active. Within the high-risk group, those that were later identified as autistic displayed significant differences with social attention and positive affect than the comparison group. A novelty within this study was the examination of parental input and behaviour during the dyads, noting a qualitative and interpersonal component in the manner in which mothers interacted with the infants later identified as autistic, providing more

in-depth knowledge of the quality of social engagements than the study conducted by Rozga et al., (2011).

The qualitative differences in social engagements demonstrated in these studies are embedded in attentional processes accompanying other non-verbal and verbal behavioural manifestations. Dyadic social engagements represent a different form of social learning than triadic acts. Mundy (2017), for instance, argues that dyadic engagements include different social components than those found in joint attentional experiences. Research has shown that high-risk infants present differences in joint attentional measures (Sullivan et al., 2007; Presmanes et al., 2006) such as lower times of gaze following (Bedford et al., 2012) and difficulties shifting their gaze when elicited alongside the pointing gesture (Sullivan et al., 2007). These peculiarities - detected in dyadic social engagements - show a possible variance in the developmental pathways of infants at-risk. It posits the consideration of the notion of a conceptual distinction between social engagements and social learning; thus, further exploration is necessary to reliably establish the quality of these social engagements as well as changes in patterns over time.

Additionally, home environments provide distinct social and sensory experiences influencing differential attentional processes that, subsequently, impact on infants' social relatedness. The studies described above reduced the examination of social interactions to one dimension measured within dichotomic forms: structured and non-structured. However, how infants at-risk engage in both types of interactional frameworks as well as other forms of incidental learning is yet not known.

In summary, although naturalistic research with infants at-risk is limited, current findings have provided knowledge concerning to how this group presents more fixating behaviours to objects, shows differences in social engagements as well as lower looking rates within dyadic and triadic forms of social engagements, in both structured and non-structured activities. Nonetheless, the designs of these studies retain levels of variable control and – as with the paradigmatic social referencing research – treat contexts as physical spaces and not cultural frameworks.

Similar to typically developing infants, very little is known about the types of looks display by infants at-risk in naturalistic settings, as well as how looking behaviours change over time. It is plausible that differential looking patterns do affect how infants at-risk construct social knowledge.

In order to operationalise social looks, this study based its research on a semi-naturalistic paper by Clyman et al., (1986) where an operationalised typology of social looks was created, to identify different categories types of looking behaviours that infants elicited in a modified version of the 'Stranger Situation' paradigm. The following section provides detailed explanations of the study undertaken by the authors and the reliability issues encountered at the time, that impacted their social looks typology.

2.7. The typology of social looks

A critique of social referencing studies for using experimental paradigms (Boccia & Campos, 1983; Feinman & Lewis, 1983; Klinnert, 1981) was put forward by Clyman et al., (1986). The authors highlighted a lack of examination of referential looks within naturalistic environments as well as the need for research approaches to conducting qualitative enquiries, away from highly controlled experiments. In an attempt to move social referencing outside the contrived walls of the laboratory setting, Clyman and associates conducted a semi-naturalistic study to create a more operationalised differentiation between social referencing looks and other types of looking behaviours that functioned as infants' information-seeking abilities. Ontologically, the study aimed to conceptualise social referencing within a broader theoretical framework of social looking. Methodologically, the study intended to serve as a bridge between empirical studies and qualitative approaches by using the 'Stranger Situation' paradigm in pre-term and full-term infants within a home setting.

A typology of social looks was developed through analysis of videotapes of 12-month-old infants interacting in a playroom setting. Eight different categories of social looks, including two pertinent to social referencing, were identified and characterised within different degrees of sociability, ranging from those categories denoting a minimum degree of sociality to intrinsically social

concepts. The common denominator amongst all conceptual categories was their functionality, as each category represented different ways in which infants used looks to obtain information from the adult. The named categories were classified as (1) Orient to a Voice, (2) Orient to an Action, (3) Pre-Action Social Referencing, (4) Post-Action Social Referencing, (5) Bids for social Interaction (long), (6) Bids for Social Interaction (short), (7) Watching Others Communicate and (8) Gaze Aversion (see Appendix 1).

In order to test the reliability of the different social looks' concepts, the authors conducted a pilot study using a modified version of the 'Stranger Situation' paradigm in 12-month-old pre-term and full-term infants. The methodological procedures of this study varied, compared to the classic 'Stranger Situation' paradigm, in that the study was conducted in the home environment with procedures that involved less manipulated variables with the addition of an infant free play phase, whilst mothers were being interviewed. Patterns of looking behaviours amongst both cohorts were consequently analysed, showing individual differences in patterns of looking behaviours between pre-term/full-term infants. Specifically, full-term infants displayed the category of 'Bids for Social Interaction' as their most frequent looking type for both short and long bids. In contrast, the least frequent type was pertinent to social referencing looks. Additionally, infants looked at the stranger more than they did the mother, particularly within the paradigm sequence when the stranger enters and plays with the infant.

2.7.1. Methodological issues

Clyman et al., (1986) attributed the low frequency of referential looks to methodological issues encountered in their study.

One of the issues was pertinent to the characteristics of the setting where variables, manipulated to a lesser degree, produced instances of 'mild uncertainty' (p.82) during social referencing trials that affected the frequency and patterns of social referencing. This presupposition was based on the notion that uncertainty directly elicits (low) instances of referential looks. The interpretation and theoretical conceptualisation of social referencing within

boundaries of the 'Stranger Situation' paradigm that, by virtue, attributes social referencing components within attachment relationships (and seemingly dismisses instrumental social referencing¹¹) makes it difficult to evaluate how the study's design provided less variable control that prompted a reduction in the number of referential looks.

The theoretical framework adopted brings incongruency between the qualitative and quantitative referential looks data. Conceptually, the two social referencing categories denoted two forms of infants' referential looks, based on a sequential unfolding of information-seeking function: pre or post-action. These two distinct categories imply a model of social referencing that emphasises the regulatory component of the paradigm, attributing its functionality to infants' instrumental referencing rather than affective component - based on experiencing uncertainty about the Stranger. In their modified 'Stranger Situation' paradigm, the highest elicitation of referential looks to the mother occurred when the stranger entered, played, and held the infant. Clyman et al., (1986) acknowledged that interpreting infants' intentions might have required some biased attribution, for instance, the authors used the context as a source of discernment to resolve issues such as difficulties rating looks as referential acts. To avoid such occurrences, one of the aims of this thesis is to conceptualised looks without erroneous descriptive fallacies, by generating descriptions that reflect observable behaviours and not interpretative postulations about infants' intentions.

Furthermore, the study's difficulties in discerning what constituted uncertainty led to reliability issues in the conceptualisation of social referencing looks also. The authors argued that uncertainty as a study measure might be difficult to identify. How the authors solved the uncertainty problem was by redefining referential looks to include '*specification in advance of those objects and events which evoke uncertainty*' (p.83). As an exemplar, Clyman et al., (1986) described instances when the child looked at the hand of the adult and/or the

¹¹ Instrumental social referencing provides infants with information about what to do and how to act in relation to a person, situation and/or object (Feinman, 1982; 1992) rather than how to feel.

toy in response to an adult's offer of the object. If the child first looked at the toy (with uncertainty) then at the adult, this look was rated as social referencing, but if the child first looked at the adult's hands then at the adult's face, this look was not classified as referential.

The criterion of what constituted uncertainty - based on infants' looking behaviours - did not aim to disambiguate referential looks against other looking behaviours but to '*aid judgement of the intention to seek information*' (p.83). This descriptive refinement did not solve the conceptual problem of reliably discriminate referential looks when the (so-called) uncertainty was present from other seeking-information looks. Thus, coders did use the context to rate referential looks when the child's face was not fully visible, or the face did not show a strong uncertainty affect.

One of the difficulties with using the context as a vehicle for interpreting infants' intentions and subsequent behaviours, is that the setting retains manipulated and contrived characteristics that are not representative of naturalistic environments. The lack of methodological dynamicity in Clyman's study resulted in a strong reliance on infants' reactions to adults' initiations rather than on infants' formative experiences. As in the language study conducted by Tamis-LeMonda et al., (2017) and described in previous sections, non-manipulated environments shape linguistic exchanges within social interactions, characterised by intervals of rich language input interspace with silences and periods with less language production. These dynamic components, embedded in social contexts and within interactional frameworks, are valuable sources of interpersonal information not reflected in Clyman's study but present in the current study. These elements facilitated the analytical coding process of creating an in-depth nomenclature of social looks, where the role of the adult and the influence of the context were taken into account when classifying looking behaviours.

Conceptually, other social looks categories presented some difficulties also. Clyman et al., (1986) argued that difficulties in conceptualising types of looks might have influenced the findings also. As the authors noted:

our attempt to study social referencing in nonexperimental context compelled us to delineate other types of social looking, and indeed we found it difficult to separate social referencing reliably from other types of social looks (p.88).

Firstly, the modified paradigmatic design resulted in the remaining categories - 'Bids for Social Interaction', 'Gaze Aversion' and 'Orientations' - being defined based on how infants gathered direct information from the adult, excluding those behaviours that permitted infants to acquire indirect knowledge through non-directed learning (Lewis & Feiring, 1992). The operationalised category pertinent to 'Watching Others Communicate' reflected some aspects of indirect learning by describing how infants observed others having a conversation. Yet, the paradigmatic methodology prevented the identification of other situations where infants could use other forms of indirect social information.

Secondly, the categories lacked broader social influences that info social interactions and ultimately, helped infants construct social knowledge. This limitation is most salient in categories denoting orienting looks, where definitions are constructed as causal reactions to social and non-social stimuli and not as socially mediated processes. Elicitations of orienting looks are, in fact, social in nature as they require the existence of an 'othered' component (Lahman, 2008), i.e., an agent producing the noise or the voice, and a situational incident eliciting such noise. What constitutes non-social components are the source producing the reaction: human voice versus objects. In natural environments, orienting to (social and non-social) stimuli might be embedded in richer, more sophisticated forms of looking, requiring infants to isolate the source of input amongst all the sensory and social information characterising dynamic environments by visually scanning, tracking and/or following in order to identify the referent.

Thirdly (and as detailed previously), categories pertinent to infants' 'Bids for Social Interaction' looks were conceptualised exclusively based on infants' initiations, neglecting the instances where infants responded to adult's initiations. The two social-interactive categories did not account for looking behaviours that occur as a direct effect of adults' communicative cues, i.e.,

when the adult and not the infant, solicited infants' attention. The reduction of social interactions to infants' initiations is due to the semi-naturalistic design used, preventing mothers from actively participating with the infant during trials but from being emotionally available for any other function besides providing prescribed information also. Infants' responses to adults' initiations, elicited naturally have yet to be conceptualised.

2.8. A description of social referencing looks

Following the study by Clyman et al., (1986), Hornick & Gunnar (1988) conducted a semi-naturalistic study to explore patterns and frequencies of social referencing looks in infants through their exposure to an alive rabbit. A descriptive typology of social referencing looks was obtained through the analysis of infants' referential looks in four different conditions: (1) a classic social referencing, where mothers were seated away from the infant and instructed to smile following referential looks, (2) an emotional communication segment, where mothers provided verbal and non-verbal information to the infant whilst seated and in the absence of referential looks, (3) an instrumental social referencing, where mothers approached the infant and explored the rabbit together and (4) mothers returned to their seat but continued to provide positive information to the infant. Four distinct conceptual categories were identified: (1) Referencing Looks, pertinent to looks to the mother's face following looks to the rabbit (2) Sharing, looks to the mother's face accompanied by positive affect, (3) Glances/Checks, consisting in rapid look to the mother but not necessarily to her face and (4) Other, any other look that did not rate as any of the other three categories.

Coding analysis showed that, when infants were first introduced to the rabbit, the most common looks pertained to the categories of 'Glances' or 'Sharing', and not social referencing looks. In their study, two infants (n=27) did show referential looks to the mother, but they not correlated with regulatory behaviours, despite mothers' positive messages. Additionally, patterns showed that social referencing looks were the least frequent in all conditions except for condition 3 when the mother approached the infant to explore the

rabbit together. These results provided evidence that referential looks function as a vehicle to gathering information about what to do about an object (instrumental social referencing), and not how to feel about a situation and/or toy, as previously postulated in other referential studies (Ainsworth, 1992; Kim, Walden & Knieps, 2010; Kim & Kwak, 2011; Walden & Kim, 2005). The authors argued that uncertainty might not be the necessary component in order to elicit referential looks, as the referent (a live rabbit) might not have provided the unfamiliar properties in order to induced affective 'uneasiness' in infants. Rather novelty about the animal and infants' positive appraisals of the rabbit might have prompted infants' sharing looks. This assertion is further evidenced by the analysis of patterns and frequency of looks showing 'Sharing' looks to be the most common type.

This study provided relevant conceptual and methodological knowledge of looking behaviours pertinent to infants' gathering information in less contrived experimental conditions. Methodologically, the Hornick & Gunnar's study included a condition where mothers were able to offer information in the absence of infants' referential looks, suggesting how multi-modal messages enhance infants' looking behaviours outside boundaries of social referencing. As Emde (1992) noted, messages embedded within multiple channels resemble real-life experiences and are more likely to influence infants' behaviours (Vaish & Striano, 2004).

The most frequent conceptual categories from both, Hornick & Gunnar and Clyman and associates, corresponded to 'Sharing' and 'Bids for Social Interaction'. A point of conceptual diversion between the two studies and this thesis is the attribution of information gathering properties to these two looking categories. As Hornick & Gunnar (1988) argued, infants already created their own appraisals of the live rabbit and looked at the mother intending to share that experience. Thus, information gathering it is not a necessity; rather, the interpersonal exchange is, which makes this specific look a form of joint attention.

A novelty found in the Hornick & Gunnar's (1988) study was the identification of glances as a type of social look. The scholars described glances as 'looks involving very brief visual contact with the mother, not necessarily directed toward her face, with an unchanged facial expression' (p.4). Despite glances being conceptualised within paradigmatic designs, it provided preliminary evidence of how infants use attentional processes when two components have been established: (1) appraisals about an object (in this case a live rabbit) and (2) when interpersonal and instrumental information have been exchanged within dyadic encounters. These two components might reduce infants' need for acquiring information from the adult, shifting looks toward more monitoring than seeking information processes.

Nonetheless, little is known about these types of looking behaviours as fewer other studies have conceptualised looks as glances, except for another study by Hobson & Hobson (2007) examining identification as an imitative component of joint attention in typically and autistic children. The authors included measures of self/other interpersonal engagements, amongst others 'Checking' looks, that were used to assess either the situation or the tester's response' (p.148). Whilst Hobson & Hobson's attributed cognitive properties to this category, Gunnar and Hornick (1988) emphasised the shortness and swiftness of glances. It is plausible that glances are typified by both duration and cognitive components to provide infants with access to brief attentional focus in order to regulate and/or maintain their behaviour.

Subsequent research has examined looking behaviours at a specific stage, for instance, how looking behaviours function in the context of humour (Mireault et al., 2014), in toddlers (Martin, Crnic & Belsky, 2003) and within the locomotor transitional stage from crawling to walking (Clearfield, Osborne & Mullen, 2008). The latter study used the operationalised typology of social looks by Clyman et al., (1986) to study changes in looking behaviours within the onset of infant's locomotion (particularly from crawling to walking).

The methodology of the Clearfield's study consisted in the introduction of components of the social referencing paradigm¹² during parent-child interactions in a laboratory setting, where (1) the frequency of social referencing looks amongst all social looking behaviours and (2) the walking distance undertaken by the infants around the laboratory setting, was measured. As in the studies by Clyman et al., (1986) and Gunnar & Hornick (1988) results demonstrated higher prevalences for 'Initiated Bids for Interaction' looks than 'Social Referencing' looks. However, a conceptual error with Clearfield's study was the attribution of the same social functionality to two different looking categories, 'Watching Others Communicate' and 'Initiating Bids for Social Interaction.'

There is a significant semantical difference with those social looks representing joint attentional processes - as in the case of 'Bids for Interaction' - and those that constitute indirect forms of social learning, such as 'Watching Others Communicate.' Both looks facilitate infants social understanding, but they include different social-cognitive components and distinct mental functions when elicited. This conceptual error might be linked to the reliability issues in concept development that encountered by Clyman's study, and that affected the subsequent use and interpretation of the typology of looks.

Despite attempts to move social referencing studies outside laboratory settings (Clyman et al., 1986; Hornick & Gunnar, 1988), there are no studies that have explored broader operationalisations of looking behaviours in naturalistic settings. This project aims to fill this gap by identifying and conceptualising social looks in naturalistic environments.

2.9. Conclusion

This chapter has contextualised this thesis' aims within the areas of joint attention and social referencing. It has contextualised the different paradigms used to elicit referential looks and to examine behaviour regulation in typically

¹² The manipulation of variables in the form of placing novel toys in two corners of the laboratory room and facial emotional displays by the mothers (happy vs concerned) was applied. If the infant showed approaching behaviours to a toy, the parent was instructed to smile; if the infant displayed avoidance by trying to evacuate the play area, the parent had to show a negative face.

developing infants, contributing to the understanding of how infants seek information from an adult in situations of ambiguity.

In the next chapter, I present my research positionality, methodology and methods underpinning this research and the decisions made to answer the research questions pertinent to this enquiry.

Chapter 3

Methodology

3.0. Introduction

The previous chapter evaluated how social referencing studies have used different paradigms to examine elements of infants' social-emotional development, specifically how different sequential components of referencing operate under conditions of uncertainty. Additionally, it provided a detailed explanation of a single study on social looks that serves as a framework for this work. The previous chapter also highlighted the lack of research studies examining looking behaviours not solely ecologically but longitudinally also. Seeking to fill this gap, this thesis set about to identify and conceptualise social looks within natural contexts, specifically within nursery settings, across three timelines (T1= 12-14 months; T2= 15-17 months; T3= 24-26 months). In order to create an in-depth typology of social looks that included the intertwined relationship between infants, adults and the social contexts, this study engaged in a constructivist methodological approach, where such social interrelation does not constitute a process influenced unidirectionally but is characterised by being multidimensional and multifaceted (Wang, 2017).

This chapter presents the conceptual framework of the research, providing a detailed description of the constructivist approach and the rationale for its use in this thesis. Within social referencing studies, there is a consensus – arising from ontological beliefs – that the best epistemological approaches to study the phenomenon are through experimental designs where variables are manipulated in order to examine infants' behaviours. This study provides a novel and differential perspective, as moves beyond specific paradigmatic models of social referencing and into the exploration of attentional processes within naturalistic settings, providing a broader epistemological stance.

3.1. Paradigms and the constructivist approach

Paradigms have been defined as 'the set of beliefs and practices that guide a field' (Morgan, 2007:49). In research, paradigmatic positionality determines

the ontological frameworks and epistemological stances that influence the pursuit of knowledge. Guba & Lincoln (1994:112) asserted that:

implicit or explicitly, these [paradigms] positions have important consequences for the practical conduct of inquiry, as well as for the interpretations of findings and policy choices.

Two dominant approaches - qualitative and quantitative methods - have dominated social science research (Morgan, 2007) creating a polarised contrast between the two approaches (see Guba & Lincolns' 'Major Paradigms and Perspectives'). This contrast led researchers to advocate for alternative paradigms approaches (Morgan, 2007) to decrease the 'paradigm war' (Clegg, 2005) and combine both, qualitative and quantitative methods, shifting the attentional focus from ontological concerns to epistemological practices.

Morgan (2007) - influenced by Kuhn (1962/1996) - conceptualised the different paradigms as belonging to an ontological hierarchy within a continuum composed of four versions ranging from generality to specificity: (1) Worldviews: that include macro-social structures pertinent to values, morals and aesthetics (2) Epistemological Stances: that constitute a narrower approach where epistemological aspects are considered pertinent to researchers ontological belief systems, (3) Shared beliefs Among Members of a Speciality Area: where ontological aspects of meaningful inquiries, linked to best epistemological practices, are consensually agreed and consistently applied and (4) Models Examples of Research: that provide the highest level of specificity and consist in the 'Models Examples of research', serving as exemplars of how research is conducted within a specific field. As Morgan claims, (2007:50):

All four versions treat paradigms as shared beliefs systems that influence the kinds of knowledge researchers seek and how they interpret the evidence they collect.

These different paradigms are a distinctive differentiation of Guba & Lincoln's (1994) definition of paradigms as worldviews (or fundamental beliefs), guiding the researcher not solely through methods but through ontology and

epistemology also. Morgan's assertion that all four paradigms 'are nested within each other' (p. 54) provides both paradigmatic cohesion as well as research differentiation.

Guba & Lincoln (1994) believed that all paradigms are 'human constructions' (p.108) as they are formulated and operationalised by the human mind. The authors created an intra-paradigmatic system for distinguishing and comparing paradigms inquiries, based on three components pertinent to ontology, epistemology, and methodology (1994:108):

Inquiry paradigms define for inquirers what it is they are about, and what falls within and outside the limits of legitimate inquiry. The basic beliefs that define inquiry paradigms can be summarised by the responses given by proponents of any given paradigm to three fundamental questions, which are interconnected in such a way that the answer given to any one question, taken in any order, constrains how the others might be answered.

The paradigmatic inquiry distinctions were primarily pertinent to positivism and constructivism, whereby ontological differences resulted in significant epistemological and methodological consequences. The authors explicitly advocated for a qualitative approach based on a Naturalistic Inquiry - that later became a form of constructivism. Guba & Lincoln (1994) considered positivist paradigms as reductionists due to the level of control that researchers asserted of certain variables over others, affecting the relevance of phenomena, this is generalisability and applicability, over research rigour. Additionally, Guba & Lincoln (1994) believed that positivist approaches strive for determinism, i.e., predictability through hypothesis testing, detracted research from including meaning and purpose of human behaviour. Guba & Lincoln (1994: 106) postulated:

Two critiques [to positivist paradigms], one internal to the conventional paradigm (that is, in terms of those metaphysical assumptions that define the nature of positivist inquiry) and one external to it (that is, in terms of those assumptions defining alternative paradigms), have been mounted that seem not only to warrant a reconsideration of the utility of qualitative data but to question the very assumptions on which the putative superiority of quantification has been based.

Guba & Lincoln (1994) counterbalanced empiricist approaches with constructivist views, such as observational methods, that prioritised understandings through theoretical consensus and qualitative designs. The paradigm differentiation depicted by Morgan (2007) and the intra-paradigm system analysis proposed by Guba & Lincoln (1994) illustrates research differences and points of diversion between social referencing studies and this study of social looks. It explicitly provides the epistemological positionality of this thesis as a constructivist approach to examine looking behaviours.

To reiterate, the paradigmatic position of social referencing studies shares some commonalities with positivist/postpositivist approaches, believing that reality - in this instance the phenomenon of social referencing – is fused through causal laws that aim for ‘nomological prediction and explanation’ (Baškarada & Koronios, 2018:5), this is, explanations to identify the cause of an effect, or a set of causes that are determined by predictions related to the effects. As in the case of social referencing, explanations of the phenomenon are described in terms of the presence of uncertainty (cause) that results in infants’ referencing the adult (effect) to seek (affective) information in order to regulate their behaviour (effect¹³). The nature of this reality (as in the social referencing phenomenon) stipulates predictions to three different independent components (Baškarada & Koronios, 2018): probability, quantity, and timing. In social referencing studies, probability is considered based on predictions that are made about the unfolding of the phenomenon within its sequential components; quantity is attributed to the changes in infants’ behaviour based on causality and within the limits of the paradigms and timing, pertinent to infants’ behavioural changes occurring following the introduction of different independent variables that elicit specific changes (referential looks and behaviour regulation).

A point of diversion of social referencing paradigms that prevent the models from entirely ascribing to positivist approaches is the examination of the phenomenon under some social influences, pertinent to affective messages

¹³ The causal component evoking regulatory behaviours effects is constituted by the affective message displayed by the adult, following infants’ referential looks.

from social agents. Despite emotional signals being controlled and constrained to be unidirectional, the paradigms do not establish a total independent relation between the researcher and the phenomenon being researched, as adults' messages do socially influence infants' regulatory behaviours.

Following the paradigmatic hierarchy established by Morgan, social referencing studies can be postulated within the last two models: 'Shared beliefs Among Members of a Speciality Area' and 'Models Examples of Research', where beliefs pertinent to how infants act in situations of uncertainty and the use of adults' affective messages to regulate their own behaviour leads to the investigation of social referencing using paradigmatic models such as 'the Ambiguity Postulate', 'the Stranger Situation' and the 'Visual Cliff' as valid research exemplars. Thus, the lack of alternative epistemological models to study the phenomenon in ecological settings prompted a paradigmatic shift that resulted in the consideration, by some scholars, of alternative methodologies to understand social referencing, away from contrived paradigm models.

Clyman et al., (1986) as well as Hornick & Gunnar (1988), attempted to undertake such endeavour by exploring the phenomenon in less manipulated environments of semi-naturalistic settings, however, the paradigmatic shift did not have the repercussion expected.

In this thesis, the ontological position pursues such paradigmatic shift, by the exploration of social looks as they unfold naturally. This study, therefore, can be (partially) positioned within the broader perspectives of paradigms (Morgan, 2007), specifically within the two distinct versions of 'Worldviews' and 'the Epistemological Stances'. This positionality arises from the notion that social phenomena, specifically looking behaviours, are components of the social world better explored naturally. More explicitly, social looks when elicited within social interactions and embedded within social contexts, facilitate and influence infants' construction of their own realities.

This view aligns with the approach, providing the theoretical framework for this research. An element of diversion preventing this research from entirely

ascribing to the broadest version of paradigms (as worldviews) is the lack of accountability for macro-social structural issues, pertinent to ethical and moral values within society. This research takes into consideration social contexts as the backdrop for the elicitation and exploration of social looks in natural settings but does not engage in cultural-historical components and/or issues such as social justice. Using the inquiry paradigm model of Guba & Lincoln (1994), this thesis' epistemological positionality is detailed as follows:

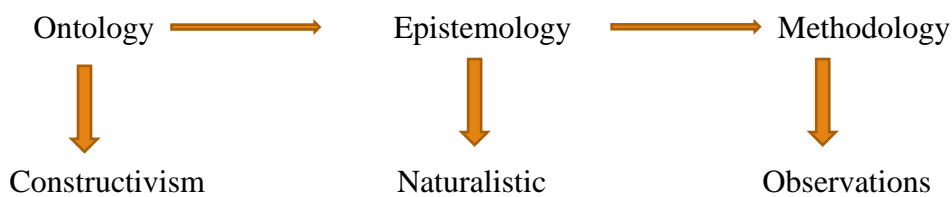


Figure 3.1. This thesis inquiry model

The following sections will describe the components constituting the theoretical perspective, methodology and methods used to study social looks.

3.2. Constructivism as an ontological framework

As mentioned previously, the overall theoretical framework underpinning this research is based on a constructivist approach (Dewey, 1933/1998; Piaget, 1962, 1972; Vygotsky, 1962; 1978).

Constructivism is based on the premise that individuals construct their understanding of social realities through the discoveries, learnings and experiences obtained within social interactions. Individuals cannot be separated from their social contexts as they provide the means for interpretation of social action (Vygotsky, 1962, 1980; Bodrova & Leong, 2007).

This theoretical approach places great value in the assertion that knowledge is socially constructed through a process of meaning-making. As Schwandt (1998) states: 'constructivism means that human beings do not find or discover knowledge as much as they construct or make it' (p.237). Knowledge, in this instance, is not considered a means to an end but its construction is framed

within socially shared frameworks of social interactions within cultural settings (Rogoff, 1990; Schwandt, 1998; Tomasello et al., 2005; Vygotsky, 1978).

The theoretical perspective of this thesis is based on the premise that infants' social looking behaviours play a critical role in the construction of social meaning during episodes of active engagement. This approach differs from other social constructivist stances - such as ethnology and ethnography - as their interest resides in how cultural and social aspects of knowledge construction, i.e. relations of power or demographical and social factors, influence children's self-identity and participatory roles within research (Hedegaard & Fler, 2008; Richardson, 2003). This thesis, therefore, takes a more psychological constructivist approach to examining social looks. A psychological constructivist perspective requires that the phenomenon under study is considered an experiential act, that is elicited socially to understand how infants create meanings within social settings (Fosnot & Perry, 2005; Richardson, 2003). Here, social contexts and social partners are influences to social looking behaviours, not constraints to infant's social participatory roles. Thus, social components - consisting of social partners, interactions, and contexts - add to the infants' contribution and construction of knowledge, creating shared social and psychological understandings without focusing on moral and cultural issues. Ultimately, this enquiry does not adhere to the conceptions and analytical interpretations of some social-cultural constructivist approaches, by excluding any method that involves the researcher taking an active role with participants. Rather, by observing interactions and behaviours that permit the natural unfolding of attentional acts. Social looks, therefore, are constructively conceptualised based on the following assertions: (1) that infants actively construct social knowledge by engaging in social experiences, (2) that the acquisition of meaning is influenced and mediated by others (3) that social contexts - defined by the practices, values and beliefs related to a specific setting - contribute to this constructive learning process.

Valsiner (2001) describes signs as psychological processes that are subjectively constructed, emerging through intra and inter psychological worlds. Much in alignment with Valsiner's (2001) conceptualisation of signs, social looks emerge and are elicited within intra and interpersonal processes

established within social domains. Nonetheless, in this thesis, social looks are not conceptualised as subjectively constructed but socially mediated elements that establish a semiotic and social relation between the infant, the social partner and the context. Looking behaviours provide attentional fields by capturing what Valsiner (2001) alludes to 'relative stability' (p.87) within communicative signs, i.e. they encapsulate infants' experiential elements of the social world, facilitating the construction of knowledge. This ontological stance to social looking cannot be conceptualised as isomorphic to experimental approaches as their examination do not take place within lower psychological levels of stimulus-response approaches, rather they transcend perceptive realms into socially mediated domains.

This ontological view shares commonalities with the constructivist approach to understanding emotions (Barrett, 2006, 2009, 2013, 2017; Linquist et al., 2012). Research on the topic of how emotions are made postulates that emotions are individually conceptualised (and ultimately constructed) by acts combining intra-personal experiences unfolding within social contexts. This active immersion of the individual in social situations permits the acquisition of concepts (mental representations) functioning as facilitators of emotion construction. As Barrett emphasises (2017:40):

we don't recognise emotions or identify emotions: we construct our own emotional experiences, and our perceptions of other's emotions, on the spot, as needed, through a complex interplay of systems.

This thesis uses a similar constructivist position and principles to frame social looking as Barrett (2013, 2017) does. It considers looking behaviours as being socially mediated and embedded within contexts. Much in line with Barrett's dispute of processes based solely on recognition and identification of emotion over constructivists approaches, this thesis diverts from social referencing paradigms also, and considers the phenomenon of social looking as socially constructed experiences.

3.3. Social partners as mediators of social meanings

The constructivist perspective places value in the process of learning (Bodrova & Leong, 2007; Liu & Chen, 2010; Lutz & Huitt, 2004; Vigotsky, 1962) that is characterised as being mediated through social interactions, transmitted by adults and constructed by infants through the establishment of shared meanings (Emde, 2009; Tomasello et al., 2005; Vigotsky, 1962). Co-constructing knowledge through social engagements requires adults to collaborate and contribute to building an understanding of social encounters, objects and events (Bandura, 1978).

The constructivist approach employed in this thesis views social looks as intrinsic to human agency that neither can be separated nor manipulated away from social influences. Social referencing research, including the Clyman et al., (1986) study, discounts human action over the unidirectional process of transferring and receiving of information, exempted of any mediated and shared meanings. Whereas the role of the infant consists in referencing the adult to seek information about an uncertain object and/or event, the adult's role is solely to provide binary affective information (Hirshberg & Svejda, 1990; Rosen, Adamson & Bakeman, 1992; Walden & Baxter, 1989; Walden & Ogan, 1988). In this thesis, the social relationships established between adult and child (through looking behaviours and including referential looks) are considered not as merely operant exchanges of information but as social experiences.

Tomasello et al., (2005) proposed a theory of shared intentionality to explain how humans come to understand and develop social cognition. This theory places importance in two aspects: (1) the infants' ability to understand intentionality and (2) infants' ability to share emotional states. These two functions operate as a one modular system permitting the emergence of what they called 'dialogic cognitive representations' (Tomasello et al., 2005: 689). These representations manifest as a result of infants' dyadic and triadic social experiences that permit infants' participation in meaningful, collaborative and cultural practices.

The theory of intentionality claims that social interactions - in the form of joint attentional engagements - constitute a key component of how infants construct an understanding of the social world. Research findings in the field of joint attention corroborate this assertion by demonstrating that joint attentional processes not solely represent a milestone for developing language and learning (Carpenter, Nagell & Tomasello, 1998; Mundy, 2013, 2016, 2018), but constitute the mechanisms involved in social relatedness also (Mundy, 2016; Osório et al., 2011). As Mundy (2016:8) states:

social relatedness is built around shared experiences with others, and the opportunity to repeatedly process information about a common reference, such an event, with other people during episodes of joint attention is essential in sharing experiences.

This thesis shares Tomasello and associates' proposal stating that how children come to know about other's intentions occurs through social engagements. Thus, social interactions create frameworks of shared meaning that contribute to infants' social understanding. It is plausible that these meaning-making processes are not reduced to infants' participatory roles (as within ethnographic approaches) or infants' reactions to ambiguous stimuli (as in the social referencing paradigms), rather, they are elicited within indirect forms of observational learning (Lewis & Feiring, 1992). During non-directive episodes, infants observe adults' actions and behaviours unfolding within social environments serving as referents of social information (Bakeman & Adamson, 1984; Perra & Gattis, 2012) and as a source of influence for social learning (Lewis & Feiring, 1992). Indirect learning, therefore, might function similar to joint attentional interactions, with both experiences involving looking behaviours that serve as an attentional tool to actions, events and activities related to social partners within social contexts.

3.4. Contexts as facilitators of meanings

The different paradigmatic models of social referencing have used the physical environment of laboratory settings to manipulate and expose infants to uncertainty (Baldwin and Moses, 1996; Campos & Stenberg, 1981; Feinman, 1992; Striano & Rochat, 2000; Stenberg, 2003; Walden & Ogan, 1988). This

attribution creates a structural relation between the infant and the environment that is exempted from the influences of broader social structures such as values, norms, and expectations (Emde, 2009). In this thesis, nursery settings were used as socio-cultural spaces that served as a backdrop for infants' elicitation of social looking behaviours. According to Hedegaard, (2008), institutional practices influence how infants engage in the different activities that promote changes in development. Familiar contexts create practices and routines that permit infants to initiate and respond to interactions with others and to build direct and indirect social experiences. Social referencing paradigms prevent infants from actively engaging and gaining familiarity with the social contexts (in this instance, laboratory settings) and to form any (internal) meaningful valuations¹⁴ (Emde, 1992, 2009), refraining infants from developing social representations such as reciprocity and empathy (Emde, 2009).

In this thesis, the naturalistic approach taken permits social settings to function as social frameworks for the elicitation of looking behaviours. Social looks provide infants with the visual engagement and attentional processes necessary to attend and interpret (novel) experiences, actions and activities into internalised rules and expectations from specific environments, in this instance nursery settings, in order to guide infants' pro-social behaviours. Additionally, institutional activities provide different experiences for infants than those within home environments (Hedegaard, 2008), as the practices, activities and relations of institutions provide different learning conditions. Nurseries - as natural unfolding environments - are inasmuch as different as experimental settings, where variables are manipulated and measured outside social influences. The identification and subsequent conceptualisation of social looks, as they unfolded naturally in nursery practices, informed infants of the 'motive goal' (Hedegaard, 2008:16) in this instance, looks to the adult's face that possessed distinct functionalities, facilitating infants' creation of social knowledge.

¹⁴ Valuations refer to the internalisation of expectations about rules within social settings.

In summary, the constructivist position of this thesis postulates the importance of infants' active process in creating meaning of social realities within social structures, pertinent to both interpersonal relations and cultural influences. These different social layers create a process of 'symbolic mediation' (Wang, 2017:54) where social interactions with significant adults do merge with values, norms and practices of the setting in which are elicited, resulting in infants' constructing knowledge about their social realities. As Wang (2017) describes: 'any given psychological process is being shaped by factors within the person, at the level of the person, and between persons' (p.55). This broader conceptualisation permits the interpretation and understanding of how infants become to understand their social world through a social analysis of looking behaviours, rather than relying (exclusively) on a perceptual stimulus and infants' reactive responses found in social referencing paradigms. Interpretation, therefore, constitutes a fundamental, epistemological perspective in this thesis.

3.5. The Epistemological stance

3.5.1. Interpretivism

Orienting the researcher towards how infants actively attend to and engage with the social world requires an interpretative perspective.

Baškarada & Koronios (2018) defined interpretivism as a reflexive posture towards tradition, where meanings are established within the context of the cultural world. Interpretivism is usually associated with constructivist approaches (Baškarada & Koronios, 2018; Guba & Lincoln, 1994; Morgan, 2007) and presumes that social phenomena are based on explanations and constructions of meaning (Baškarada & Koronios, 2018). Walsham (1993) states that the goal of interpretivism is to make sense of the social world through the examination of contexts - where information emerges - and the establishment of a feedback process between information and context. This feedback loop is explored and understood by procedures allowing the acknowledgement and reconstruction of aspects of the natural world made explicit through human interactions and actions (Goldkuhl, 2012). Interpretation, therefore, is a crucial strategy for acquiring meaning,

particularly if one views individuals as intentional, goal-directed and active in their own constructions of their social realities (Blumer, 1969, 1979; Kelliher, 2005).

Baškarada & Koronios, (2018) argue that positivists may adopt either methodological individualism (where the focus is on the individual exclusively) or methodological holism, based on the power found within macro-levels of social structures. Social referencing paradigms primarily advocate for the former, as explanations of the referencing process are based solely on the infants' reactions to the exposure of stimuli, established within causal relations. Conversely, this thesis advocates for the creation of interpretative meanings of social looks, by a process of coding observational data embedded within social interactions and influenced by cultural contexts.

This analytical process, therefore, requires the researcher to observe, interpret and make decisions about the elicitation of the phenomenon. This study explores infants' social looks at three different time points (T1= 12-14 months; T2= 15-17 months; T3= 24-26 months) and as they occurred naturally. The method used aligned with the research inquiry, consisting in the use of behavioural observations, where looks are identified - using a micro-unit definition - and coded through inductive and comparative techniques, where behaviour manifestations of social look acts are conceptualised into conceptual categories.

Unlike other qualitative approaches, such as phenomenology, where understandings of social phenomena are considered first-degree interpretivism (Mcgill, Schutz, Natanson, & Breda 1963), the construction of the typology of social looks was not a product of first-hand experience. The first-hand phenomenological strategy is based on the premise that the constructs onto human behaviour are created through the meanings of the person enquiring about such understandings (Bahari, 2010). As Saunders, Lewis & Thornhill (2007:106) described:

Interpretivist researchers play a role of 'social actors' where they could interpret their everyday social roles in accordance with the meaning given to these roles and interpret the social roles of others in accordance with our own set of meaning.

Interpretation in this thesis consisted of a second-degree framework (Mcgill, Schutz, Natanson, & Breda 1963), referring to the process by which social looks were displayed by infants (first-degree construct) but interpreted by the principal researcher, through processes of inductive analysis (Schwandt, 1998). Infants elicited social looks naturally, exempted of any interpretative or conceptual functions. First-order variables (social looks) are not *per se* meaningful, substantial concepts that exist in isolation and exempted of any social connotations (much like social referencing paradigms). Rather, they require an interpretivist approach - undertaken by the researcher (second-degree construct) - to transform behavioural manifestations into constructs of conceptual meanings (Wang, 2017). The interpretative process consequently resulted in the creation of an in-depth nomenclature of social looks.

The interpretation of these intertwined, multi-layered components required a methodology that encapsulated the natural, social flow of interactions without variable manipulation¹⁵ (Valsiner, 2001; Wang, 2017). The researcher's choice of a qualitative, naturalistic methodology permitted the exploration of social looks outside experimental constraints.

3.6. Qualitative methods in naturalistic settings

Lewis and Ritchie noted (2003:2) that: '[qualitative research] enables researchers to gain an in-depth understanding of the social world.' The use of a naturalistic perspective allows researchers to remain close to the social context and the interpersonal relations in which they emerge (Blumer, 1969).

Owens (1982) refers to the term naturalistic as the dynamic system in which all parts are interconnected, influencing the other parts. He further states (1982:6) that,

to understand the reality of that world requires acceptance of the notion that the parts cannot be separated, bit by bit, for careful

¹⁵ This research pre-selected some variables pertinent to an age criterion and the type of setting to observe social referencing. The lack of manipulation is refereed here as the absence of experimentation and to the recordings of the phenomenon as it unfolded in the social setting.

examination without distorting the system that one seeks to understand.

A naturalistic position advocates for the examination of human behaviours 'in situ', with all the complexities and dynamicity that the different components of the social system bring. Heyman, Lorber, Eddy & West (2014) consider naturalistic settings and situations as being ecologically valid, as they require fewer inferences about generalisability. Conversely, semi-naturalistic studies increase the quality of data but decrease generalisability, as they convert typical environments into 'something close but not identical to the real world' (p.8).

In the case of the semi-naturalistic studies conducted by Clyman and Hornick & Gunnar, the environment represented a small diversion from experimental settings, as Clyman et al., (1986) used a modified paradigmatic model to examine referential and social looks, the 'Stranger Situation', creating a gap between the less manipulated methods and the unaffected natural world. This methodological difference was noted in their findings showing that, when variables became less manipulated, frequency and patterns of looks differed from those within empirical, social referencing studies. For instance, the most frequent type of looks in their study was 'Bids for Interaction (Short and Long)' and in the Hornick & Gunnar (1988) study, 'Sharing' looks presented a higher frequency rate than referential looks. In this study, the natural context provides direct ecological validity to social looking behaviours resolving the lack of generalisability issue within nursery settings.

This thesis provides an epistemological stance that moves social looking research away from laboratory settings -overpassing the semi-naturalistic designs used by Clyman and colleagues - directly into naturalistic settings. Thus, it allows the examination of social looking types as well as the comparison of natural patterns of looks against experimental methodologies. According to Heyman, Lorber, Eddy & West (2014), one of the issues of conducting research in naturalistic environments is the difficulty in isolating the cause of specific behaviour, as multiple causes can naturally elicit the

behaviour. In this study, social influences are not solely accepted but desirable also, to permit the qualitative nature of the research inquiry to be examined. Nonetheless, to avoid the issue postulated by Heyman and associates, a micro-behaviour code unit, defined discretely as a single behaviour, was adopted. This definition has been used in previous social looks research studies (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Martin, Crnic & Belsky, 2003) and it is postulated as 'infants' looks to the adult's face'. This concrete behavioural unit permitted the clear identification of acts of looking within dynamic, natural settings as well as facilitated the coding analysis process, by constituting looking occurrences as micro-behavioural units (see chapter 5).

The naturalistic approach required a method that fulfilled the purpose of the research inquiry. Hence, the use of observations constituted a preferred choice as it allowed to remain close to the phenomenon and to capture natural occurrences of social looks. The study's infants' observational data was gathered in nursery settings at three different developmental ages (12-14 months; 15-17 months and 24-26 months), which presupposed the selection of some variables pertinent to age and setting. The stipulation of the age variable was decided based on other social referencing research (Hornick & Gunnar, 1998; Sorce, Emde, Campos & Klinnert, 1985; Stenberg, 2016; Vaish & Striano, 2004) and the Clyman et al., (1986) study, using infants between 12-18 months of age to explore social referencing and social looks.

3.7. Observations as a method for the study of social looks

According to Guba & Lincoln (1994:108), 'not any methodology is appropriate'. The authors advocated for the selection of methods that aligned with the predetermined methodology, informed by the researchers' ontological positionality.

As mentioned previously, infants' observations were chosen to allow social looks to be recorded, observed, and interpreted in natural contexts. Observations represented the frame of reference for the creation of in-depth knowledge about social looks, positioning looking behaviours within co-constructed social experiences (Handberg et al., 2015). This method permitted

the study of specific social processes involved in the emergence of attentional processes.

Heyman, Lorber, Eddy & West (2014:2) define behavioural observations as ‘a researcher seeing and/or hearing and then systematically recording the behaviours of an individual or groups of individuals within a particular social context’. According to the authors, behavioural observations are both a method for identifying behaviours that are fundamental for theories and an analytical process of testing behavioural theories. This definition corresponds with the aim of this research inquiry, where observations of occurrences of social looks provided objective information about social looks processes (rather than outcomes), pertinent to types of social looks as well as being a tool to examine frequency and distribution measures amongst participants and across times.

The type of observation executed in this study corresponded to what Robson & McCartan (2016:318) called ‘the marginal participant’ or ‘complete observer’ (Baker, 2006), pertinent to the position of the researcher as non-interactive. The principal researcher was physically present in the setting and seen by the infants attending nursery but avoided any involvement and participation with any of the participants (including non-participant infants) and with adults also, which diverts from other theoretical approaches using participant observations¹⁶. This role is, nonetheless, not exempted of influence within the social setting and the children involved. As Woodhead and Faulkner (2000) stated: ‘observers whose intentions are to be unobtrusive are ‘kidding themselves’ (p.17).

3.7.1. The ‘observer effect’

The presence of the researcher during data gathering might produce a degree of an ‘observer effect’, creating moments of unwarranted reactivity in infants’ behaviours (Robson & McCartan, 2016). These behaviours can momentarily

¹⁶ Other research approaches such as phenomenology or ethnography use participant observations as their method of data collection consisting in the immersion of the researcher within the participants and/or setting under study. This role involves a higher degree of participation than does observation (Gold, 1958; Pearsall, 1970).

shift children's attention from the natural fluidity of social events to the observer and the actions undertaken when collecting data.

This effect was noticed during observations within each time point, where infants became aware of the presence of the researcher and diverted their attention towards the unfamiliar adult, resulting in the momentary alteration of their behaviours. Additionally, some participants displayed approaching behaviours in order to initiate interactions with the researcher or attempted to touch the equipment in an exploratory manner. Robson & McCartan (2016) suggested the use of various strategies that researchers - conducting observational data - can apply to minimise this effect. First, the authors proposed a position of minimal engagement with participants by avoiding eye-contact, smiles or any other type of behaviours that might elicit and/or reward children' approaching and/or interacting behaviours.

A second strategy requires the use of the environment to allow observers to position themselves at an angle that promotes un-intrusiveness and some level of invisibility. This type of strategy refers to a process of observer's habituation through continual exposure and presence. According to Robson & McCartan (2016), habituation is achieved when participants revert to displaying patterns of interactions and reduce and/or stop interactive attempts towards the observer. This strategy was applied during the three sets of data collection and proved to be helpful not solely for gathering raw footages of infants' interactions but for nursery staff also, as it allowed them to carry on with their duties without interference from the researcher. Equally, participants' habituation to the researcher was established soon after data gathering processes began, as those infants who initially attempted to interact with the observer, decreased in their attempts soon after.

In this thesis, non-verbal behaviours - in the form of establishing eye-contact with the researcher - were observed throughout the data collection process. The presence of the observer did elicit a response and shifted the focus of attention for some, but not all participants. For instance, they looked at the camera as well as the researcher occasionally, approaching the apparatus in an attempt to explore it. These actions caused looking acts to momentarily

shift towards the observer, resulting in some levels of distractibility during data gathering. To minimise the observer effect, the researcher applied the strategies described by Robson & McCartan (2016). Prior to conducting the natural observations, the researcher allowed time for infants to get habituated to the researcher and the equipment, by setting up the equipment and waiting a few minutes to one side of the nursery room, ensuring infants' attention was redirected (following a novelty to the researcher period) to the natural context and not to the unfamiliar adult. Additionally, the short habituation time allowed the researcher to gather information about the daily dynamics of the setting and to formulate an *in situ*, strategic, recording plan as to where the participants were located within the room and the best physical position to conduct the recordings so to remain as non-intrusive and 'invisible' as possible.

During recordings, the researcher attempted, as much as possible, to position herself at different angles within the room, so to capture infants' interactions and faces as well as allowing some physical distance to not (unintentionally) prompt infants to initiate interactions. During instances where infants attempted interactions, the researcher refrained from interacting, by gently distancing from the infant and not providing any social contact, such as smiles or looks, that might have been perceived as invitations for interactions. Additionally, nursery members re-directed infants' attention toward an object or other activities away from the researcher and the recording equipment.

Attempts for initiations decreased considerably soon after collection procedures began; nonetheless, the dynamicity of settings provoked some isolated attempts to engage with the researcher during the duration of video recordings. The longitudinal nature of the research allowed the researcher to become familiar with the setting and the temperament of participants, particularly at Time 2 and Time 3. For instance, some participants tended to be more socially overt, showing a higher predisposition for exploring novelty, in this instance, approaching the researcher more. In contrast, other infants liked to remain within physical distance of the familiar adults and occasionally observed the behaviours of the researcher without actively seeking contact. This knowledge, gathered during Time 1 data collection, facilitated the

recording process at subsequent timelines as permitted the researcher to make informed decisions such as extending the duration of recordings with overt participants for effective data collection.

As previously mentioned, observations were conducted across three stipulated time points, pertinent to specific chronological ages of participants (12-14 months; 15-17 months and 24-26 months). The longitudinal design of this study permitted the examination of social looks as well as the identification of changes in looking patterns over time amongst infants within the same cohort. As mentioned in chapter 2, naturalistic research with infants at risk is limited, and there are no research studies that have examined social looks as a measure to understand early social-attentional processes. This research was not able to fulfil the requirements of the last research inquiry due to encountering difficulties in recruiting at-risk participants. The stipulation of contrived research criteria, i.e., infants at risk required to be (1) of a chronological age between 12-18 months and (2) have a sibling already identified as autistic hindered the recruiting process. The researcher was aware of potential difficulties with finding participants that met both criteria; nonetheless, the researcher felt that in order to gain validity and reliably to compare both cohorts, the age criterion selection was necessary.

The researcher's willingness to maintain such restricted age criterion resulted in an inability to find participants for the study and prompted a reconsideration of the research project. Following difficulties with recruiting, the option to increase the age criterion for infants at risk was considered and later dismissed due to a lack of research representativeness in comparing typically developing infants and (potentially) toddlers at-risk and the difficulties in recruiting toddlers whose sibling(s) held a positive autistic identification. A survey conducted by Crane et al., (2016), examining parents' opinions and experiences in obtaining a positive identification of autism for their children in the UK, placed an average of 3.5 years as the waiting time from when parents initially expressed concerns about their children's development to a positive confirmation and identification of autism, stipulating the age of identification as 5.5. years for autistic children

and 11 years for Aspergers¹⁷. The average age of identification had implications for this research, as the age of children receiving positive identification as autistic would have placed the average ages of their sibling as toddlers or older, resulting in abilities such as language and social skills being developmentally more mature, and complex, compared to the cohort of infants of this thesis' first and follow-up studies.

The dismissal to increase the age criterion for the at-risk cohort prompted a shift in the research inquiry into re-examining social looking behaviours within the same cohort but at a different time point, i.e., at a much later chronological age¹⁸. This decision transformed the initial inquiry from a comparative study to a longitudinal exploration of social looks and proved pertinent to the overall purpose of the research.

However, the longitudinal study design was not exempted of difficulties. Longitudinal studies have the disadvantage of being time-consuming and not cost-effective (Choy, 2014). As Caruana, Roman, Hernández-Sánchez & Solli (2015:538) state:

Conducting longitudinal research is demanding in that it requires an appropriate infrastructure that is sufficiently robust to withstand the test of time, for the actual duration of the study.

Additionally, recruitment and pragmatical issues were encountered due to the wider gap between data collection from Time 2 to Time 3¹⁹, which affected components of the replicability due to the low sample, particularly at Time 3 (n=11). Pragmatically, nursery settings were located within the UK and Spain, which made the ability to find participants within the same cohort available, a year later, very challenging. Additionally, time availability between the

¹⁷ Asperger's Syndrome was one of four separate diagnosis labels identified in the Diagnostic Statistical Manual. In the revised version, DSM-5 (2013) the separate autistic labels were redefined within an Autism Spectrum Disorder continuum, based on criteria of severity and levels of need required by the individual.

¹⁸ Discussions were conducted with my supervisors as to how to move the research forward and the decision was made to return to the initial cohort, a whole year had passed.

¹⁹ Such gap was created as the researcher spent time trying to recruit participants at risk and then having conversations with my supervisors around the different options possible to carry the research forward.

researcher and some of the nurseries identified in the study was limited, impacting in data collection procedures. For instance, some participants attended nursery within restricted days and/or times, making the longitudinal nature of the research challenging, especially at the Time 3 point.

Despite these pragmatical difficulties issues, natural observations allowed to systematically capture instances of social looks amongst infants during interactions and daily routines of nursery settings, using video recordings.

3.7.2. The use of video cameras as a tool for collecting data.

Cameras have proven to be an exceptionally reliable tool when conducting research with children, as they are able to capture important information such as activity, movement (Striano & Bertin, 2005; Franchack, Kretch, Soska, & Adolph, 2011, 2016), and participants 'rich, non-verbal cues' (Jewitt, 2012:3) such as gaze, gestures and facial expressions.

Clyman et al., (1986) used cameras to code and operationalise social looks. They identified difficulties with camera work as a source of unreliability in defining social looks, as faces of some participants were not recorded during data collection, resulting in coders' inability to stipulate the type of looks associated to infants' behaviour manifestations. To avoid the same pragmatical problem, a pilot study was conducted that informed reflective practices and practical decisions related to the use of video cameras for data collection purposes.

Heyman, Lorber, Eddy & West (2014) highlighted some difficulties with conducting behavioural observations, pertinent to ethical difficulties such as confidentiality and anonymity of participants. These ethical issues are important in any research study but become fundamental when participants are children and unable to provide assent.

3.8. Ethical Considerations

3.8.1. Research with children

Christensen & James (2017:3) argue that 'to carry out research with children does not necessarily entail adopting different or particular methods. They further assert that researchers must adopt practices that respect children's' experiences and make research 'participant friendly' (p.9).

Having children as participants in any research brings different ethical components to the study, particularly when considering aspects such as confidentiality and consent (assent) (Harcourt & Conroy, 2005; Hill, 1997; Flewitt, 2005; Ritchie & Lewis, 2003). The inability of children to understand the process of research and to provide consent is perceived by some researchers as a vulnerable quality to consider when including children in research (Christensen & James, 2017; Hill, 1997; Robson & McCartan, 2016).

Sociological approaches believe that children's vulnerabilities stem from relations of power between the researcher and the children (Alderson & Goodey, 1996; Christensen & James, 2017; Connolly, 2008; Punch, 2002). Within this perspective, children are perceived as different from adults due to sociological and cognitive constraint affecting them. Sociological constraints stem from a generational gap, creating a disparity between the level of knowledge held by the adult compared to the child. Cognitively, the child is not able to understand the adult's world, resulting in the establishment of a situation of power, where adults impose their assumptions and interpretations onto the children (Punch, 2002).

It can be argued that ethical considerations and assertions made in relation to developmental theories, might constitute aspects that are intrinsically separate and conceptually different; contrary to sociological perspective views, adults do hold greater knowledge and wisdom than children, which can contribute to enhancing research processes and ethical elements rather than hinder any research enquiry, as it is the view of Christensen & James (2017).

In this thesis, the researcher took a non-participatory role and her presence, although acknowledged by infants, was bounded exclusively to one of

gathering visual data. For instance, the researcher stopped recording participants during most private, vulnerable times such as instances where they had their nappy change, redirecting the recordings to other participants and resuming data gathering once the participant was back interacting naturally in the room.

3.8.2. Infants, gatekeepers and negotiating consent

Participation of children in research is usually established through negotiation and collaboration with a range of gatekeepers such as schools, parents, or other organisations (Flewitt, 2005; Ritchie, Lewis, Nicholls & Ormston 2013; Robson & McCartan, 2016). Recruitment of participants and participatory consent have consequences to the study outcomes, as Ritchie, Lewis, Nicholls & Ormston (2013:65) stated: ‘the way in which access is negotiated on the ground can be critical to the success of a study’. Prior to initiating the recruitment process, ethical approval was sought (and granted) from the ethics committee at Sheffield Hallam University to ensure that all the necessary steps, including study design, data gathering, and ethical considerations were in place.

Gatekeepers have responsibilities and authority towards the welfare and safety of children, which can result in an adult’s rejection of participants to take part in studies (Robson & McCartan, 2016). The recruitment process was conducted by gaining access and consent via a third-party process. Participants were solicited by contacting nursery managers and by sharing information through verbal and written format (see Appendix 2). Nursery managers identified potential participants and consequently approached parents. Parents who showed interest in the research were provided with written informational sheets. The content included detailed explanations of the purpose and process of the study as well as agreement from parents allowing their children to participate.

Robson & McCartan (2016) state that this tripartite process may constitute a problem when trying to gain consent, as instances where one parent might agree to take part in the study, but the other might refuse participation, might occur. This situation did occur during recruitment for study one, in which verbal

and written consent was obtained by one parent but not for the other, resulting in the exclusion of that participant in the research. The researcher also ensured that parents of non-participatory infants were aware of the research being conducted and the date stipulated to collecting data by verbally checking with the nursery that all parents were informed and in agreement with the researcher recording actions. On one occasion, one parent informed the nursery of their refusal for their non-participant infant to appear in the visual data, so the reached agreement between the nursery manager and the researcher stipulated the removal of the infant from the recording room whilst data collection was taking place. Despite parental verbal agreement being obtained, the researcher was still mindful of those infants not participating in the research and attempted, as much as possible, to exclude them from appearing in the recordings, by positioning the hand-held camera within different degree angles that captured participants' faces and interactions but did not capture non-participatory infants.

According to Ritchie, Lewis, Nicholls & Ormston (2013), an effective way of engaging settings in research projects is to be clear about all aspects of the study, from purposes and objectives to design, procedures, and ethical aspects of the enquiry. Information about any research requires clarity and specificity about (1) the requirements of the research, (2) the role of the children as well as (3) how methods of data collection might impact in the needs, activities, and daily routines of the setting. This thesis aligns with the authors' view of the process of gaining consent being a dynamic endeavour rather than a means-to-an-end product. The parents and gatekeepers' decisions to participate in research may change at any stage of the research enquiry, resulting in the potential withdrawal of consent at any given. The researcher provided information forms to nurseries at Time 1 that were handed to all parents whose infants met criteria for participation including contact details of the researcher and her supervisors, with explanations of their right to withdraw at any time. The researcher collected written agreements at Time 1 for each participant prior to conducting the gathering of data.

Despite possessing the consent forms and the researcher emphasising the need to gain parents' written agreement prior to conducting the data collection,

some Spanish nurseries gathered verbal consent from the parent on the day of data collection and not written forms. Consequently, to ensure consent was valid, the researcher asked the staff to contact the parent via phone or text message to regain confirmation of consent. Once consent was granted, the researcher arranged for the collection of the written consent at a later time that same day. Written consent for all participants taking part at Time 1 was collected and consent was reassessed and sought - albeit verbally - at point 2 and 3 (Ritchie, Lewis, Nicholls & Ormston, 2013).

Ethically, there is a presumption that any consent for children participation remains valid throughout the study; however, if the view of the researcher is that the process of gaining consent is dynamic, then it is morally appropriate to communicate with gatekeepers at data collection follow-ups, ensuring that previously given consent is still upheld. This position not only makes research ethically respectful but also makes the right of gatekeepers to withdraw from the study explicit and available.

Flewitt (2005) draws attention to the use of the word 'informed' when doing research with children. She argues that the path a study takes cannot be predicted and that children's understanding of the benefits and/or possible disadvantages of participating in any research could be limited. She proposed the term 'provisional consent' (p. 556) as a more accurate and descriptive concept to use when negotiating access to children.

Flewitt's views might be relevant when conducting participatory research with (vulnerable) children that are able to articulate and express their own subjective, personal views. Disclosure of sensitive information might be paramount in those instances, altering the results and the study outcomes within the research process. Any researcher needs to take into consideration this possibility when doing research with children. However, this study did not include procedures that focused on a specific outcome, rather it consisted of an exploration of infants' social looks in natural settings. Consequently, the ethical issue that Flewitt (2005) refers to did not apply to participants taking part in this research.

Nonetheless, Flewitt's point could be considered within a broader social framework and could have significant implications related to settings and contexts. Access to institutions such as nurseries provided the researcher with a view of educational practices that were linked to ethical and moral issues. As Punch stated (2012) 'many research environments are adult spaces where children have less control' (p. 328). Being sensitive to the needs of the setting as well as being aware of the particularities of the context are important aspects when positioning research within ethical and moral parameters and for ensuring that children are ethically and morally protected.

3.8.3. Anonymity and Confidentiality

Anonymity alludes to the preservation of the identity of participants outside the research team (Ritchie, Lewis, Nicholls & Ormston, 2013). Confidentiality involves not sharing information about subjects unless previously agreed and only for specific, research purpose reasons (Robson & McCartan, 2016).

During the process of recruitment and data collection, confidentiality and anonymity were preserved by gatekeepers referring to participants by their first name. Any participant's information disclosed by nursery members consisted exclusively of infants' names and dates of birth. During data analysis, participants were assigned a number that informed the process of analysis and preserved infants' anonymity.

As discussed previously, this research used video data as a method for conducting field observations and care was placed to non-participants appearing in the recordings, by avoiding as much as possible recording them. Pragmatically, data was stored safely in a secure server that was password protected. Data analysis was conducted using a private portable laptop, detached from the university software. This computer was not accessible to any other person and was only activated by the introduction of a secure password only known by the researcher to ensure confidentiality. Anonymity and confidentiality were also secured during data analysis processes via the conduction of the analytical coding exclusively in the researcher's home environment and not in public places.

This study was a qualitative research to purposefully explored the types of looks infants display in natural settings but used quantitative methods to gain further knowledge about social looks, specifically to reveal the patterns of looking behaviours across the three timelines and amongst participants.

In summary, the theoretical position of this thesis aligns with a constructivist approach to understanding social phenomena; specifically, proposes that social looks are attentional acts embedded within social interactions and influenced by the context. The epistemological stance requires the use of a methodology and method that allow the phenomenon to be examined without any variable manipulation and as it unfolds in real-life environments, therefore a naturalistic observational approach provides the best epistemological stance to this research inquiry.

The use of behavioural observations is not exempted of some methodological difficulties attached to qualitative methodologies: (1) the richness of the data might impair the researcher's ability to form meaning of specific looking behaviours, (2) the flexibility that qualitative methods bring might result in a lack of clarity as to how the data is analysed and interpreted, and (3), issues with reliability and representativeness might compromise data obtained through analytical methods. Additionally, the use of children in research prompts some ethical considerations leading to some methodological decisions that need to be explored prior to conducting the longitudinal study.

3.9. Conclusion

In this chapter, I have provided the epistemological perspective guiding this qualitative, longitudinal research. The next chapter is a detailed explanation of the pilot study conducted prior to the researcher engaging with the main study as well as the process of data collection.

Chapter 4

Methods

4.0. Introduction

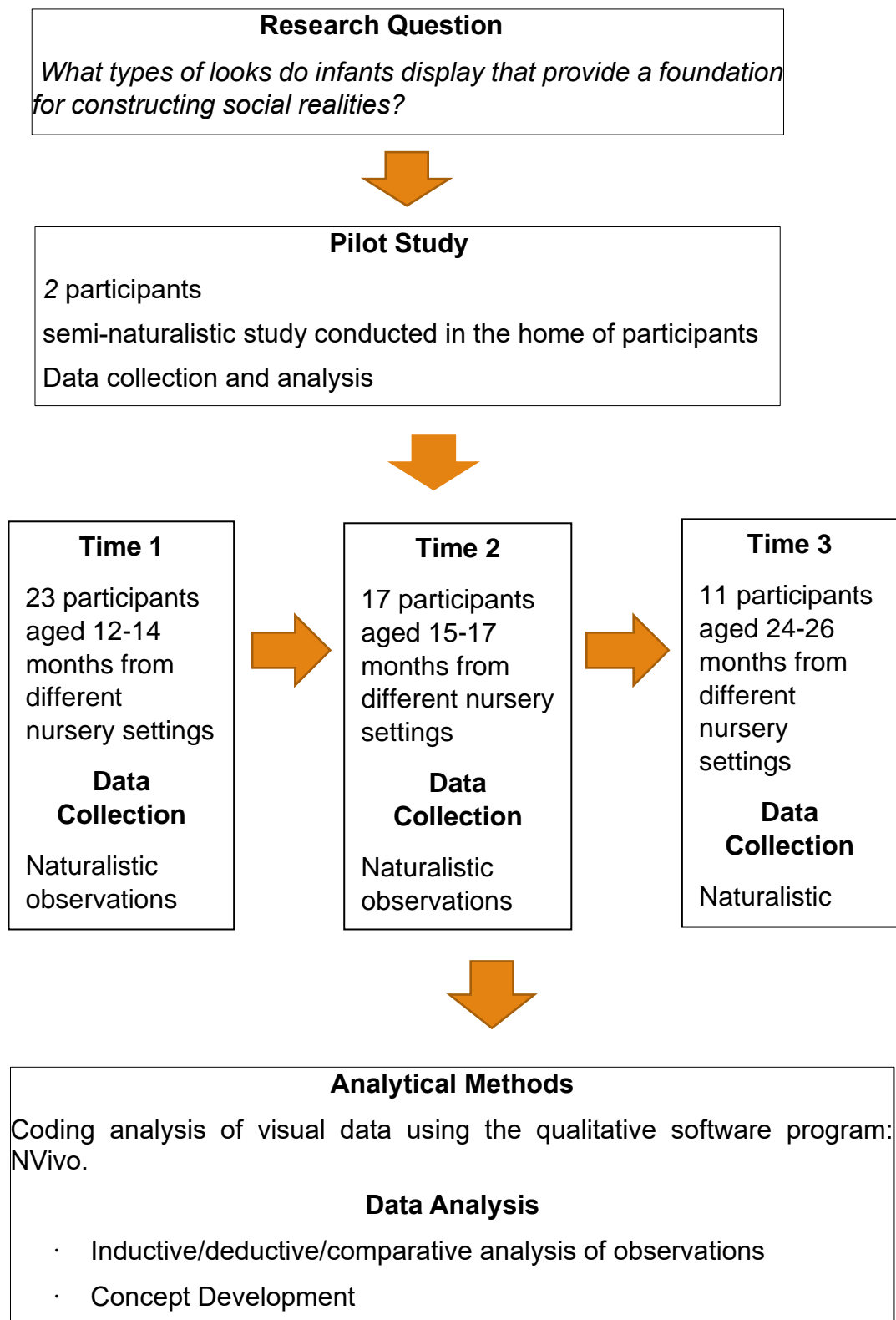
This chapter describes the research design and discusses aspects of the main study, including the methods and outcomes of the pilot study, and the research procedures are undertaken to conduct the main research project.

To reiterate, the aim of the study was to examine social looks and create a typology of looking behaviours from behavioural observations. The central research question was:

What types of looks do infants display in social settings?

To answer this question, the study conducted naturalistic observations of infants in nursery settings at three different time points (T1=12-14 months; T2=15-17 months and T3= 24-26 months). This research intended to be an expansion of the study conducted by Clyman et al., (1986), by developing an operationalised typology of social looks using naturalistic methods.

Figure 4.1. Overview of the qualitative study of social looks



As shown in Figure 4.1, prior to embarking on the main longitudinal research, a pilot study - comprising of two children aged 16-months and 18 months - was

conducted in the homes. The initial purpose of the pilot study was the examination of some pragmatical and methodological aspects of the research inquiry prior to undertaking the main research study. Nonetheless, reflections conducted following the implementation of the pilot study permitted some methodological considerations pertinent to the main research also.

4.1. The pilot study

The pilot study had three distinct aims: (1) to assess the feasibility of the existing theoretical framework of social looks, (2) to allow the researcher to familiarise with the analytical process and (3) to provide methodological and pragmatic knowledge about the use of observational methods as means to explore social looking behaviours naturally.

The pilot study served not solely as an informative tool to test aspects of the research enquiry (Leon, Davis & Kraemer, 2011; Polit et al., 2010; Robson & McCartan, 2016; Van Teijlingen & Hundley, 2001), but as a vehicle to gain greater clarity about the research enquiry also, by providing a 'clear definition of the focus of the study' (Frankland and Bloor, 1999: 154). Thus, it was not the intention to test the effectiveness of the original categorical descriptions, but findings of the pilot study did facilitate the acquisition of in-depth information about the interpretative stance used by Clyman et al., (1986) in describing and creating the typology. As Sandelowski (2000:335) argues: 'descriptions always depend on the perceptions, inclinations, sensitivities, and sensibilities of the describer'.

The pilot study used a semi-naturalistic methodology, consisting of mother-child interactions followed by the introduction of the classic social referencing paradigm, exposing the participants to a remote-controlled dinosaur that was able to walk, roar and light up the eyes. The novel object intended to recreate classic paradigmatic ambiguity effects - in line with other experimental designs that used this type of (uncertain) object (Hornik, Risenhoover & Gunnar, 1987; Stenberg & Hagekull, 2007; Walden & Ogan, 1988) - to elicit children's referential looks to the mother. Nonetheless, unlike the classical social referencing paradigm, the mothers were responsible for the introduction of the novel toy following a non-verbal signal by the researcher. This decision was

more pragmatical than methodological as mothers were physically closer to the child and able to position themselves at an angle that allowed the toy to be out of the participants' view during the non-ambiguous condition. A second practical reason was the need of the researcher to have a clear view of the child's face during the process of data gathering, most pertinently, following the child's exposure to the ambiguous toy so to capture referential looks. Having the researcher conducting two different tasks simultaneously would have hindered the quality of the visual data gathered and may have resulted in the obtention of non-valid data.

It might appear incongruent to conduct a pilot study measuring referential looks using a similar experimental design than social referencing studies, prior to conducting a naturalistic study. The rationale for not using nursery settings for the pilot study was based on: (1) the desire to remain somewhat close to the original study to be able to compare and become familiar with the different social looks concepts, including referential looks, in a similar setting than the Clyman et al.,'s study; had nursery settings been used, the richness of the data would have resulted in perhaps gaining less clarity to the methodological process by looking concepts displaying greater behavioural variance, (2) to test and assess the use video cameras in a more contrived environment so to make decisions as to how best capture children's faces in more dynamic and open environments, (3) to provide children and their mothers with a safe environment in which conduct the pilot study to promote natural interactions and the elicitation of non-reactive looking behaviours, could occur. As a result, the selection of this strategy permitted:

- the researcher to remain close to the Clyman et al., (1986) study by using a similar methodology (semi-naturalistic studies) but different paradigmatic design²⁰. The use of similar research components permitted the researcher to gain knowledge of the different concept categories prior to the conduction of the main study.

²⁰ The pilot study used the classical social referencing paradigm whereas the Clyman and colleagues' research used a modified version of the 'Stranger Situation'.

- To conduct exploratory research in natural environments without the dynamicity and fluidity found in other contexts such as early years settings without infants' needing to understand the macro-structures of the social context, i.e., expectations and norms.
- The home environment provided the small room setting for the researcher to gain practical skills such as operating the two video cameras, allowing to engage in reflexive considerations to carry forward to the main research.

As mentioned previously, the pilot study took place in their family homes at a time of day that was most convenient for each family, and that ensured children were neither tired nor hungry. Prior to conducting the study, the researcher met with each parent and provided detailed information of the aims, objectives and procedures of the research and collected the required consent forms, making explicit their right to withdraw from the study at any time during data collection and up to two weeks after data had been collected. A further reminder of their right to not take part was given prior to data being collected.

The pilot study comprised of 50 minutes recordings of observational data, using two cameras: one tripoded in the corner of the room and a second camera held by the researcher; whilst the static camera recorded broader elements of the room and dyadic interactions; the hand-held camera used visual features such as zoom to ensure the child's face was in view, particularly in instances where the child was moving around the room. The pilot study's procedure consisted of two conditions:

- (1) the non-ambiguous phase, involving free, non-manipulated play interactions between mother and child. This phase lasted approximately 20 minutes and consisted of non-manipulative parent-child interactions and,
- (2) the second condition involving the introduction of the novel toy in order to elicit referential looks.

Following the gathering of video data, observations were edited to 35 minutes of video footage, and the feasibility of the operationalised categories was tested through analytical processes. The coding process served two purposes:

(1) to inform of the adequacy of the typology of social looks so conceptual and methodological considerations could be made and (2) to acquaint the researcher with skills for effective coding of units of behaviour.

Instances of social looks and their behavioural manifestations were identified and transcribed according to the pre-existing category. Coding processes involved two cycles of analysis: the first cycle included the identification of social looks²¹ and their descriptive behaviours. Descriptive social behaviours that did not possess inclusive criteria for an existing category were coded separately and analysed in cycle two. The second cycle reviewed those descriptions that did not constitute categorical denomination and required a novel conceptual definition. The coding process created an analytical trail of (1) types of social looking, according to the pre-existing classification, (2) descriptive social looking components associated with conceptual categories and (3) duration of looks²².

Following the analysis of data, areas for further reflection were identified:

4.1.1. Conceptual considerations

Difficulties classifying children's looks (and their behavioural manifestations) to specific existing categories highlighted the need for further clarification of potentially ambiguous descriptions. Some of the behavioural features observed and coded during the analytical process did not accurately reflect the propositions suggested by Clyman et al., (1986). This issue was most prominent with categories with a strong social dimension such as 'Bids for Social Interaction' which, according to the pre-existing proposition, possessed a functionality of sharing an emotional reaction and/or offering a toy. In the pilot study, both participants used this type of look, but they did so (a) to emphasise a statement, (b) to ask for help or (c) to gain clarification about an event or

²¹The unit of behaviour's definition adopted in the pilot study aligned with the proposed description by Clyman et al., (1986). The scholars defined social looks as 'the child's look to the adult's face' (p.78).

²²This last component included the start and end of each social look occurrence, permitting not only the identification and coding of 'short bids for social interaction' looks (requiring a time component) but the implementation of analytical techniques such as revisiting of codes and definitions in order to gain research validity.

action, in the form of asking questions. For instance, during an interaction, participant 2 elicited an 'Initiated Bid for Social Interaction' look alongside the verbal command 'mum, can you get out now?'. This expression in the form of requesting an action from the adult, served a different function than the original concept, as this participant's request did not include an affective reaction and/or an invitation for interaction. An explanation for this incongruence can be provided by the age difference amongst participants (children were six and eight months older than the original study) and their advancement in development compared to the original study where they used 12-month-old infants. In their original study, Clyman et al., (1986) included a time criterion for the 'Bids for Social Interaction' category, discriminating between long and short bids, based on a description of infants' information processing. Coding analysis showed that infants displayed looks lasting on average 3 seconds, rather than the 2-second rule stipulated by the authors. Furthermore, during the pilot study coding analysis, it was almost impossible to assert instances where infants engaged in (allegedly) information processing without making subjective and inferred interpretations. It became apparent that a categorical proposition - stipulated based on quantitative measures of duration - reduced the definition to a time variable, making this concept too narrow and less reliable. Also, it shifted the focus away from other more salient behavioural features that may have had greater categorical representativeness.

The 'Orienting to a Voice' category presented some discrepancies that facilitated the researcher to engage in iterative reflections related to concept development. Behavioural manifestations identified during analysis showed that both participants presented a slight head movement towards the adult prior to looking at the adult's face. This motor component was a novel behaviour not reflected in the pre-determined description. The lack of inclusion of this descriptive element did not affect categorical functionality pertinent to infants' orienting toward a stimulus. Still, it allowed the researcher to reflect upon the differences between behavioural variability and/or typicality within concept development, based on contextual and social influences. This idea of conceptual variability is influenced by Barrett's (2017) view of how emotions are constructed, where category representation is dependent on two

components: (1) contextual information and (2) the person's internal experience (in that particular situation). According to Barrett, contexts enhance specific affective attributes making emotional concepts variable based on external social input. From a constructivist standpoint, similar principles apply to social looking acts, particularly in natural contexts, as social partners and environments do influence infants' experiences that affect behavioural manifestations pertinent to looking categories.

- Social referencing looks

The pilot study used the classical social referencing paradigm (Feinman, 1992; Walden & Baxter, 1989; Zaratany & Lamb, 1985) to elicit referential looks to the mother. Quantitative analysis showed that social referencing was a low-frequency look, which affected the accurate exploration of this concept category. As in the original study using home environments and finding social referencing to be a low-frequency look, the characteristic of the setting might have impacted on the low incidence of referential looks, reducing and/or eliminating infants' feelings of uncertainty following the introduction of the novel toy. This low incidence permitted the researcher to consider and, to some degree make predictions, on outcomes of social referencing patterns for the main study, based on familiarity of infants with the setting and the reduced probability of encountering novel toys.

- Absence of categorical occurrences

During coding analysis, two existing categories 'Watching Others Communicate' and 'Gaze Aversion' did not occur. The former category is defined by infants' look at two people conversing. The methodology of the pilot study - consisting of dyadic parent-child interactions - excluded a third person (not including the researcher) and naturally invalidated the occurrence of this look. The latter category 'Gaze Aversion' stipulates a process whereby the infant initially fixates the look to the adult's face and then looks away. This type of look did not appear in the study conducted by Clyman et al., (1986) nor was coded in the pilot study as infants did not avert looks to decrease sensory stimulation. Similar outcomes were predicted for the main study also, as in natural environments the availability to social stimuli is, somewhat, permanent,

which makes it difficult (if not almost impossible) to divert and/or decrease infants' attentional processes away from social partners and/or external stimuli.

- Additional categories

During coding analysis, behavioural manifestations that did not meet criteria with the pre-existing typology were given different conceptual definitions, prompting the creation of new categories. Novel categories and its descriptions are shown in the figure below²³.

Figure 4.2. Additional categories identified in the pilot study.

Social Look Category	Definition
Instrumental	The child looks at the adult to ask for help
Vocalisations	The child looks at the adult to emphasise or express something
Responding to a question	The child looks at the adult to answer a question
Responding to name	The child looks at the adult when adult calls his/her name
Sharing	The child looks at the adult to share an experience
Monitoring	The child looks at the adult following an action, either from the adult or from the child that it is not sudden or unexpected
Glancing	The child looks briefly at the adult then looks away to an object or an activity

The lack of familiarity of the researcher with coding processes, combined with the lack of specificity of the existing categories, resulted in the development of new categories that possessed high levels of subjective interpretation, preventing concepts from acquiring evaluative criteria of reliability and trustworthiness. This problem was most prominent for the categories pertinent

²³Children in the pilot study were verbal and used age-appropriate utterances, therefore the concept 'Vocalisations' allude to children's use of language (vocalisations) with the intention of emphasise and/or express something.

to 'instrumental', 'sharing' and 'monitoring', where axial concepts possessed semantic inferences that led to issues of ambiguity, much as some concepts from the previous study. Despite Sandelowski (2000) stating that 'no description is free of interpretation' (p.2), the descriptive stance taken in the pilot study lacked the objective clarity and reliability intended for this thesis. Following conversations and guidance received from my supervisors, it was decided that the three novel categories: 'Sharing', 'Instrumental' and 'Monitoring' did not represent taxonomical objectivity, so they were dismissed as concepts categories. However, some propositional elements were retained as valid components of categorical development in the main study's analytical process. For instance, monitoring was included as one of the six social dimension components, specifically for the 'glancing' category, and the definition pertinent to the concept 'sharing' alludes to infants' initiations for communicative purposes, embedded in the novel category 'Initiates Social Communication Engagement'.

The reflective discussions undertaken with my supervisors highlighted the importance of ensuring that the analytical coding process retained research criteria pertinent to objectivity, generalisability and trustworthiness. In the main study, these components were obtained by placing attention to the process of coding social looks and the conduction of an inter-coders' reliability test.

4.1.2. Pragmatic elements

Clyman et al., (1986) acknowledged the existence of some reliability issues in the conceptualisation of their categories due, in some instances, to poor camera work that resulted in an inability to capture children's faces. To prevent this issue from occurring, pragmatical considerations were taken into account when designing the pilot study and during data collection. Specifically, issues pertinent to (1) the position of cameras, (2) the types of shots taken to ensure children's faces and dyads were captured best and (3) the use of zooming options.

The use of two video cameras - one placed statically in the room with a tripod and the second being hand-operated by the observer - reduced some of the

logistical issues. Having two recording devices permitted the encoding of broad visual coverage of natural social interactions from different angles (Dufon, 2002; Fletcher, Price & Branen, 2010; Mitchell & De Lange, 2011; Roschelle, 2000) and ensured that referential looks, following infants' exposure to the novel toy, was fully captured. Furthermore, having two sets of recordings guaranteed the duplication of recordings and the preservation of data for subsequent analysis (Fletcher, Fletcher, Price & Branen, 2010). The use of a tripod with adjustable options permitted to position the camera at the height of the children's faces (Fletcher, Price & Branen, 2010), and the zooming option allowed to set up the lenses to capture children' social behaviours, such as gestures, physical proximity and goal-directed actions also, occurring during social interactions with their mothers. Having a second camera that was manually operated permitted the direct manipulation of the recordings to different angles and positions (Fletcher, Price & Branen 2010) also.

Home environments permitted the indirect control of elements such as (1) physicality, i.e., room size and (2) emotionality, i.e., familiarity of the surroundings. Despite the reduced physical environment and the use of two operating cameras, data collection procedures encountered instances where recordings of interactions (and children's faces) proved to be as challenging as the original study, due to participants being mobile. This issue was most prominent during games such as 'hide and seek', involving high levels of movement across the room, that impacted the ability to capture infants' faces. Researcher's reaction to this problem was to move closer to the child, with the subsequent challenge of becoming more intrusive and visible to the children.

Remaining physically close to participants raised important issues around intrusiveness and the 'observer effect' (Robson & McCartan, 2016), as participants' awareness of the presence of the researcher diverted their attention (albeit momentarily) from interactions with their mothers and toward the researcher and the camera. This diversion led to the researcher to consider useful strategies to minimise distractibility, particularly during the main research' data collection procedures, as the characteristics of the setting and the age of participants predicted higher mobility ratios. After careful

consideration, a decision was made to implement different techniques described by Robson & McCartan, (2016) to help reduce the 'observer effect', explained in chapter 3.

To reiterate, the pilot study was an iterative, explorative process to test research components pertinent to pragmatic and analytical elements, prior to the implementation of the main study. This reflective process included the examination of the research inquiry to establish clear research objectives that possessed qualities of innovation and contribution to knowledge. As mentioned in previous sections, the pilot study did include components of experimental design with the implementation of the classical social referencing paradigm (Kim & Kwak, 2010; Zarbatany & Lamb, 1985). This, somewhat, methodological incongruence proved to be a valuable exercise, as permitted the researcher to remain close to the Clyman et al., (1986) study as well as served as a reflective tool about pragmatical components and issues related to conducting behavioural observations. Additionally, it allowed the researcher to gain familiarity with the operationalised categories and the coding process. The knowledge obtained in the pilot study was applied subsequently to aspects of design and analysis in the main study.

4.2. The main study

To reiterate, this longitudinal study aimed to examine infants' social looks in natural environments to create a typology of looks that informed how infants construct an understanding of their social realities. The central research inquiry was:

What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?

To answer this question, the study used behavioural observations in nursery settings as a method for data gathering. The study received full ethical approval from the University Research Ethics Committee in April 2017. Following ethical guidelines, the researcher contacted various nursery settings in the UK via email, with information about the study. Initially, the recruitment

of participants was intended for those infants who were based in UK nurseries, and specifically within the Devon area, where the researcher lives. Difficulties recruiting infants led to the researcher to ask for assistance from both supervisors, who recommended a member of the university team that had good working relationships with nurseries within the Sheffield area. This colleague proved very valuable in facilitating access to nurseries by contacting early years providers on the researcher's behalf and initially mediating between the researcher and the institutions. As a result, a small cohort of participants was recruited. Not having enough participants still, a decision was made to expand the recruitment search into Spanish nurseries, as the researcher was able to access participants through her professional connections.

Participants were selected based on an age criterion of between the ages of 12 and 14 months. This prerequisite was established as it aligned with the Clyman et al., (1986) and other social referencing studies that included infants of the same age (Gunnar & Stone, 1984; Klinnert et al., 1986; Sorce, Emde, Campos & Klinnert, 1984; Stenberg & Hagekull, 2007).

There is a vulnerability component when working with children that requires consideration. Lansdown, (1994) states that children's vulnerabilities are represented by a developmental immaturity from an inherent lack of physical, cognitive, and social maturity. Children are developmentally less capable, which results in the creation of socially and emotionally dependent relations with adults and contexts. I share Lansdown's views of considering infants as vulnerable and less capable and advocate for the need to perceive infants as dependent on others, as it ensures that research practices are conducted with the utmost ethical and moral rigour.

4.3. Time 1 Study

As explained previously, an email containing information sheets and consent forms was sent to various nurseries settings, initially in the UK and subsequently to Spain. The email contained details of the purpose and aims of the study and requested access to any participant who met the criteria for

participation (see Appendix 3 for copies of the information sheet and consent forms). Twenty-three infants took part in the Time 1 study.

4.3.1. Data collection

Following written consent, nursery visits were arranged directly with managers, agreed based on when it was most convenient for the setting. The visits comprised approximately 60 minutes when recordings involved one participant and increased in time when there was more than one participant to be filmed. The duration of the data collection included the setting up and habituation components, detailed in Chapter 3.

Once in the nursery room, the habituation phase - intended to minimise the 'observer effect' (Robson & McCartan, 2016) - comprised of (1) the setting up of the equipment and (2) observing practices and routines of the nursery. A particularity observed during data collection was the uneasiness of adults at being recorded, expressing their worry as to 'not doing it right'. This was an unexpected novelty, so the researcher reiterated and reassured staff members of the aim of the study, emphasising that the focus was in recording infants' looking acts and not attending to adults' performances and practices. Reassurance aided adults' initial reservations and anxieties, resulting in their habituation to the camera and their ability to carry on their duties. Nursery members facilitated the process of data collection by being mindful of not blocking the static camera view - by walking behind the cameras and/or delaying the conduction of specific tasks - and allowing the researcher complete freedom to gather visual data.

The pilot study confirmed the appropriateness of using two cameras for the process of data collection. Recordings were carried out using two cameras of the same make (Schmitow, 2012); one camera was placed statically on a tripod to capture the entire room and to ensure that infant's elicitation of social looks was always in view. Tripods were adjusted so the camera remained at infants' eye level (Fletcher et al., 2010), facilitating a clear view of their face area (Fletcher et al., 2010; Schmitow, 2012), infants' associated behaviours and the surroundings. The second camera was operated by the researcher allowing free-movement recordings, and the manipulation of camera options

such as zooming (Fletcher, Price & Branen, 2010). Data collection processes proved to be difficult due to the dynamicity of the environment and participants' ability to move freely around the nursery room, comprising a wider physical space than the home environments. This difficulty was more pronounced at Time 2 and 3 of the longitudinal study, where infants' changes in motor development resulted in their tendency to engage in more active, exploratory activities (Clearfield, Osborne & Mullen, 2008).

Having two cameras proved to be a hindrance to the data gathering process. The camera options that proved useful during the pilot study, such as zooming, represented a hindrance during naturalistic data gathering. A significant problem was the size of the nursery room, preventing the single, tripod camera from capturing wider field views. This issue was most prominent when there was more than one participant to be recorded in the room. Not having accounted for this inconvenience, the possibility of not gathering useful data and dealing with similar reliability issues than in the original study, triggered feelings of anxiety in the researcher and prompted the need to decide *in situ* the best course of action. The researcher then decided to physically move the static camera to different positions around the setting whilst manually recording participants with the hand-held camera. Operating two cameras simultaneously hindered the researcher's ability to capture the footages of participants effectively. It soon became apparent that operating a camera and needing to move the static camera physically was counter effective. So, following the initial clumsy attempts, the researcher decided to record participants using the hand-held camera exclusively, against some practicalities such as the increased amount of time required to conduct the observations when there was more than one participant. This option proved to be the most appropriate as it permitted to make logistical decisions on-site, based on the social dynamics of the setting and the social behaviours of participants.

4.3.2. Remaining unobtrusive

The presence of the researcher elicited some behavioural reactions in both participants and non-participant, infants. As experienced in the pilot study, capturing social looks required, on occasions, some degree of physical proximity to participants, which prompted some reactions such as approaching and/or attempting to interact with the researcher.

As detailed in chapter 3, the strategy applied consisted of responding to infants' initiations in the most sensitive manner whilst remaining neutral (Fletcher, Price & Branen, 2010). This was achieved by becoming minimally interactive (Robson & McCartan, 2016) by neither engaging nor rewarding any interactive attempts and by avoiding eye-contact with infants.

Once all visual data was recorded, coding analysis using the qualitative software program NVivo commenced.

4.3.3. Data analysis

So far, I have detailed the design and data collection processes involved in acquiring observational data in natural settings. This next section focuses on the process of data analysis conducted at Time 1, describing the coding procedures used to conceptualised social looks into axial categories. The subsequent coding analysis conducted at Time 2 and 3 followed the same systematic steps, with the difference that comparisons were conducted using the novel conceptual framework created at Time 1 and not the typology from the original study.

Conducting naturalistic research allows the collection of rich, detailed data that is congruent with the research inquiry (Saldaña, 2016). Subsequently, data requires to be described and interpreted into meaningful content (Miles & Huberman, 1994; Robson & McCartan, 2016). Blumer, (1969) stipulated that the use of analytical methods were based on perspective, allowing the researcher to: (1) remain open and curious about the analytical process in

order to construct meaning of a phenomenon, (2) to discern what to attend to as well as identify essential elements of inquiry and (3) filter those components that are not fundamental for the research.

As noted previously, this research used two analytical processes, one qualitative and another quantitative. The qualitative stance comprised the creation of descriptive categories of social looks through coding of observational data. The qualitative process, therefore, takes into consideration Blumer's notion of perspective by defining and containing the unit of observable behaviours to a micro-behavioural definition²⁴. This narrow and discrete frame of reference allowed the researcher to distinctly identify social looks from other social behaviours that were not components of the research inquiry. The quantitative approach provided information about individual differences in looking patterns amongst participants and across timelines.

Qualitative data were analysed using two systematic coding processes, applied to identify instances of social looks and classify units into descriptive categories. The two stages comprised of: (1) inductive component, where looks were described and compared with the pre-existing typology and (2) deductive component, where categories were consolidated and ultimately constructed. This analytical process diverts from other qualitative coding approaches such as grounded theory practices, as looking categories were not developed from an open coding analysis. Grounded theory follows a sequential method of analysis – usually bottom-up processes - starting with open coding methods that generate lower abstraction level themes and arriving at empirical theory creation, through abstract categorisation (Bowen, 2006; Braun & Clarke, 2006; Glaser & Strauss, 1967; Glaser, 1978; Strauss, 1987; Strauss & Corbin, 1990). The thematic analytical process ends when data reaches a level of saturation (Bowen, 2006), meaning that there are no more themes to be extracted from the field data. Conceptually, the themes generated through open coding are interconnected and share central features. This particularity arises from the attribution of conceptual generality, i.e. the development of relationships amongst concepts.

²⁴ The definition used in this research was adopted from the original study.

The specific method undertaken in this thesis adheres to a 'process' coding (Corbin & Strauss, 2015; Saldaña, 2016; Strauss & Corbin, 1998). Process coding refers to the creation of concept categories from observable behaviours (processes) that represent meanings attached to the concept category. In this instance, social looks categories are anchored within a social dimension and not within themes, constituting different types of concept functionalities. The set of looking categories developed are characterised by being mutually exclusive rather than constituting subcategories of supra-concepts. The pre-existing typology functioned as sensitising²⁵ concepts (Bowen, 2006; Blumer, 1954) from which to create the in-depth operationalised categories of social looks.

4.3.4. Concepts, goals and definitions

Conceptually, categories are characterised by possessing attributes of exclusivity and goal-directed features. In this study, the aim was the construction of distinct and mutually exclusive concepts of infants' looking behaviours as differential social acts occurring within natural environments. Non-contrived contexts, therefore, provide propositional flexibility and variability to behavioural manifestations rather than creating static, invariant representations of looking behaviours.

Two distinct theories influenced the analytical stance for concept development: (1) Barrett's (2011, 2017, 2018) constructivist theory of emotions and (2) the Barsalou's (1982, 1983, 1985) cognitive and taxonomical model. Both theoretical frameworks provided the conceptual characterisation that contributed to the creation of the categorical propositions.

Barrett (2017, 2018) defines concepts as mental representations containing prototypes, characterised by constituting the best examples of any category. Prototypes are context-dependent and influenced by the situation they emerged in; emotion categories do not present the same pattern every time,

²⁵Sensitising concepts represent interpretative instances that help build the process of analysis by providing frameworks to observe, organise and understand a specific phenomenon (Bruner, 1954).

rather they are characterised by their conceptual flexibility and variability. As Barrett (2017:88) states:

concepts aren't fixed definitions in your brain, and they are not prototyping of the most typical or frequent instances. Instead, your brain has many instances - of cars, of dot patterns, of sadness, or anything else - and it imposes similarities between them, in the moment, according to your goal in a given situation.

The same attributes described by Barrett for the representation of emotion categories can be applied to looking concepts elicited in natural environments. Attentional acts are mediated by others' social actions and/or behaviours and by the ever-changing environment, influencing manifestations of behaviours associated with looking concepts.

Barrett's characterisation of concepts as goal-based is influenced by the taxonomical classification proposed by Barsalou (1982, 1983, 1985). This scholar distinguishes between two distinct types of categories: (1) common taxonomical, related to biological properties of entities that reflect salient, pre-determined physical properties and (2) goal-directed, constructed in order to obtain a specific goal. This latter type, also known as ad-hoc categories, represents non-biological features extracted from different elements of other common taxonomical categories. The salient aspects are attached to the pursued goal and not to the physical properties the category possesses. Thus, goal-directed categories are defined by what it is conceptualised as ideals (Barsalou, 1985; Horstmann, 2002), which refers to the necessary features that exemplars require in order to best served the goal associated with that concept. Ideals, therefore, determine the graded structure²⁶ of the category and depend on the goal they serve at a given time.

The conceptualisation of ideals (within categories) constitutes mental representations of what Barret considers a concept prototype, i.e. the best description of an affective concept in a given situation. The naturalistic and longitudinal nature of this research brings similar conceptual qualities than those stated by both Barrett and Barsalou, through the creation of social looks

²⁶Graded structure alludes to a continuum of category representativeness (Barsalou 1983, 1985; Horstmann, 2002) defined by typicality of members to their category.

concepts that represent 'prototypes' that are defined by the most salient and observable behaviours associated with the category. Concept representation is acquired by operationalising social looks as goal-directed categories (Barsalou, 1983,1985), where axial concepts describe the function of a category and what 'holds the category together' (Barrett, 2017:92). Observable behaviours represent the interpersonal and social components constituting inclusivity criteria (ideals) for concept classification.

This thesis, however, takes a diversion from Barsalou's understanding of goal-directed categories in that categorical construction is not based on definitions and/or components extracted from other categories. Rather, social looks concepts are mutually exclusive and the descriptive behaviours associated with each category - although universals such as gestures and/or physical proximity - are attributes pertaining to that specific concept, providing meaning to the category.

Taking the example of a category such as 'Initiates Social Interaction Engagement', the axial name provides the function for those looks identified as infants' attempts to engage socially with the adult; its behavioural components, such as vocalisations and/or gestures, constitute the observable manifestations contingent with contextual dependency and interpersonal variability. This conceptualisation of social looks, therefore, takes into consideration the influence and mediation of contexts and social partners, reflecting the various layers influencing looking behaviours.

4.4. The coding process

As stated in previous chapters, this research aims to identify and conceptualise infants' looking behaviours in natural environments. The analytical process involved the translation of visual data into taxonomical definitions of social looks through the identification of units of behaviour - defined as infants' looks to the adult's face (Clyman et al., 1986) – and their interpretation into conceptual categories.

To reiterate, the process of analysis consisted of the following stages:

1. Inductive analysis through the coding of micro-units of behaviour and their behavioural manifestations descriptions associated with each look.
2. Comparison analysis against the pre-existing typology of social looks to classify instances of looks into categories.
3. Deductive analysis where categories were consolidated and created using techniques such as merging and elaborating.

These steps followed a linear, sequential approach at Time 1 compared with Time 2 and 3, specifically with the inductive and comparative stages of analysis. The researcher's lack of familiarity with the coding process resulted in the need to pay more attention to specificity and accuracy within the inductive and comparative phases within this timeline to ensure behavioural manifestations and concepts were classified and described accordingly. In subsequent time points and as the researcher became more familiar with the analytical process and the meaning of the distinct concept categories, coding became more swiftly, permitting the incorporation of a more refined iterative approach to coding. As a result, cycles of analysis were characterised by being less sequential and more dynamic, moving backwards and forwards across stages.

A qualitative software program – Nvivo – was used to support the process of analysis.

4.4.1. The use of the software NVivo

The qualitative software program – NVivo - was used in this thesis to help with the analytical coding process.

The NVivo software functioned as a tool that provided a practical approach to organising qualitative data, by structuring and storing video footages of infants' looking experiences into files within their corresponding timelines²⁷ and permitted the creation of a workspace whereby assist the researcher in the data analysis procedures, by establishing a systematic approach to recording,

²⁷ Note that not all participants who took part at Time 1 study appeared in the subsequent timelines.

retrieving and querying observational data. The NVivo software permitted the creation of an audit trail where the identification and description of looking behaviours could be logged in and coding analysis conducted in order to conceptualise social looks into descriptive categories.

Codes were analysed at a level of description so to capture the observable social behaviours associated with each looking unit. At Time 1, the coding analysis began with the establishment of codes pertinent to the pre-existing typology of social looks created by Clyman et al., (1986) as a frame of reference for the inductive analysis. As the inductive process advanced and the researcher immersed and gathered descriptive social looks data, a number of new categories were extrapolated and added to the pre-existing ones, increasing the total number of social looks and creating a more in-depth classification of looking behaviours.

The advantages of using the qualitative software program NVivo to create a typology of social looks were twofold: (1) pragmatically, it permitted the storage and management of sizeable visual content into folders (internals) organised longitudinally into timelines and (2) analytically, as it assisted the researcher in working with qualitative data systematically and clearly, by exploring and creating a trail audit of the analytical process. During observational analysis, each instance of social look (code) was entered within a visual trail including elements pertinent to (1) duration (starting and ending times of social looks occurrences)²⁸, (2) an axial concept, associated to a respective unit and (3) a description of the looking behaviours associated with that concept. This level of detailed description permitted easy identification and visual display of data content that facilitated interpretative analysis.

Nonetheless, the NVivo program posed some practical and analytical disadvantages: A small screen display that impacted on the researcher's ability to clearly view videos and accurately identifies instances of social looks and ultimately conceptualise looks into categories. Poor screenplay quality has been one of the criticisms attributed to the use of the NVivo qualitative

²⁸ These measures provided relevant information that aided the coding process of nominal labelling, especially relevant for types of looks requiring a duration component as inclusivity criterion.

software (Bazeley & Jackson, 2013). In order to solve this practical issue, the researcher decided to play the videos using Windows Movie Player, which allowed for a wider screen view but added time and effort to the analytical process as once looks were identified, the segment was re-played within the NVivo software at a slower speed function to log in the different components associated to the look. Additionally, the use of NVivo allowed the creation of sequential trails of visual data and the classification of cases into categories. However, analysis using NVivo was exempted of any analytical interpretation and meaningful relationships amongst components of observational data. Descriptions of looking behaviours and categories represented isolated entries stored within internals that required the researcher's knowledge, obtained through coding procedures, to provide meaning to the data using techniques such as merging, comparing, elaborating and conceptualising instances of social looks.

4.4.2. Stage one: Inductive analysis

The analytical stage commenced with the identification and coding of each instance of social looks. This stage constituted an exploratory process of recording as much as coding, where preliminary analysis influenced subsequent cycle processes (Saldaña, 2016). The recordings detailed descriptions of instances of looks and entries including duration, descriptions and, in some instances, classification of social looks into pre-existing categories.

This stage was highly influenced by outcomes of the pilot study consistent with the creation of objective concept propositions, away from subjective conceptual descriptions. The inductive analysis emphasised faithful descriptive propositions of looking behaviours to ensure that each description provided an objective account of each act of looking²⁹, exempted of any subjective interpretation that could affect taxonomical analysis and ultimately compromise the trustworthiness of the typology. Propositional objectivity was

²⁹ A note of remembrance of errors committed during coding analysis in the pilot study that led to considerations for the main research.

acquired by noting explicit, exhaustive, observable manifestations of social behaviours and processes³⁰ as they unfolded visually.

The absence of inferential attribution was possible by the researcher's application of perspective (Blumer, 1969), i.e., by remaining close to the functionalities of each incident of looking and by discerning and extracting those behavioural manifestations that formed the most salient features of categorical concepts. This was obtained by engaging in an iterative process of detailing the various descriptive characteristics associated with the different units of behaviour, clustering the most salient behavioural components from each concept and assessing and comparing elements of connection with the pre-existing social looks categories. This latter comparative process represented a fundamental step throughout the analytical process leading to taxonomical classification detailed in the next sections of this thesis.

The overall inductive process was divided into specific analytical actions:

(1) Novel categories; these represented units of behaviour that required the creation of a new social look concept and its associated behaviours, as they did not share a concept and/or behavioural features with any of the existing categories.

(2) Concept elaboration, represented those concepts sharing taxonomical status, including some behavioural components from existing concepts but required a level of category elaboration, presumably due to methodological differences.

(3) Merging categories, including units of behaviour that retained qualities and function with pre-determined concepts but required merging some of their associated behaviours components in order to create more in-depth, exhaustive categories.

These different analytical techniques were implemented across and within categories, for instance, the novel category 'Glancing' was conceptualised

³⁰ In this study, processes allude to the social elements in which social looks are elicited and embedded within social context that represented analytical reasoning.

through the application of merging a time component from the pre-existing category of 'Bids for Social Interaction' and elaborating on the pre-determined definition pertinent to the category of 'Gaze Aversion'.

Detailed below is an extract of initial inductive analysis using the NVivo program, where nominal concepts and their behavioural manifestations are logged alongside descriptions of social looks units without the assignation of a category.

Table 4.3. Extract of inductive coding analysis

ID	TIMESPAN	CONTENT
1	0:06.9 - 0:07.5	Watches others interact. Child watches as adult talks with another child whilst holding a feather.
2	1:00.1 - 1:03.2	Child watches adult whilst having a feather
3	1:08.6 - 1:11.2	Orient to a voice. The child turns her head when hears adult making a sound
4	1:25.1 - 1:27.0	Watches adult performing an action. Child watches adult throw feathers in the air
5	1:31.0 - 1:33.4	Watching others interact. Child watches adult talk with another child
6	1:39.0 - 1:40.6	Watching others interact. Child watches adult interact with another child
7	1:39.2 - 1:45.2	Watching others interact. The child looks at adult interacting with other children
8	1:50.8 - 1:52.0	Watching others interact. Child watches as adult calls another child and plays with feathers
9	1:58.0 - 2:00.0	Watching others interact. The child looks as the adult is interacting with another child
10	2:09.8 - 2:12.4	The child looks up at the adult when the adult says "look"
11	2:23.6 - 2:25.0	Watching others interact. The child looks up to the adult putting a feather in another child's head
12	2:46.5 - 2:48.6	Orient to a voice. The child looks up to adult when the adult asks, "am I pretty?"
13	2:50.5 - 2:51.6	Child watches the adult play with the feathers
14	3:19.3 - 3:20.9	child looks at adult and other children climbing in adult's lap
15	3:26.3 - 3:28.0	The child looks at the adult when the adult offers her hand as the child climb on her lap
16	3:30.4 - 3:31.6	The child looks at the adult when trying to climb on the adult's lap
17	3:43.0 - 3:43.7	child looks at adult whilst trying to climb on adult's lap
18	3:58.2 - 3:59.8	child looks at the adult when the adult is trying to comfort another child

4.4.3. Comparison processes

Comparative processes were undertaken alongside inductive analysis to support the process of category formation. Constant comparison was

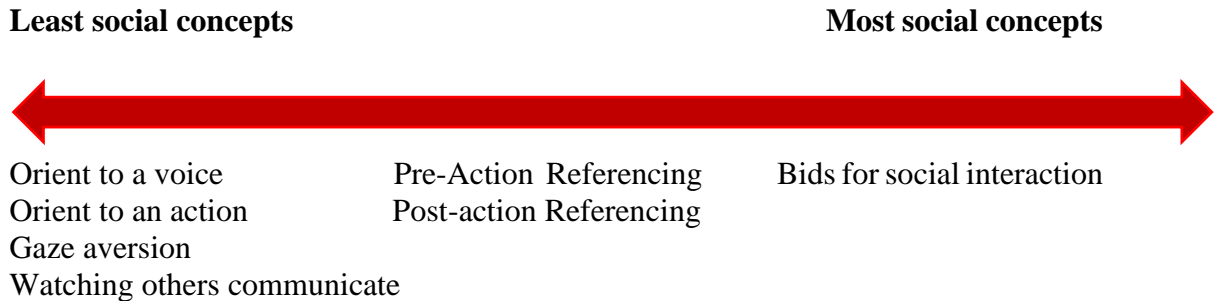
conducted against the pre-existing typology of social looks at Time 1 but against the provisional nomenclature of looks at Time 2 and 3.

Comparative processes permitted the identification of relevant behavioural content's similarities and differences with the pre-existing propositions, bringing a level of abstraction that permitted the coding process to evolve from descriptive analysis to conceptual development. This iterative stage was based on three elements (1) inclusivity, (2) representativeness and (3) trustworthiness. These criteria were applied through a systematic process and at two very distinct levels: (1) concept to concept level and (2) category to instances levels. These two analytical techniques were applied simultaneously as concept comparisons could not be interpreted in the absence of descriptive behavioural manifestations, i.e., instance levels. The comparison process, therefore, unfolded as follows:

- (1) a concept-to-concept level of comparison, permitting the analytical process coding of functional qualities of social looks. This cycle provided the semantic structure of looking terms, involving comparative analysis for categorical representativeness. The aim was to ensure that axial concepts captured semantical meaning (functionality) pertinent to each act of looking. For instance, categories such as 'Bids for Social Interaction', 'Orienting to a Voice' or 'Pre-Action Social Referencing' provided the relational, structural, and semantical meaning of social looks experiences, related to infants' attempts to engage socially, orienting to social/non-social stimuli and seeking information through referential looks respectively. This comparative level was influenced by the social dimension stipulated by Clyman et al., (1986) also, where looking classification was based on a continuum moving from least degrees of sociability to highly sociable concepts.

The figure below illustrates the taxonomical spectrum, as it was understood by the researcher.

Figure 4.4. The spectrum of social dimension classification stipulated by Clyman et al., (1986).



The social dimension informed functional qualities and social variability of the nominal categories with the specific behavioural manifestations providing explanations as to how axial looking concepts unfolded naturally. Comparisons at the level of instances (descriptions) were required also.

- (2) The second level of comparison took place at the concept-instance analysis, where salient descriptive features of social looking behaviours, belonging to a concept, were compared with the pre-existing propositions. Behavioural descriptions provided the explicit, rich explanations of looking acts functions. Analytically, behavioural propositions represented a criterion for concept demarcation and provided prototypicality to each category.

The analytical comparison stage allowed the subsequent revision, modification, elaboration and/or creation of a robust conceptual nomenclature of social looks (Saldaña, 2016) that led to the establishment of seven provisional novel categories: (1) Watching an Adult, (2) Watching an Adult Perform an Action, (3) Watching others Interact, (4) Glancing, (5) Child Emotionality, (6) Responding to Joint Attention and (7) Responding to Name.

4.4.4. Stage two: deduction and concept development

Having reached an analytical level were categories where provisionally formulated (Blumer, 1969), the next step focused on the consolidation of the concept categories in order to develop robust, well-defined concepts. The task

consisted in developing what Saldaña (2016) describes as ‘categories of categories’ (p.278), i.e., the creation of a taxonomical set of concepts, where categories possess an equal qualitative value (Saldaña, 2016), rather than hierarchical attributes.

Concept development was conducted by means of reading through each node entry and subsequently revising, refining, or elaborating on key behavioural components that may have functioned as typicality for each category. Nodes, in NVivo terms, refer to references that contain qualitative data related to units of analysis (Bazeley & Jackson, 2013). In this thesis, each node constituted a named category, which included the sum of each participant’s descriptive behaviours (internals) as coded by the researcher. This node structure facilitated the classification process as permitted to extrapolate intra-category, behavioural similarities and to corroborate or elaborate definitions against pre-existing definitions.

In order to decide what components were representative of each category, a criterion of behavioural salience and representativeness was stipulated. The naturalistic as well as the longitudinal characteristics underpinning this study, brought some difficulties to this iterative component, particularly with regards to the process of extrapolating behavioural manifestations to form the ideals within concepts. The main issue encountered was pertinent to fixtures such as the complexity and variability of behavioural manifestations shown over time, increasing the level of difficulty in delineating descriptions

These difficulties led the researcher into inquiring the possibility of creating different propositions for each of the three-time-points, permitting to capture infants increased developmental maturity. However, this option was discarded as (1) it would have impacted on levels of taxonomical clarity and proposition simplicity, subsequently jeopardising components of analytical reliability, due to the creation of higher levels of conceptual abstraction, (2) despite behavioural complexity, the essence of each category. i.e., its functionality and semantic representativeness remained consistent within concepts and across timelines. Based on these different aspects, concept consolidation was acquired by including those behavioural components that (1) possessed

qualities of salience, (2) represented the most prototypical behavioural manifestations across timelines and (3) provided category typicality.

4.5. Reliability issues leading to qualitative research criteria

As noted in previous chapters, this study aimed to solve some of the reliability issues encountered in the study by Clyman et al., (1986). Conceptually, a source of analytical unreliability was represented by the creation of definitions that were based on a single function, neglecting those instances where looks possessed more than one functionality. Furthermore, categorical propositions included behaviours belonging to the visual channel solely, exempting other forms of infants' non-verbal communicative manifestations.

In order to resolve some of these issues, the analytical process was built upon evaluative research criteria to ensure that categorical descriptions possessed qualities of trustworthiness, and representativeness (Lincoln & Guba, 1985; Shenton, 2006), leading to generalisability and reliability of the concept categories.

Historically, validity and reliability as evaluative measures have had its roots in positivist traditions (Golafshani, 2003; Guba & Lincoln, 1994), where epistemological determinism - through the conceptualisation of phenomena as variables - led to the use of statistical techniques to formulate probabilistic predictions and generalisations about a specific phenomenon (Figgou & Pavlopoulos, 2001). Golafshani (2003) argues that concepts of reliability and validity used in quantitative research have been redefined in qualitative approaches through the use of alternative terms such as trustworthiness, rigour and quality. These research components are evaluated through criteria of credibility, confirmability, and dependability (Lincoln & Guba, 1985), aiding researchers in the differentiation between 'good/bad' research practices. The use of both research criteria terms of quantitative-qualitative denotes - according to Golafshani - share similar goals, i.e., the evaluation of research, but bring differences pertinent to ontological and epistemological beliefs, particularly, as to how to acquire knowledge but, ultimately, they

I agree with Golafshani that the terms used by different research approaches indicate differential epistemological practices and methodological demarcations, but equally, do not constitute a reflection of competing research aims. This assertion is best represented by the use of both qualitative and quantitative analytical methods for the exploration of social looking behaviours. Therefore, the main qualitative research criteria of acceptability of the findings relied on the acquisition of trustworthiness and representativeness of social looks concepts. Additionally, this research used quantitative measures in the form of patterns and distributions of looks to provide further information about the phenomenon.

Guba & Lincoln (1981) stated that the criterion of trustworthiness can be obtained by the application of qualitative research components, specifically, credibility, transferability, dependability, and confirmability. These components were applied throughout the study to ensure the construction of reliable propositions of social looks that provided the evaluative quality required. Their application is detailed as follows:

- **Credibility:** the term credibility refers to what empiricists attribute to external validity, and it is concerned with ensuring that the outcomes of a study align with the research aim(s). According to Lincoln & Guba (1985), one of the factors that ensures research credibility is the use of well-established methods that provide appropriate measures of any phenomenon under study. In this thesis, credibility was obtained at different stages of the research process: first, the naturalistic and longitudinal nature of the research led to the selection of qualitative methods, in the form of behavioural observations that resulted in a more in-depth understanding of the phenomenon and how it emerged within social contexts, influenced by social partners. This knowledge facilitated the iterative process of establishing behavioural descriptions of social looks concepts. Miles & Huberman (1994) claimed that field data - collected at the beginning of any qualitative research - possess lesser qualitative value than data gathered near the end of the study. This assertion holds value here as the process of analysis became more efficient and accurate over time, whereby coding practices and

the understanding of the phenomenon deepened. To increase the qualitative value of observational data, the researcher revised all the codes entries from Study 1 to ensure accuracy, cohesion and validity of the content extracted through data analysis. Second, through sessions with my supervisors, which permitted the researcher to seek help when facing dilemmas and to avoid fundamental mistakes. Guidance from my supervisors was instrumental during the conduction of the pilot study, including the analytical coding process.

Third, access of an original study aided the research process, as not solely provided a framework in which to build an in-depth typology of looking behaviours but facilitated access to information related to reliability issues that were considered and avoided in this study also. Previously established definitions permitted the researcher to engage in iterative practices by using techniques with which verify, elaborate, and create novel content from the pre-existing concepts. The comparative analysis allowed the development of detailed descriptions and provided the basis for trustworthiness in this qualitative inquiry (Shenton, 2004). Last, the conduction of a pilot study, prior to undertaking the main research, allowed the researcher to familiarise with the qualitative methods and analytical practices selected, gaining practical and conceptual knowledge about the research. The use of an inter-coder reliability test at Time 1 and Time 2 allowed to assess the trustworthiness with each of the concept categories.

- **Transferability:** this term refers to the production of knowledge that has relevance outside the context of the original research setting (Klein, 1999; Pozzebo, 2004). The naturalistic approach granted criterion of transferability, as looking behaviours emerged naturally within social contexts. Erlandson, Harris, Skipper & Allen, (1993) argue that naturalistic enquiries do not acquire total transferability, as observations are dependent on the setting in which phenomena occur. This study used nursery settings to examine looking behaviours, which are contexts that determined specific practices, routines and norms that influence social behaviour. These cultural peculiarities brought cohesion to the data and potential conceptual transferability to similar

contexts. It may provide the possibility to compare looks, elicited in early years practices, to other similar contexts.

The stipulation of an age criterion informed the selection process as well as permitted to gain greater depth of the phenomenon at specific time points. The detailed account of the different stages undertaken in this research from methodology and methods to coding procedures) allows for future replicability, providing not solely qualities of transferability but of research dependability also.

- **Dependability:** alludes to the stability of the data over time and under different conditions (Elo et al., 2014). In this thesis, dependability was acquired through the analytical process by creating an audit trail of the coding procedures for each participant at three different time points. The recordings of observational, raw data permitted content structure to be organised, described, classified, and revised (twice in the case of data from Time 1) prior to creating the final typology of social looks into categories of looking behaviours. This analytical process permitted the establishment of research components of confirmability and accountability also.
- **Confirmability:** Confirmability criterion refers to the accuracy and objectivity of the information provided by participants and/or that is extrapolated from the data (Miles & Huberman, 1994; Shenton, 2004; Elo et al., 2014). In this thesis, confirmability was established by the conduction of an inter-coder reliability test to gain consensus of the different categorical definitions of social looks. The test allowed to evaluate for categorical objectivity and accuracy as well as to measure the percentage of agreement amongst observers.

4.6. Conclusion

This chapter has provided an in-depth account of the methodological approach used in this study. It included explicit explanations of the methods, designs and procedures undertaken in this thesis. To reiterate, the main aim was to create an in-depth typology of social looks. It was fundamental that the process of concept development was described accurately. The implementation of

well-established research strategies throughout the study process supported the trustworthiness of the typology of social looks created in this thesis.

Chapter 5

Category Development

5.0. Introduction

This chapter offers further detailed descriptions of the process of category construction that emerged through analytical coding methods. Following the processes of data collection and analysis partaken at Time 1, the creation of an initial and rudimentary categorisation of social looks is presented here. The Chapter incorporates explanations related to the conduction of the first reliability test conducted to evaluate the initial classification of social looks.

This chapter addresses the central research question:

What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?

5.1. The categories of social looks

Following coding analysis, an initial set of social looks categories was developed representing different ways in which infants naturally elicited looks to the adult. As discussed in the previous chapter, the nominal categories were classified within parameters of concept meaning and functionality. This semantical classification was influenced by the social dimension used in the Clyman et al.,’s (1986) study to operationalise social looks. The authors alluded to a classification of looks based on a dichotomic social dimension and stipulated based on degrees of sociability (see chapter 4). Thus, the authors considered categories operationalised as orientations as the least social category and those pertinent to ‘Bids for Social Interaction’ as the most social. In this thesis, concept structure represented the varying social relations and interconnections of infants with the context and adults, encapsulated within dimensional boundaries of functionality. Six different dimensions were stipulated:

1. Orienting dimension: pertinent to those categories which key features represented infants' motor movements towards the referent, in this instance, the adult.
2. Observing dimension: represented by social looking categories that denoted indirect, non-participatory attentional processes.
3. Social referencing dimension: alluded to those categories belonging to components of social referencing processes.
4. Social interaction dimension: pertinent to social looks concepts elicited by infants in order to engage in joint attention with the adult
5. Affective dimension: included a single concept comprising affective components accompanying looking acts.
6. Monitoring dimension: represented by a category that denoted functions of monitoring processes.

As mentioned previously, to help develop the categories of looking behaviours I used the typology created by Clyman et al., (1986) as a comparative framework, comprising of eight operationalised categories of social looks - all possessing information-seeking properties. As noted, the concepts with the least degree of sociability were pertinent to orientations, divided into two categories: (a) Orient to a Voice and (b) Orient to an Action. The concept constituting the highest degree of sociability was represented by the nominal category 'Bids for Interaction', where (c) Long Pause and (d) Short Pause alluded to differences in infants' information processing. The remaining categories were not explicitly classified within the social continuum but represented looks consisting in (e) Watching Others Communicate, (f) Pre-Action Social Referencing, (g) Post-Action Social Referencing and (h) Gaze Aversion.

The pre-existing typology served as a structural and referential baseline in which the novel classification was developed. It also permitted the comparison and differentiation of acts of looking amongst the two different study contexts: semi-naturalistic, involving some variable control through a modified version of the 'Stranger Paradigm' and naturalistic, involving no manipulation of

variables. As a result, categories were described in terms of their social function (meaning) as they occurred incidentally. Furthermore, descriptions described the most salient characteristics of each axial concept, providing categorical representativeness (Barsalou, 1983, 1985) and demarcation exclusivity amongst categories. As a result, the categories extracted possessed non-hierarchical qualities and included the following:

- An axial concept – which represents the different functional meanings of each act of looking.
- A description – representing the behavioural manifestations associated with each concept category that provides the ‘how’ components of each category function.

5.2. Novel categories of social looks³¹

During Time 1 coding analysis, seven qualitatively distinct categories emerged:

- **Watching an adult perform an action:** Child looks at the adult conducting a specific, goal-directed action. This look might involve the shifting of attention between the adult’s face and the action the adult is conducting.
- **Watching others interact:** Infant observes at the adult interacting with other children. This look may involve some shifting of attention between (1) the adult, (2) others and (3) the activity and/or objects. This look might involve some infants’ imitative gestures whilst observing.
- **Watching the adult:** infants observe the adult when the adult is not engaged in interactions with others or in any goal-directed actions³².
- **Responding to joint attention:** Infants look at adult in response to adult initiating interaction in the form of offering a toy, suggesting an action or addressing the infant by name.
- **Responding to name:** Infants look at the adult following the adult’s use of the infant’s name. This look requires infants to disengage their attention from an activity and/or interaction and to orient and look towards the direction of the adult.
- **Child emotionality:** infants look at the adult then display a positive or negative emotional expression. The emotional expression neither occurs as a response to an adult’s comments nor engagement. Rather,

³¹ The iterative nature of the coding analysis resulted in changes in coding terminology, axial concepts and definitions reflected in subsequent chapters.

³² There were instances whereby the adults noticed the infant looking at them and initiated interaction with the infant; as a result, the look shifted into a joint attentional concept, specifically into the category of ‘Responding to Social Interaction.’

the infant spontaneously looks at the adult then shows positive/negative affection.

- **Glancing:** The infant looks briefly (less than 2 seconds) at the adult's face then shifts attention to an activity, event, or another person.

Each category represents a different type of social look functionality, exemplifying ways in which infants use attentional processes in natural settings.

5.2.1. Watching an Adult Perform an Action

The child looks at the adult conducting a specific, goal-directed action. This look might involve the shifting of attention between the adult's face and the action the adult is conducting.

This look refers to infants' directing their attention to adults' specific actions embedded in social practices. This look provides infants with information about others' behaviours as intentional acts, congruent with the characteristics of the natural setting. Adults' goal-directed actions such as putting a top on a bottle, tidying up the playroom or feeding other children served as examples of this specific look and constituted behavioural demarcation against other categories belonging to the same social dimension. The natural context, and specifically the cultural practices of the setting, play an important role in the elicitation of this look, as looks were more prominent during situational events such as snack time or playtime, where infants' physical position was restricted, i.e. when seated in a highchair or around a table. Variability was noted through infants' attentional shifts between the adult's face and the actions conducted and was dependent on the social context, particularly within the younger cohort.

5.2.2. Watching others interact

Infant observes the adult interacting with other children. This look may involve some shifting of attention between (1) the adult, (2) others and (3) the activity and/or objects. This look might involve some infants' imitative gestures whilst observing.

Another category identified denoting observational processes was pertinent to infants' looking at the adult interacting with other children.

Participants observed adults' interacting with other children; commonly, the infant is at a physical distance from the adult/group. Adults' joint attentional engagements with others, such as singing and playing with toys, are exemplars of the types of interactions infants observed and served as joint attentional models³³. Infants' observations often involved attentional shifts between the adult, the other children, and the object(s), establishing a triadic form of information processing. Observing adults whilst interacting with others often instigated infants to reenact and/or imitate the actions simultaneously whilst observing others and on occasions, prompted infants to approach the adult and join in the group, changing attentional functions from observing to interacting.

5.2.3. Watching the adult

The infant observes the adult when the adult is not engaged in interactions with others or in any goal-directed actions.

A type of infant' observational look emanated from situations where the adult was neither interacting nor performing a specific action. Exemplars of this looks are instances where the adult was sitting observing/monitoring the children (without engaging in interaction) and/or entered/left the nursery room. This look, therefore, is highly influenced by the cultural context, possessing functionalities of both observational and monitoring components. Categorical demarcation and concept variability are provided by adults' behaviours that require actions to fall outside parameters of inclusivity for other categories within the same social dimension, i.e., adults' goal-based actions and adults' interactions with others. This social look permits infants to observe and monitor adults and to learn cultural components of the setting, i.e., rules and norms of the setting.

³³ This interpretation is based on data analysis showing that this type of look was elicited prior to infants engaging in active joint attentional engagements with the adult.

5.2.4. Responding to joint attention

The infant looks at an adult in response to adult initiating interaction in the form of handout and gives, suggesting an action or addressing the infant by name.

During the early stages of inductive coding analysis, a prevalent look recurrently emanated from the data, alluding to instances where infants looked at the adult's face in response to the adult's initiations for social interaction. Initially, this research defined the unit of behaviour as infants' initiated looks to align with the original study³⁴. However, the definition was widened to infants' looks to the adults' face (initiated and non-initiated) due to twofold reasons: (1) the significant prevalence of infants' looks as responses of adults' attempts for interactions and (2) to solve some of the reliability issues identified in the original study. For instance, Clyman et al., (1986) provided the example of an adult offering a toy to the infant; this look was conceptualised as social referencing, solely if the infant expressed uncertainty, but as the authors cited (1986:83):

If the child first looked at the adult's hands and then at his or her face, it would not be rated as a social reference because then looking at the adult would be to explore the person whose hands stimulated the uncertainty. Such a look would be an orientation to an action.

The authors further justified the decision to conceptualise the look as an orientation based on their inability to measure the exact point of fixation reliably. This arbitrary coding system posed conceptual incongruence between the behavioural manifestation illustrated in the example and the concept definition of 'Orient to an Action' looks, described as 'infants' reactions to a sudden action and/or movement' (p.79). The infant – based in the exemplar provided – did not react to noise or movement but responded to a social gesture (denoting initiations attempts) from the adult. This look, therefore, represents infants' responses to adults' bids for interaction, and required to be

³⁴ Despite the authors defining units of behaviour as 'infants' looks to an adult's face' (p.78), they only considered and coded looking behaviours that were elicited by infants not adults.

accurately coded by its function, i.e., as responses and not as orientations to actions.

Responses to adults' interactional attempts function within the realms of social engagements, alongside categories related to initiations of social interaction. Conceptually, this look requires infants to actively attend to an adult, following the adult's initiation for interaction. The referential agent here is the adult, not the infant. This look describes the social relation established between the adult and the infant through adults' gestures such as handouts and gives, and/or verbalisations in the form of commenting and/or commanding. Additionally, adults used the infant's name to draw direct attention to the adult.

The component of calling the infants' name, found in this categorical description, presented qualitative differences with the category of 'Responding to Name'. Mainly, that adults' name-calling was used in some but not all initiations, constituting, therefore, a behavioural variable rather than a necessary component of the category. And that, within joint attentional processes, instances of adults' use of infants' names were encapsulated in interpersonal engagements unlike the 'Responding to Name' category, where often infants oriented to the adult outside social interactions. This difference provides alternative functionality to the concept representing, fundamentally, one form - amongst others - of adults' attempt to engage infants in interactions. Conversely, the concept category 'Responding to Name' constitutes a distinct category, with different functionality.

5.2.5. Responding to name

Infants look at the adult following adult's use of the infant's name. This look requires infants to disengage their attention from an activity and/or interaction to orient and look towards the direction of the adult.

This novel category requires the infant to respond to a social agent, by acts of looking, following the calling of the infant's name. Adults' name-calling establishes a direct causal relationship between the verbal input and infants' attentional acts. This cause-effect characteristic is shared by other taxonomical categories, specifically those belonging to the dimension of orienting, where infants orient towards social and non-

social stimuli. A point of diversion between 'Responding to Name' and 'Orient to a Voice'³⁵ category resides in the adults' verbal directness (through name-calling), prompting infants' elicitation of looks.

Adults calling the infant's name serve as a direct, attention-eliciting cue but possesses different functions, depending on the social context and situation, for instance, it might be used as: (1) behaviour regulation, to stop the infant's action, i.e., climbing chairs, throwing objects (2) modelling, to prompt the infant to copy the same action as the adult, (3) commands, to instruct infants to execute an action such as grabbing a toy. Contexts, therefore, play an important role in providing the situational meaning for the elicitation of this causal look. Behaviour variability is represented by occasions where orienting movements preceded looking behaviours, influenced by the dynamicity of natural environment resulting in infants needing to orient (and track) the physical location of the agent.

A peculiarity detected during analytical coding was infants' looking behaviours when adults named other infants or mentioned the participants' name when talking to others. Coding analysis included such instances as infants *did* look at the adult's face, but they were not coded as responses due to (1) adults' name-calling referred to another infant and therefore did not result in social interactions and, (2) included infants' reactive responses, usually in the form of orientations toward the adult, therefore in such instances, the look was coded as 'Orientating to Voice' rather than 'Responding to Name'. Nonetheless, this particularity shows infants' understanding of the social meaning of calling someone's name, even if it is not one's own.

5.2.6. Child emotionality

The infant looks at the adult then spontaneously displays a positive/negative emotional expression. The emotional expression neither occurs as a response to an adult's comment (as in the case of orientations to voice) nor as engaging in joint

³⁵ The omission of the counterpart category 'Orient to an Action' resides in the lack of social component that this category possesses, unlike 'Orient to a Voice' and 'Responding to Name' where behaviours are elicited by social, verbal stimuli.

attentional practices (as in the case of initiations and responses to social interaction).

This social look category denotes instances where infants displayed affective facial expressions towards the adult. A requisite for category inclusivity is that the emotional expression displayed is elicited spontaneously, i.e., in the absence of adults' input and/or reactions. Demarcation criteria for this concept exclude those categorical properties of infants showing affective expressions as a result of active social engagements with the adult (categories related to the social interaction dimension). The emotional displays occurred, in most instances, alongside infants' initiated looks to the adult's face but, on occasions, emotionality proceeded the look (usually attached to negative emotional expressions).

The functionality of this look is based on positive/negative affect sharing, often in the absence of interpersonal encounters and mutually shared understandings (hence the spontaneity component attached to this look) and, on occasions to socially unavailable adults, who failed to notice infants' affective displays. Exemplars of this category were shown when infants, playing independently, disengaged from the activity and (spontaneously) pose a positive emotion to the adult then look away, or when the infant stood in the room and looked at the adult then started crying. For this look, positive emotion was the most prevalent affect displayed by participants, with smiling at the adult representing the most frequent behavioural manifestations for this look. Negative affect, in the form of infants posing a sad face, crying and displaying anger, are also present but to a lesser degree.

On occasions, following infants affective display to adults, this look naturally evolved into social interaction looking behaviours.

5.2.7. Glancing

The infant looks briefly (less than 2 seconds) at the adult's face then shifts attention to an activity, event, or another person.

This category represents the singular concept amongst the typology of social looks that retains a duration component as a criterion for inclusion. The

concept alludes to a type of look characterised by brief attentional acts – 2 seconds or less prior to infants shifting their attention back to the activity or towards another focal point in the environment. Duration time and attention engagement/disengagement, therefore, constitute the fundamental features of this look.

This look functions as monitoring processes and requires infants to process multi-modal, peripheral information simultaneously. Commonly, infants are engaged in their own independent and/or shared activity prior to glancing at the adult. Exemplars pertinent to this category were represented by instances when infants glanced at adults passing by, or when adults were conducting specific actions such as feeding other children and/or writing notes.

Despite these examples demonstrating that associated behaviours include components from other propositions, i.e., from 'Watching an Adult Perform an Action' or 'Watching the Adult', what constitutes category demarcation is precisely the duration component and not the functional element.

This category's description shares some qualities found in one of the pre-existing categories: 'Gaze Aversion'. This original concept was defined by Clyman et al., (1986) as: 'the infant fixates on an adult's face and then looks away, but not to another adult or a toy' (p.80). 'Glancing' category includes this same feature of shifting attention from the adult, but contrary to the 'Gaze Aversion' proposition, the infant redirects their attention back towards the activity, toy and/or another infant. The absence of aversion here is linked to the ecological nature of the study, where stimulation is ever-present, preventing infants from averting gaze completely.

5.2. The pre-existing social looks categories

To reiterate, Clyman et al., (1986) created eight operationalised categories of looking behaviours, retaining characteristics of information seeking properties. The social looks categories represented the first attempt to create a classification outside strict empirical requirements. The typology was developed within a social continuum based on degrees of sociability. Methodologically, the semi-naturalistic study included the manipulation of some variables through the implementation of a modified version of the

'Stranger Situation' paradigm (see Chapters 2 and 3). Despite the study's lack of clarity of the analytical process undertaken to construct the nomenclature, some characteristics pertinent to the different looking concepts were made explicit. These are:

- Social looks descriptions are based exclusively on the infant, excluding any role partaken by adults in eliciting looking responses, and any contextual influence.
- Categories are restricted to the visual channel solely, excluding any other forms of affective communication such as gestures and verbal prosody.
- The different propositions hold a level of descriptive subjectivity and interpretation, due to analytical coding issues, leading to some researcher's biases in identifying and accurately coding instances of looking behaviours.

The typology of social looks served as a framework for the exploration and comparison of instances of looks in natural environments. Consequently, the coding analysis provided qualitative differences in behavioural presentations with the pre-existing social looks descriptions, that required the use of techniques such as merging, elaboration and reconceptualisation

5.3.1. Orienting to a Voice

Original definition: '*The child looks at an adult who either begins speaking or adds a strong emphasis to an ongoing vocalisation*'.

Clyman et al., (1986) formulated a category description that represented infants' looking behaviours following an adult's verbal input or strong vocalisation. The authors included instances when the child turned to watch an adult stand up or when the child watched an emotional expression.

Differential behaviours extracted during coding analysis showed that - in natural contexts - infants' orienting behaviours were more salient (and often necessary), prior to looking. As mentioned in chapter 2, there is a qualitative difference between orienting – denoting the processes of orienting our sensory

organs to the stimuli – and attending – representing active information processing following physical orientation (Mundy, 2016). Infants in this study demonstrated behaviours such as lifting and/or turning their heads to scan and locate the adult, prior to attending to the voice. These motor behaviours are congruent with the natural characteristics of the setting, where social dynamicity and fluidity prevents infants from being able to, instantly and directly, attend to a single stimulus as it is the case with experimental designs.

Exemplars of orienting looks were represented by adults' vocalisations characterised by the use of semantic terms in the form of adult's commands and/or comments, expressed in high pitch, exaggeration and different tonality. These speech differences were recognised in the original definition also, where orienting looks were elicited as a result of adults' strong vocalisations. These verbal particularities remained present and consistent across time points, showing significant relational patterns between highly exaggerated adults' voices and orienting behaviours. The proposed definition explicitly emphasised this component as a key feature for this look.

The elaborated proposition was defined as:

The infant turns or lifts the head and orients and looks at the adult's face. Acts of orienting occur following the adult's verbal expression adding a strong emphasis to an ongoing vocalisation, making a high pitch comment or giving a command.

5.3.2. Orient to an action

Original definition: '*The infant looks in reaction to a person's sudden or noisy movement*³⁶'.

Similar to its counterpart category, a salient feature of this look is the strong behavioural manifestation of orienting behaviours prior to looking. This look was elicited following auditory output performed by the adult. Coding exemplars demonstrated that sounds such as banging, hitting, or knocking

³⁶ The pre-determined definition possesses levels of semantic ambiguity as it is not clear what constitutes sudden and/or noisy movements. It is assumed within this study (and corroborated by observational coding) that the noise is caused by adults' manipulating objects, attaching non-social qualities to this orienting look.

elicited infants' looks towards the adult. These auditory and kinaesthetic inputs surpassed the threshold of noise displayed in nursery settings so much so that prompted infants to orient towards the adult. A significant quality of this feature look, therefore, is the unexpected and incongruent sound eliciting infants' behavioural reactions.

The elaborated proposition was defined as:

The infant turns or lifts the head and looks at an adult's face following the occurrence of an unexpected noise or a person's noisy action or movement.

5.3.3. Watching others communicate

Original definition: 'The infant looks at two people communicate. A triadic relationship is established, which may have multiple meanings'.

The pre-existing definition explicitly denotes the existence of a triadic relation between the infant and the two adults conversing. The methodology undertaken by the authors, in the form of the 'Stranger Situation' paradigm, brings significance to this category as the paradigm involves the infant's exposure to a stranger. In the original study, the modified paradigm included a component where parent and stranger engaged in conversation whilst the infant played independently. Having more than one adult in the room is often a feature in nursery settings also, bringing the research criterion of generalisability to this look. Conceptually, the authors did not specify the meaning of this look, describing this tripartite relation as 'having multiple meanings' (p.79). Clyman et al., (1986) speculated with different possible purposes: (1) the child observes the adults in order to learn and (2) the child feels excluded. The novel proposition did exclude such ambiguous interpretations in order to maintain the research criterion of trustworthiness. Additionally, semantic content was represented by infants' attentional acts that were consistent with observing adults during conversations - inconsequently of its functionality.

Descriptive codes showed variance in behavioural presentation, as most infants visually referenced one adult then shifted their attention towards the

second adult. This back and forth element reaffirmed the triadic nature of this social look and constituted a variable element for this look.

The elaborated proposition was defined as:

The infant looks at the adult involved in a conversation with another adult. The child might shift attention between the people talking.

5.3.4. Pre-Action social referencing

Original definition: 'The infant looks at an uncertain event or object and then looks to an adult before acting in response to that event or object'.

Clyman's et al., (1986) conceptualisation of this look alluded to the classical social referencing paradigm. In their definition, the sequential components associated with the ambiguity paradigm are still present, whereby the infant encounters an ambiguous event then elicits referential looks to the adult in order to regulate their behaviour. A behavioural requisite for this look required the infant to neither pause nor show a strong emotional reaction when observing the ambiguous event and referencing the adult.

Natural environments brought a different conceptualisation of this classical social referencing look, with instances of referential looks occurring in the absence of any ambiguous event and/or object, but in the presence of potential violations of the social norms and rules of the setting. Behavioural observations showed that 'Pre-Action Social Referencing' acts were highly embedded and influenced by the cultural setting, providing infants' with the social and moral information shaping their behaviours. Thus, infants' information-seeking was pertinent to their intended actions and not to the reduction of feelings of uncertainty, following the exposure to an ambiguous event.

Exemplars of this look showed that infants approached objects and/or events with a clear intention and, before executing such action, they referenced the adult to gather information in order to regulate their own behaviour, for instance, infants walked and/or crawled towards a door and before touching

or trying to open it, looked at the adult, then looked back at the door; on other occasions, pre-action referencing occurred during social interactions with the adult and prior to the infant conducting a specific action. For instance, an entry for this look described how infant and adult were engaged in reading a book together, and whilst the adult was reading, the infant touched the page (intending to turn the page before the adult finished reading it) then looked at the adult, who said no. Following the adult's feedback, the infant desisted and continued looking at the book.

To reiterate, Clyman et al., (1986) postulated that this look required infants to not pause during the process of infant's attending to the stimulus and referential looks to the adult. Coding analysis positively showed this temporal effect. An additional component was identified also, in the form of infants' refraining from fully conducting their pre-intended actions by stopping and looking at the adult. This behavioural manifestation is significant as provides demarcation criterion against its counterpart category 'Post-Action Social Referencing' look. Following referential looks, infants redirected their attention back to the object and/or event but shifted their attention again, towards other environmental focus. This component brings novelty to the category and represents a qualitative difference between experimental designs and natural occurrences of the phenomenon.

Variability was noted within the behavioural regulation component where, in most instances, infants did not regulate their behaviour following adults' messages rather redirected their attention back to the object and immediately away from the event and/or object. Additionally, the messages that adults provided to infants were not constrained to facial expressions and vocalisations, as it is the case in social referencing paradigms, but were characterised as being multi-modal combining verbal and non-verbal cues.

The elaborated definition, therefore, included the possibility of an object and/or event to be ambiguous but explicitly emphasised infants' intentional acts, stopping behaviours and regulatory components as key features providing typicality to this category.

The elaborated proposition was defined as:

The infant approaches an event and/or object (may be uncertain or not) with a clear intention for action then, prior to acting the infant stops and looks at the adult, who provides a multi-modal message, i.e. gestures, vocalisations and affective cues). The infant then redirects their attention back to the event, object or person.

5.3.5. Post-action social referencing

Original definition: 'The infant performs an activity, feels uncertain about the activity, and then looks at an adult'.

The pre-existing category definition required that infants executed a specific activity, and experiencing feelings of uncertainty, to display referential looks to the adult. The feeling of uncertainty about an activity, therefore, constituted the cause prompting infants to look at the adult.

Similar to its counterpart, 'Pre-Action Social Referencing', a different presentation was observed during coding, providing a different conceptualisation of this category. This look is characterised by possessing a function of assessing adult's reaction to the infant's behaviour, and not as a form of seeking information due to uncertainty. Post-Actions referential looks were noted during situations involving infants' joint attentional engagements with peers and/or individual play, where actions violating the rules and norms of the setting prompted infants to look at the adult. For example, infants' actions such as throwing objects, snatching toys from others and/or putting things in their mouths elicited referential looking. Uncertainty about an activity did not constitute a functional component for this category; rather, infants' information gathering looks served as appraisals of adult's reactions and possible consequences³⁷.

³⁷ The conceptual disparity between infants' uncertainty – as stipulated by Clyman and associates - and appraisals of adults' reactions (identified in this study) resides within cognitive and behavioural components; whereas the pre-existing definition alludes to behavioural reactions (and subsequent experiences of uncertainty) following infants' action performance within an activity, in this study infants' post-action referencing occurred as a result of perceptions and evaluations of their own behaviour (transgressions) and how it related with their knowledge of the cultural expectations and norms of the setting. Such integration of information elicited a look in order to inform infants of possible repercussions and not to reduce uncertainty about the activity, as originally postulated.

A behavioural component that surfaced during coding analysis was the presence of attention shifting; the infant either redirected their attention towards the object and/or person or looked away. Variability in behavioural regulation was noted also, as some infants, following adult's feedback, did refrain from re-executing the previous action. In contrast, some infants disregarded the adult's message and repeated the action.

The elaborated proposition was defined as:

The infant performs an action, touches, grabs and/or take an object then looks at the adult to gather information. Following referential looks, the infant shifts their attention away from adult either back to the object or action or elsewhere.

5.3.6. Initiates bids for social interaction (short and long)

Original definition: *'The infant appeals to an adult to share an emotional reaction to an object or event or appeals for interaction with an adult, as in offering a toy or raising his-her arms'. The short category requires the look to last 2 seconds or less.*

Clyman et al., (1986) classified this category as being the most social amongst all the social looks category. The authors divided the concept into two different propositions based on a duration criterion: long and short. Long bids for interaction constituted any look lasting more than 2 seconds, whereas short bids could not exceed 2 seconds. The rationale behind the inclusion of a time component was based on the child's attempts to interact with the adult as well as the levels of information processing required.

Observational coding demonstrated that infants attempted to engage the adult in social interaction by displaying specific behaviours such as offering a toy, physical proximity by moving closer to the adult, gesturing and/or vocalisations. Affective displays represented a variable component, unlike the pre-existing proposition where affective sharing about an object and/or event constituted a required functional feature for category inclusivity. The duration component, previously stipulated in the original study, did not affect infants' social goal rather, it was the behavioural manifestations attached to acts of

looking that constituted the most significant quality providing meaning to the category.

The elaborated concept, therefore, merged the two pre-existing categories into a single proposition, and reformulated the original axial concept from 'Initiates Bids for Social Interaction (long and short)' to 'Initiates Social Interaction Engagement'. The new term provides a more explicit semantical structure to the category, aligning conceptually with its counterpart 'Responding to Joint Attention'.³⁸

The elaborated proposition was defined as:

Infant appeals to an adult to initiate an engagement by looking at the adult and offering a toy. This look may be accompanied by physical proximity (the child moves closer to adult), gestures (extending arm), affective expressions and/or vocalisations.

5.3.7. Gaze aversion

Original definition: *'The infant fixates on an adult's face and then looks away, but not to another adult or to a toy'.*

Clyman et al., (1986) proposed that the primary function of this was to reduce the amount of stimulation experienced by the infant. Nonetheless, this category was absent from their coding analysis and was, subsequently, excluded from their study findings. Similarly, this thesis' data showed no instances of look and was not included as part of the novel typology. An explanation for such absence can be attributed to the naturalistic methodology that did not provide opportunities for infants to avert their gaze entirely due to the constant stimulation within the environment.

5.3.8. Categorical summary

Following analytical coding at Time 1, the total number of categories created and/or elaborated consisted of 13 different concepts, classified within 6 different social dimensions, as shown below:

³⁸ This category's axial name was later redefined to 'Responding to Social Interaction Engagement' to provide taxonomical cohesion to social looks classification.

Figure 5.1. Initial Social Looks Classification.

Social Dimension	Concept Category
Orienting	<p>Orient to a Voice: The infant turns or lifts the head and orients and looks at the adult’s face. Acts of orienting occur following the adult’s verbal expression adding a strong emphasis to an ongoing vocalisation, making a high pitch comment or giving a command.</p> <p>Orient to an Action: The infant turns or lifts the head and looks at adult’s face following the occurrence of an unexpected noise or a person’s noisy action or movement.</p>
Observing	<p>Watching an Adult Perform an Action: Child looks at the adult conducting a specific goal-directed action. This look might involve the shifting of attention between the adult’s face and the action the adult is conducting.</p> <p>Watching Others Communicate: The infant looks at the adult involved in a conversation with another adult. The child might shift attention between the people talking.</p> <p>Watching Others Interact: Infant looks at the adult interacting with other children. This look may involve some shifting of attention between (1) the adult, (2) others and (3) the activity and/or objects. This look might involve some infants’ imitative gestures whilst observing.</p> <p>Watching an Adult: The infant observes the adult when the adult is not engaged in interactions with others or in any goal-directed actions.</p>
Social Interaction	<p>Initiates Social Interaction Engagements: Infant appeals to an adult to initiate engagement by looking at the adult and offering a toy. This look may be accompanied by physical proximity (the child moves closer to adult), gestures (handouts and give), affective expressions and/or vocalisations.</p> <p>Responding to Joint Attention: Infant looks at adult in response to adult initiating interaction in the form of offering a toy, suggesting an action or addressing the infant by name.</p> <p>Responding to Name: Infants look at the adult following adult’s use of the infant’s name. This look requires infants to disengage their attention from an activity and/or interaction to orient and look towards the direction of the adult.</p>
Social Referencing	<p>Pre-Action Social Referencing: The infant approaches an event and/or object (may be uncertain or not) with a clear intention for an action then, prior to acting the infant stops and looks at the adult, who provides a multi-modal message, i.e. gestures, vocalisations and affective cues). The infant then redirects their attention back to the event, object or person.</p> <p>Post-Action Social Referencing: The infant performs an action, touches, grabs and/or take an object then looks at the adult to gather information. Following referential looks, the infant shifts their attention away from adult either back to the object or action or elsewhere.</p>
Affective	<p>Child Emotionality: The infant looks at the adult then spontaneously displays a positive/negative emotional expression. The emotional expression neither occurs as a response to the adult’s comments nor as engaging in joint attentional practices.</p>
Monitoring	<p>Glancing: The infant looks briefly (less than 2 seconds) at the adult’s face then shifts attention to an activity, event, or another person.</p>

5.3. The inter-coder reliability test

Following analytical coding at Time 1 and the subsequent creation of 13 different taxonomical categories, an intercoder test was conducted to evaluate the trustworthiness and homogeneity of the novel categories. Measures of the

value of inter-coder agreement in identifying looking acts and classifying instances of looks into concept categories were obtained.

Three observers, independent to the study but known to the researcher, were recruited to code separate segments of observational data from Time 1, corresponding to three different participants selected at random. The number of coders was selected in accordance with qualitative research literature stating the need to have at least two coders to reliably test categories (Mouter & Vonk Noordegraaf, 2012).

The test used same coding materials than the researcher, i.e., a computer with a video player application to play the assigned video data³⁹ and a piece of blank paper to log and classify each unit of behaviour manually. The test procedure consisted of the analytical coding of a 20- minute video. Observers were required to conduct the same coding procedures as those undertaken by the researcher, consisting of the identification of social looks and the assignation of an existing category. Observers were provided with a paper copy with the 13 taxonomical concept definitions as a framework for analysis.

Prior to commencing coding procedures, a training session, lasting approximately 20 minutes, took place with each observer (each test was conducted separately). The sessions included explications and demonstrations of what constituted a look, of the analytical process of coding and conceptual understanding of each of the 13 concept categories. The training sessions served to minimise the observer's performance anxiety also by reiterating the purpose and benefits of conducting the reliability test.

The use of an index of percentage as a measure of reliability has been criticised for ignoring possible observer's biases during assessment procedures, through arbitrarily assigning behavioural occurrences that might result in inadequate and weak agreements of observational measures (Berk, 1979; Everitt, 1994; Watkins & Pacheco, 2000). In order to prevent this issue from occurring, the researcher explicitly stated to observers to not code those

³⁹ The researcher dismissed the use of the NVivo program to conduct the reliability test due to poor visual view that could hinder observer's coding analysis procedures.

looks that could neither be interpreted nor conceptualised in their analysis, in order to revise and discuss them at a later time.

Following the introductory session, observers proceeded with the analysis of the observational footage assigned to them. Once the analytical process ended, codes were transcribed by the researcher and observers' categories were compared with the researcher's codes, the percentage of agreement calculated prior to embarking in conversations with each coder to determine their iterative process during analysis and to evaluate difficulties during coding that affected category representation and classification.

The outcome of the reliability test demonstrated an inter-coder agreeability of 90 % of the overall categorical coding identified, with a 10% variability within ratings. Data comparison procedures showed a reduced number of observers' rated codes, and ultimately of assigned categories, in comparison to researcher's entries⁴⁰. This difference was attributed to (a) a pragmatic issue, as observers did not use the NVivo software to conduct the reliability test, which might have prevented observers from manipulating visual data, i.e. adjusting speed. This pragmatic issue might have impacted their ability to accurately identifying social looks, and (b) a lack of familiarity with the operationalised typology of social looks and its associated behaviours, which might have resulted in codes being classified according to non-salient behavioural manifestations. Additionally, that coding analysis immediately followed the introductory session, might have prevented observers from fully understanding the different behavioural demarcation and inclusivity criteria of the propositions.

The categories that indicated the most interobserver reliability were 'Initiates Social Interaction Engagement' and those associated with the dimension of 'Watching', particularly 'Watching an Adult' and 'Watching Others Interact'. These categories are characterised by being highly social and by their behavioural manifestations constituting clear categorical demarcation, which might have facilitated conceptual identification and classification. The

⁴⁰ The reduced number of codes demonstrate a minimal random assigning effect (Watkins & Pacheco, 2000) and therefore the minimisation of observer's biases.

categories that represented less inter-coder reliability were those classified as possessing a lesser degree of sociability, pertinent to categories associated with orientations and social referencing looks. In some instances, observers classified post and pre-action referential looks as joint attentional looks, but orienting behaviours and responses to joint attention were conceptualised as child emotionality categories. The difficulty in coding and discerning referential looks from other forms of looking behaviours might involve the concept definition's complexity and the requirement to identify all the sequential components - forming categorical inclusion - positively. The main analytical challenge for observers was the demarcation of each element that constituted typicality of this category and not the presence/absence of uncertainty.

Categories associated with orientations were confused for infants' responses to joint attention, due perhaps, the presence of infants' emotional expressions within social interactions. In nursery settings, both concepts elicited affective displays that made concept demarcation and behavioural variability difficult to discern. Equally, orientations are classified as the least socially embedded looks, and the absence of salient social components might have hindered the observer's ability to identify and represent this look accurately. Despite differences in coding, categorical agreement was reached amongst observers and researcher, following discussions and conceptual explanations of the different criteria constituting category inclusivity.

The observers' percentage of agreement in categorising acts of looks (90%) and their own self-reports stating that the 10% disparity in categorical classification was due to a lack of familiarity with the typology and not to inaccuracies or lack of clarity of the concepts, provided somewhat reassurance of the trustworthiness of the descriptions. It is important to note that the limited number of coders as well as the short time the researcher spent training observers might have influenced the coding process, specifically with instances of categorical agreement that could be explained by chance, and that might have affected the outcomes of the reliability test.

Following the conduction of the reliability test, the second and third longitudinal studies took place.

5.4. Conclusion

This chapter has explained in detailed the qualitative analysis' process that allowed to create the initial typology of social looks. This first set of categories represent the different types of looking behaviours that infants, between the ages of 12 and 14 months, displayed to adults in natural settings. The inter-coder reliability test conducted to assess the agreement of categorical trustworthiness revealed a 90% agreement of coders' entries, compared to those analysed by the researcher. The disparity of categorical classification was more prominent for those categories with a lesser degree of sociability, demonstrating the importance of social components in identifying and interpreting looking acts.

Chapter 6

Time 2 and 3 Studies

6.0. Introduction

This chapter details the conduction of Time 2 and 3 longitudinal studies. It explains the research procedures undertaken to collect and analyse data at Time 2 and 3 of this study, as well as describing the second inter-coders test conducted to measure inter-coders' agreement at Time 2.

6.1. Time 2 Study

Following the outcomes of the reliability test and with the initial typology of looks firmly evaluated, the researcher focused on conducting the Time 2 study. The second study took place three months after the initial study and comprised the same cohort, pertinent to infants aged between 15th and 17th months.

6.2. Recruitment and consent

Nursery settings that were involved in the first research study were contacted via email and/or phone and permission to collect follow-up data were requested. Liaison with parents was established following the same process as study one, where managers approached parents directly asking for consent for their infants to participate in the Time 2 study. Verbal consent was obtained from 17 parents of infants from the initial cohort, constituting a reduced number compared to Time 1 (n=23). The loss of six participants was due to external circumstances such as infants' illnesses on the day of data collection and/or participants no longer attending the early years setting.

6.3. Method

Time 2 study procedures used the same methodology undertaken at Time 1. The researcher recorded an hour of video footage for each child. Prior to

commencing the analytical process, each participant's video was edited to 35 minutes (same length as Time 1) of useful data⁴¹, in order to avoid the pragmatical difficulties experienced by Clyman and associates.

Due to the difficulties encountered with the use of two cameras in Study 1, a single hand-held camera was used, permitting the researcher to move freely within the nursery setting and to capture participants as they explored and interacted with others. Familiarity with the different nursery settings and knowledge of participants facilitated the process of data collection, as it allowed the following steps: (1) to plan all the different components of data gathering process *a priori*. For instance, previous experience allowed the researcher to focus on decisions pertinent to the physical elements of the nursery room and social practices of the setting. Moreover, it helped with the reduction of intrusiveness and (2) to hold knowledge about participants' temperaments, i.e., infants displaying more exploratory behaviours, which helped predict and anticipate effective data gathering procedures. Additionally, to minimise the observer's effect (Robson & McCartan, 2016), the same strategies adopted at Time 1 were applied in this study.

6.2. Analytical coding and category development

Analysis of observational data was conducted following the same analytical approach established at Time 1 in order to bring consistency and reliability to the coding process throughout the three timelines. This is, behavioural observations were viewed using Windows Movie Maker⁴², were inductive and comparative procedures were applied to describe and categorise instances of looking behaviours. Codes were subsequently stored and organised within the NVivo software, as it assisted with providing a platform to organise and retrieve not solely social looking data from Time 1 but from Time 2 and 3 also.

The Time 2 analytical process used the 13 categories of social looks, created at Time 1, as a framework in which compare the code entries recorded at Time

⁴¹ By useful data, I refer to visual data footage whereby participants and their face were visible at all times. This was achieved by the used of two different cameras.

⁴² To reiterate, due to difficulties with the small screen embedded in the NVivo software program, the decision to view recordings of infants' natural interactions using Windows Movie Player was made at Time 1.

2. The provisional typology permitted to assess the accuracy of descriptive content and to discriminate behavioural manifestations describe at Time 1 against those observed and coded at Time 2. The researcher's familiarity with coding procedures and the knowledge of the different categorical descriptions developed in the previous study resulted in coding processes to become more proficient, which facilitated node construction and conceptual assignation of units of looking behaviours. A qualitative difference was stipulated at Time 2 during the recordings and descriptions of looking behaviours. Code entries included both the concept category and the corresponding descriptive features observed, in contrast with Time 1 analysis, comprised of behavioural propositions, with the assignation of concepts occurring during comparison methods with the pre-existing typology of looks. Coding analysis revealed that the propositions of social looks created in the first study served as reliable, functional concepts at Time 2, that included the same prototypical behaviour components than those assigned during Time 1 coding analysis.

The overall analytical process revealed cohesion of concept functionality and behavioural manifestations amongst all different categorical descriptions. Social looks retained the same essential elements represented at Time 1, although social behaviours emerged in a more complex form. For instance, Time 2 showed an increase of attention shifting behaviours amongst participants, particularly within social looks involving observational processes ('Watching' categories). Joint attentional concepts retained high levels of sociability with an increase in the quality and sophistication of infants' non-verbal communicative signals, i.e., the use of gestures and positive facial expressions, especially when attempting to interact with the adult. Equally, adults' language became more elaborated, with instructions and questions being used to gain infants' attention and/or maintain social engagements. Conversely, some infants' responses to adult's invitations were embedded in imitations of adults' actions. The dimension pertinent to orientations showed less consistent and more variable patterns of behaviours, particularly with fewer displays of head movements. This reduction in orienting behaviours can be attributed to changes in motor development, facilitating the ability of infants to walk around the room and ultimately to approach the adult rather than

having to scan the environment to locate the source visually. Despite the increase in behavioural variability, orienting behaviours remained the element providing typicality to both categories.

The analytical coding revealed the emergence of a novel category also in the form of infants' initiations of communication with the adult, conceptualised as 'Initiates Social Communication Engagement'. Although this category shares similar properties with its counterpart 'Initiates Social Interaction Engagement', it diverges at the level of functionality. 'Initiates Social Interaction Engagement' denotes infants' attempts to engage the adult in social interactions, whereas the novel concept 'Initiates Social Communication Engagement' alludes to infants' attempts to communicate with adults for declarative purposes. The behavioural manifestation - providing category inclusivity - required the infant to use the deictic gesture of pointing. Pointing gestures did not constitute a behavioural component of joint attentional looks at Time 1, as younger infants used 'handouts and give' as well as physical proximity to initiate interaction with the adult.

Thus, Time 2 coding provided significant developments pertinent to: (1) the emergence of a new concept category within the dimension of social interaction and conceptualised as 'Initiates Social Communication Engagement' and (2) the reconceptualisation of the existing category of 'Responding to Joint Attention'.

(a) Initiates Social Communication Engagement Category

Coding analysis showed the emergence of a novel type of social look that contained similar properties than looks denoting social initiations but with different functionality.

These looks were characterised by infants' attempts to initiate interaction with the adult in order to communicate and share an experience. A single behavioural manifestation included in this concept, providing typicality was the infants' use of the deictic gesture of pointing. Pointing - elicited to direct adult's attention towards a referent and/or an event – constituted the most salient feature, providing, not solely, semantic structure to the category but concept demarcation against its counterpart, 'Initiates Social Interaction Engagement'

also. This novel category was classified within the social dimension of 'Initiations', and its function represents instances of looking behaviours displayed by infants in order to gain an adult's attention toward an object. Variability was provided by non-verbal behaviours such as physical proximity and/or infants' vocalisations accompanying the pointing gestures. The novel category was defined as:

Infant appeals to an adult to initiate a communicative intent by looking at the adult and pointing and/or making a vocalisation. This look may be accompanied by physical proximity (the child moves closer to adult) and other non-verbal gestures.

(b) Responding to social interaction engagement category

During the inductive, analytical process at Time 2, it became apparent that a lack of nominal accuracy existed with the category of 'Responding to Joint Attention'. Coding procedures highlighted the disjointed relation between semantical properties and functional, behavioural components associated with this concept. This disparity provided issues of representativeness and lack of cohesion with the overall typology of social looks. The provisional category was conceptualised as:

Responding to Joint Attention: Infant looks at adult in response to adult initiating interaction in the form of handouts and give gestures, suggesting an action or addressing the infant by name.

A review of the literature on joint attention processes (Mundy, 2017) revealed a pragmatical difference between behavioural measures of joint attentional processes and the social elements embedded within social interactions. Specifically, a revision of the Early Social Communication Scales (Mundy et al., 2003-2013) showed a semantical difference between the concepts of 'Responding to Social Interaction' and 'Responding to Joint Attention'. The former alludes to 'the frequency of eye-contact, gestures and turn-taking exhibited by a child in response to turn-taking interactions initiated by the tester' (p. 2). In contrast, the latter refers to 'the child's skill in following the tester's line of regard and pointing gestures' (p. 1).

Thus, 'Responding to Social Interaction' category - proposed by Mundy and colleagues – aligned, in its behavioural proposition, with the concept category of 'Responding to Joint Attention', with the inclusion of looking behaviours and gestures as infants' (behavioural) responses to adult's initiations. In the Mundy et al., (2003) paper, 'Responding to Joint Attention' category related more accurately to gaze following processes than social interactional engagements. This conceptual disparity prompted the researcher to re-evaluate the cohesion of the category at concept-instance levels and to reconceptualise the category of 'Responding to Joint Attention' to 'Responding to Social Interaction Engagement'. The novel axial concept provided cohesion to the social interaction dimension and created a clear relation between the concept and its descriptive behavioural manifestations.

6.3. Intercoder reliability

At the end of the coding analysis at Time 2, a second intercoder reliability test was conducted to theoretically consolidate the 13 categories of social looks developed at Time 1 and assess the new concept category that emanated during Time 2 coding analysis.

The same procedures applied at Time 1 were implemented for the second inter-coder test. Using the same observers, analysis of a single, 20-minute segment of video data - pertinent to Time 2 - were conducted. The (seemingly) limited data analysis conducted by each observer could be explained by the purpose as well as the pragmatical aspects of the test. The aim of the inter-coder agreement was to evaluate the trustworthiness of the provisional categories; this is, the semantic accuracy of ideals in representing axial concepts, therefore, it seemed appropriate that observers coded single footages of video data, as the number of average unit entries within the twenty-minutes was deemed sufficient for the purpose of the reliability test. Additionally, in order to enhance reliability amongst coders, more training would have been required to achieve greater disambiguation of the categorical content by continual explanations of the researcher's iterative process and

inclusivity criteria⁴³. This approach is time-consuming, and ultimately, does not guarantee replicability of the study, due to the methodological nature of the research. It is recognised, however, that the lack of interpretative and iterative knowledge of the observers, related to the context, participants' temperament and qualitative coding decisions, impacted in the coding analysis and ultimately, influenced the outcomes of the reliability test. Nonetheless, to avoid some of the difficulties experienced by observers in the previous reliability test, the introductory sessions emphasised the different concept definitions, specifically, it affirmed the elements constituting behavioural inclusivity for concept classification.

The same measures related to indices of agreement were used to assess the trustworthiness of the social looks concepts and, similar to the initial reliability test, the second test was considered reliable if there were no significant differences in the percentage of agreement between the observers' coding and the researchers' analysis.

To reiterate, the three observers coded 20-minute footages belonging to a participant from Time 2 data selected at random. Each test was conducted individually and separately using the same materials as in Time 1, i.e., a piece of paper and pen to write times, concepts and behavioural manifestations. Visual data was played using the application Windows Media Player and not the NVivo software, to prevent the small visibility screen problem affecting coding procedures. During analysis, observers retained a printed copy of the typology of social looks – including descriptive definitions - as a coding reference.

The outcome of the second inter-coder test showed an agreement of judgement - amongst observers - of 60% of the overall coding trail, with a 40% of categorical variability, compared with the researcher's analysis. These results represent higher variability rates when it comes to categorical assignation if compared to findings that emanated at Time 1. One of the plausible explanations for these results is the increase in developmental

⁴³ To some extent, these explications took place in the conversations that the researcher had with coders following the reliability test.

complexity of social looking acts, impacting in the ability of observers to discern amongst more elaborate behavioural manifestations accurately, and ultimately, their effectiveness in discriminating and classifying social looking concepts.

An analytical peculiarity noted in this second test was the coders' tendency to assign partial accuracy to codes (Amstrong, Gosling, Weinman & Marteau, 1997). This is, the positive identification of a look as pertinent to a specific social dimension but the erroneous assignation of a specific category. For instance, observers coded some looks as pertinent to the observational dimension ('Watching') correctly, but assigned the category of 'Watching Others Interact' or 'Watching an Adult Perform an Action' rather than 'Watching the Adult', as assigned by the researcher. A similar analytical pattern - but with lesser frequency ratios - was observed for looks denoting orientations, where observers rated looks as 'Orienting to an Action' or 'Orienting to a Voice' interchangeably.

This partial accuracy effect might have been caused by twofold: (1) the analytical tendency of the coders combined with the behavioural variability of the categories. For instance, one coder relied overtly on behavioural manifestations rather than axial concepts for concept attribution (MacPhail, Khoza, Abler & Ranganathan, 2015), requiring expertise and accuracy to establish the analytical connections between infants' behavioural manifestations and the appropriate looking category. This peculiarity is made more explicit with categories pertinent to the observing dimension, where the categorical demarcation is established by the role of the adult and not by infants' acts of looking *per se*. Adults' specific actions and/or joint engagements provide the behavioural manifestations for category inclusion, which observers struggled to identify, and (2) as mentioned previously, infants increased developmental maturity and, therefore, behavioural complexity that led to observers' difficulties to distinguish amongst distinct social looks' categories.

The category presenting the highest percentage of reliability was 'Watching the Adult Perform an Action' followed by 'Responding to Social Interaction'.

These two categories are stipulated by adults' actions, in the case of the former by adults' specific actions congruent with the setting, which might facilitate their identification and classification. The previous intercoders' test showed that highly social categories presented the most inter-coders' agreement, pertinent to initiations and not responses. At Time 2, however, infants' responses to adult's attempts became more salient, possibly due to adults' directed language. Child-directed language showed explicitly the intent behind adult's initiations that might have facilitated coding procedures.

The category possessing the lowest inter-coders' agreement corresponded to social referencing looks. Some observers coded orientation looks as 'Post-Action Social Referencing' looks, whereas the examiner analysed observers' codes of 'Pre-Action Social Referencing' looks as 'Child Emotionality' concepts.

These results showed similarities with the previous reliability test, whereby observers did not code social referencing looks accurately. Thus, observers coded both instances of pre and post-action social referencing as orientations and 'Child Emotionality'⁴⁴ looks respectively. The high proportion of behavioural variability⁴⁵ in social referencing looks - due to the absence of situational ambiguity - might provide a plausible explanation for the disparity found. Specifically, infants' elicitation (in some instances) of head movements prior to referencing the adult. This effect might have influenced coders to, mistakenly, attribute forms of orientations to such behavioural displays. Additionally, post-action looks included, on occasions, infants positive affect following the execution of the action, prompting observers to code this look as a 'Child Emotionality' type.

Discussions with each observer evidenced their difficulties in accurately depicting social referencing looks, due to the need to distinguishing and identifying each distinct component of the paradigm prior to coding such looks as referential. Thus, the absence of variable manipulation might have hindered

⁴⁴ In the first test, observers attributed 'Child Emotionality' codes to 'Responses to Joint Attentional Engagements' and Orienting looks.

⁴⁵ The presence/absence of specific behaviours (ideals) associated with the category is context-dependent and it might not occur in all instances of the category.

the apparent emergence (and identification) of each component singularly and sequentially, resulting in a lack of observable specificity of the social referencing model.

The second intercoder reliability test proved valuable for not solely assessing the typology of looks but for evaluating the analytical process undertaken also, through discussions with the different observers. Despite the usefulness of this exercise, both reliability tests present some limitations that require consideration. First, the use of raw agreements as the sole measure of reliability was not sufficient to establish whether the typology possesses the level of trustworthiness required (Feng, 2014), it showed observers' accuracy to code looks more broadly and in accordance with the pre-existing classification (Krippendorff, 2004). Second, this simple form of calculating the percentage of agreement – rather than using more advanced statistical methods – did not account for, and remove codes, that might have been assigned by chance, affecting agreement scores and ultimately aspects of stability and reproducibility (Krippendorff, 2004).

Following the second intercoder reliability exercise, a third study was conducted.

6.4. Time 3 Study

One of the initial objectives of this research enquiry was to compare social looking behaviours – using the typology created at Time 1 - with infants at risk of being autistic. This aim was stipulated in the research question pertinent to (see Chapter 1):

Are there any differences in social looks between typically developing infants and infants at-risk of being autistic?

Difficulties recruiting participants for this cohort (a more detailed explanation is provided in the next chapter) resulted in the decision to revisit the same cohort of participants at a later time, 12 months from the initial study, and to explore possible changes in looking behaviours.

6.4.1. Recruitment, data gathering and analysis

The recruitment process was conducted following the same procedures undertaken Time 1 and 2 studies, i.e., nursery settings were contacted by the researcher via email, and parental consent was petitioned and gathered by nursery managers.

Eleven infants from the initial cohort of 23 were recruited to take part in this last study. The decreased in participation was as a result of (1) lack of responses from early care settings following the initial and follow-up emails and (2) pragmatical issues for those nurseries that agreed to a Time 3 study, i.e. infants not enrolled in the nurseries, making accessibility and data collection a challenge.

Data gathering and analysis were carried out using the same methodological procedures than at Time 1 and 2. Overall, coding analysis corroborated the validity of the social looks categories and propositions developed. Inductive coding analysis and comparative procedures with the social looks' framework created at Time 2, did not provide novel concepts of looking behaviours, consolidating the 14 social looks type emanated at Time 2.

At the end of the Time 3 study, 14 categories of social looks were consolidated from the pre-existing 8 operationalised concepts created by Clyman et al., (1986) and the set of 13, developed at Time 1. The categories denote the different attentional acts infants use to learn about their social environment and others and reflect developmental changes, specifically in how infants use non-verbal communication to gain an adult's attention.

A third reliability test was not conducted at Time 3 due to the difficulties in recruiting participants for the cohort of at-risk that culminated in time constraints to finalise this project.

6.5. Conclusion

This chapter has explained in detailed the conduction of the longitudinal study pertinent to Time 2 (n=17; 15-17 months) and Time 3 (n=11; 24-26 months). Coding analysis demonstrated the increased social complexity, characterizing social looks, reflected in the emergence of a novel category of 'Initiates Social

Communication Engagement'. The second reliability test showed a higher proportion of disagreement amongst observers, due perhaps to a more elaborated behavioural presentation of looking acts.

Chapter 7

Quantitative Data Analysis

7.0. Introduction

This chapter provides a quantitative analysis of patterns and distribution of looks across the three-time points and amongst participants. To begin, the chapter provides visual graphs of the longitudinal patterns of looking behaviours. It details the distribution and patterns of looks for those participants (n=11) who took part in the three different time points also.

7.1. Results

Overall, infants' social looks' mean analysis shows a lack of age-related effect due to infants not increasing the number of social looks over time. Rather, participants displayed the highest percentage of looks at Time 2, as the overall scores show: T1:79.8; T2:122.8; T3:92.9. Patterns of looking across the three timelines are characterised by a prevalence of attentional processes aiming at adults' behaviours, represented by the category of 'Watching the Adult'. This concept constitutes a type of look that is embedded in the cultural environment and provides meaning about macro-social structures of the setting, specifically, of adults' behaviours that are congruent with norms and expectations of the context. The demarcation of this look excludes other looking types classified within the same observational dimension, providing infants with differential and indirect learning experiences, i.e. observations of adults' goal-directed actions, adults' social interactions with other infants or communicating with another adult. Thus, 'Watching the Adult' is a category that provides infants with the social and relational knowledge between the adult and the social context. The second most frequent look consists of the category pertinent to 'Glancing', denoting attentional processes of monitory function, demonstrating how infants consistently practice both, indirect social learning from adults with rapid monitoring of others and the environment in order to construct an understanding of their social realities.

In order to understand how patterns of looks inform infants' knowledge construction, I present a detailed quantitative account of patterns of looks across time points. Specifically, I begin with a description and comparison of looking patterns at Time 1 (12-14 months) and against the findings presented by the original study by Clyman et al., (1986), where the authors used a cohort of full-term infants. The rationale for this analysis is developmental, as the participants from the previous study were 12-month-olds infants, aligning partially with the chronological age of some of the participants of this study at Time 1.

7.2. Similarities and differences in looking patterns between semi- and naturalistic studies

As mentioned previously, this research study represents an expansion of the semi-naturalistic study conducted by Clyman et al., (1986), where the use of a modified version of the 'Stranger Situation' paradigm in 12-month-old pre-term and full-term infants was applied to test the typology of social looks.

Comparative analysis of patterns of looks in participants (full-term infants) from the Clyman's study against 12-14-month-olds typically developing participants from this thesis, shows qualitative differences in how infants' attentional processes are elicited when methodological approaches differ. The distribution of social looks in this study is characterised by the prevalence of three distinct categories (named in the highest order of prevalence) (1) 'Watching the Adult', (2) 'Responding to Social Interaction' and (3) 'Initiates Social Interaction Engagement'. These results deviate from the previous study, where 'Short Bids for Social Interaction' constituted the most rated look.

Differences within the higher frequencies of looking behaviours can be attributed to:

(1) the different methodological approaches used to examine social looks that provided high levels of variance to infants' looking experiences. For instance, the original semi-naturalistic study included some experimental manipulation, although to a lesser degree, preventing infants from spontaneously engaging in indirect forms of looking in non-restricted ways and outside parameters of

information-gathering processes. These restrictions were absent in this study, allowing for the identification of social looks with different information gathering qualities, as in the case of 'Watching the Adult' category, and (2) Clyman et al., (1986) study's theoretical and epistemological rejection of social looks, outside child-initiated behaviours, resulted in the dismissal of social looks that occurred as responses to adult's initiations, more pertinently of 'Responding to Social Interaction' category, which narrowed the examination of joint attentional patterns to one subcomponent solely.

In the Clyman et al., (1986) study, looks denoting 'Bids for Social Interaction' to the mother occurred most frequently during parent-infant dyads, whereas those 'Bids for Social Interaction' looks that were directed to the Stranger occurred most frequently in the sequence when the unfamiliar adult entered the room. These findings aligned with other social referencing studies using similar paradigmatic stances (Hornick & Gunnar, 1988), that show a higher prevalence of similarly defined looks, but differ in the occurrence of referential looks to the mother, i.e. when the Stranger entered the room as in the case of the 'Stranger Situation' paradigm.

The second least frequent look rated in this study corresponds to the category of 'Pre-Action Social Referencing', which partially aligns with results from the original study, where referential looks measured as the lowest categorical type. Clyman et al., (1986) argued that the lesser variable manipulation resulted in a lower incidence of referential looks. In this thesis, 'Post-Action Social Referencing' looks scored slightly higher than its counterpart, providing some evidence of the postulated functionality of referential looks, operationalised as behavioural regulation when elicited without any experimental constraints. Clyman et al., (1986) did not include post-action referencing within their data analysis, perhaps due to a lack of statistical significance. In this study, the lowest social look score was assigned to the category of 'Orienting to an Action', corroborating a study by Clearfield, Osborne & Mullen (2008), demonstrating how characteristics of institutionalised settings might minimise infants' sensory awareness of adults' actions. Clyman and associates (1986) found that orientations to actions were more frequent once the mother entered the room following the separation

phase, denoting infants' awareness of their 'unexpected' mothers' return, following a period of separation. In the original study, the remaining orienting category - 'Orienting to a Voice' - scored most prominently in the sequential segment when the Stranger re-enters the room. In naturalistic settings, this look rated average scores (M:5), showing perhaps that, for younger infants, orientations to social stimuli requires higher activation and a level of social awareness (perhaps not yet acquired) in order to discriminate amongst all the external input.

The remaining types of social looks are distributed differently across the two studies. The original research neither included the categories of 'Watching Others Communicate' - due to not reaching statistical significance⁴⁶ - nor 'Gaze Aversion' due to the lack of instances of this look during analysis. In this study, 'Watching Others Communicate' represented one of the lowest ratio categories (M:1.1), despite the characteristics of the institutionalised setting (the presence of various adults) permitting occurrences of this type of look.

The patterns pertinent to novel categories are distributed as follows: within the highest frequency ratios are looking concepts pertinent to 'Watching Others Interact' (M:9) and 'Glancing' (M: 8.4). These two categories represent different attentional functions: whereas the former alludes to infants' motivation to indirectly observe and (consequently) learn from adults during social interactions with others, the latter facilitates infants' ability to consistently and frequently monitor others in order to check social information during episodes of independent social engagement. Of average proportionality are the categories 'Child Emotionality' (M:3.8) and 'Watching an Adult Perform an Action' (M:2.5), denoting emerging properties of affect and intentionality respectively. Of lower frequency ratio is the category of 'Responding to Name' (M:1.8), which arguably illustrates adults' preferences to initiate interactions with infants than directing their attention towards an object and/or action.

An analysis of how these attentional processes vary over time is provided in the following sections. Although the overall distribution of social looks presents

⁴⁶ Clyman et al., (1986) excluded the category of 'Post-Action Social Referencing' in their quantitative analysis although they did not explicitly explain the rationale for discounting the look. The assumption being the experimental design resulted in a lack of instances of this social look.

similar patterns across the three timelines, the data analysed in the following sections correspond to the 11 participants whose data is available at all three timelines. The rationale for using this specific cohort is due to its representativeness in providing more consistent and stable information about the developmental variation of looks, as data is available across the three timelines.

7.3. Changes in social looks over time

	Part 11	Part 12	Part 13	Part 21	Part 5	Part 6	Part 17	Part 18	Part 19	Part 9	Part 10
Time 1	85	71	81	65	71	67	106	100	74	70	114
Time 2	145	77	85	90	136	156	125	164	75	92	210
Time 3	116	79	115	136	49	41	82	84	126	51	101

Table 7.1. Total number of looks (n=11) across the three timelines.

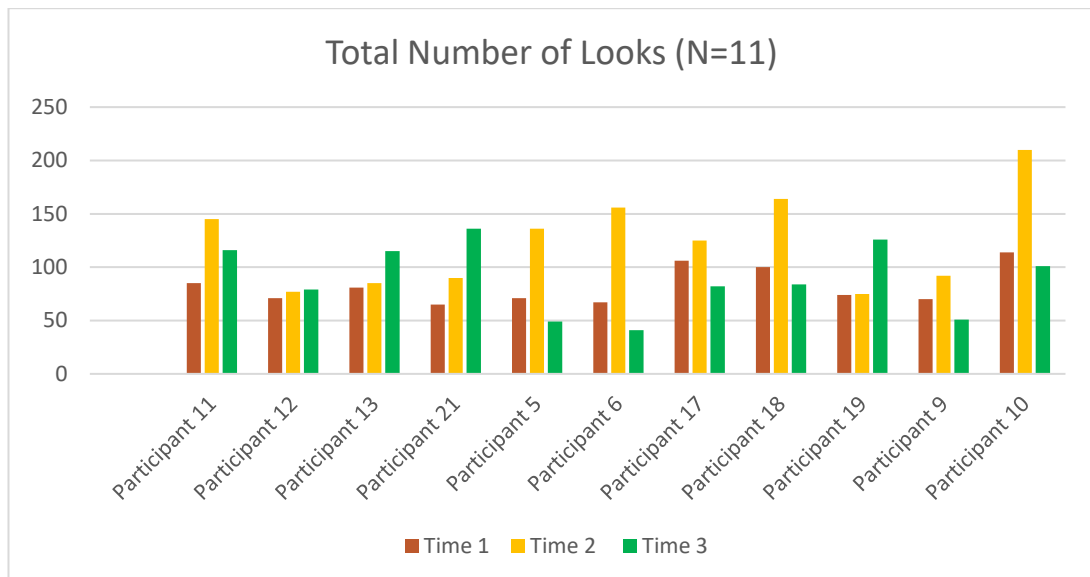


Figure 7.1. Total number of looks across the three time points

Longitudinally, the overall distribution of looks across timelines is characterised by its variability, due to individual differences in infants' attentional processes. As mentioned previously, the most frequent look across

the three-time points is 'Watching the Adult', showing its highest scores at Time 2 (15-17 months) for the majority of participants with the exception of 2 infants. This observational look is minimally surpassed at Time 3 by the second-highest category of 'Glancing', showing a steady increase across timelines (T1=8.4; T2=18.8; T3=24.5) and reaching its peak at Time 3, which corresponds to infants' developmental ages of 24-26th months. This qualitative shift in attentional patterns represents a variance in infants' information gathering processes, moving from observational learning to monitoring components.

The main research inquiry aimed to identify and categorise infants' social looks across different timelines to gain knowledge of how attentional processes influence infants' meaning of their social realities. The main study's epistemological stance used a qualitative approach to describe and conceptualise social looks, providing what Ochieng (2009) refers as 'methodological congruence' (p.15) to this study. The addition of some basic quantitative values provided supplementary information related to patterns of infants' looking behaviours across timelines and within developmental stages. As this quantitative component represents a secondary aspect of this thesis, the performance of statistical procedures was not undertaken. The lack of numerical representation brings some limitations for this study; primarily it affects the ability to systematically make inferences from the data, impacting the ability to conduct in-depth intra and interdimensional explorations of the social dimensions and their corresponding looking categories. As a result, it influences how findings are reported (Adeyemi, 2009). Future research would benefit from the incorporation of statistical analysis procedures to provide detailed information related to changes in patterns of looking in infancy⁴⁷.

⁴⁷ Studies exploring social looking (Clyman et al., 1986; Martin et al., 2003) have used mainly mean and standard deviation measures to evaluate patterns and social looking in infants. Clearfield, Osborne & Mullen (2008) used the Friedman test to calculate what types of social looks categories were most frequent amongst infants as well as the Mann-Whitney *U* test to compare differences in looking categories between the two age groups examined.

7.3.1. Changes in social looking patterns between Time 1 and Time 2

The first point to mention is the number of categorical similarities shown across Time 1 and Time 2. Timeline comparisons see the continual growth in frequency of the category pertinent to 'Watching the Adult', making this look the highest-scoring type, as well as the constant decline of looks elicited to 'Orient to an Action' (T1= 0.6; T2=0.2), representing the lowest ratio category. Additionally, comparisons between both developmental stages show minimal increases in ratios for the categories of 'Child Emotionality' (T1=3.8; T2:4.8), 'Orienting to a Voice' (T1:5.0; T2:8.8) and 'Responding to Name' (T1:1.8; T2:3.2). This modest increment suggests infants' strong motivation to respond to social stimuli and to share attention with adults. Comparatively, the pattern of steady increase amongst orientations and responses to name might be attributed to peculiarities found within the data, specifically infants' reactions (orientations) when another infant's name was called. This type of incidence was coded as 'Orientations to Voice' looks during data analysis. Thus, the increase in the frequency of 'Child Emotionality' looks might be associated with the emergence at Time 2 of a novel category - 'Initiates Social Communication Engagement - representing infants' attempts to engage the adult in shared attention about an event and/or object.

The dimension of joint attention displays similar individual patterns between the two timelines, showing a close association between 'Responses to Social Interaction Engagement' and 'Initiation of Social Interaction Engagement' looks. Both categories rated sequentially: 'Responses to Social Interaction' (T1:12.7; T2:16.4) and 'Initiations to Social Interaction' (T1:9.4; T2:9.5), showing an increase in frequency at Time 2.

Infants gained gradual proficiency in joint social interactions at Time 2, which results in a shift in attentional processes pertinent to indirect learning, specifically from observing adults interacting with others to observing adults' goal-directed actions. This look functions as information gathering about adults' intentional actions that are congruent with social contexts, showing how 15-17-month infants indirect learning is most frequently directed towards learning about adults' intentional actions.

A significant finding is pertinent to the categories related to the dimension of social referencing. Both referencing looks increase their frequency between Time 1 and 2, with 'Post-Action Social Referencing' showing a higher prevalence than the classical referential looks. However, 'Pre-Action Social Referencing' becomes most prominent in 15-17-month-old infants showing a close relationship amongst these two looks.

Infants in nursery settings spent less time engaged in observing others communicate. This category represents a low-frequency concept across the two timelines, showing its peak at Time 1 (M:1.1) and decreasing its ratio at Time 2 (M:0.7). The reduced number of looks for this category can be attributed to infants' selectivity to their preferred focus of attention, engaging in elements of the environment and others. When infants did attend to adults' conversing, they did so when dyadic engagements involved parents and a staff member.

In summary, changes in looks between the two-time points show qualitative differences in how infants use attention to construct an understanding of their social realities. Young infants spend a considerable amount of time observing adults' behaviours and engaging in joint attentional practices. Direct engagement in interactions is followed by indirect learning of adults' social engagements with others, providing infants with opportunities for both, observation and application of joint attentional skills. As infants become more proficient in processing information and in interacting with adults, they shift more frequently into monitoring processes. However, joint attentional encounters remain an important attentional skill retaining high-frequency ratios at Time 2. Thus, social proficiency results in infants spending less time observing adults' social interactions and focusing their attention to learn about intentionality. Social referencing looks scored within the low frequency, with post-action referential looks being more prevalent than the classic referential concept. Nonetheless, referential looks displayed an increase in number at Time 2, pairing with the category of 'Post-Action Social Referencing', denoting infants' gathering information from the adult in order to regulate their own behaviour.

7.3.2. Changes in social looking patterns between Time 2 and Time 3

The wider gap between the two-time points brings qualitative changes in the way infants use looking behaviour to construct meaning of their social realities, demonstrated by infants increase mastery of social-cognitive skills. Firstly, the most significant difference is the dramatic reduction in the number of observational looks toward adults' behaviours and an increase in glancing looks showed by data at Time 3 compared to Time 2. This shift in attentional focus denotes infants' increased competencies in constructing social knowledge, requiring fewer instances of indirect and direct learning and more monitoring episodes through swift glances at the adult. The category 'Orient to an Action' did not measure at Time 3, making the classical social referencing category the lowest frequency look at Time 3.

Secondly, previous practices in direct and indirect joint attentional learning result in significant variance in the patterns of joint attention. For instance, patterns of both categories of joint attention at Time 2 (and Time 1 also) were characterised by a direct association between responses and initiations of social interactions, evidenced by their high-frequency ratios and their sequential distribution, i.e. frequencies of responses followed by frequencies of initiations. Nonetheless, Time 3 shows an entirely differential pattern and distribution of categories whereby 'Responses to Social Interaction Engagement' looks remain consistent across the three timelines but 'Initiations of Social Interaction' reduce its proportionality. The decreased number of infants' initiations and the increase in infants' attempts to share attention with the adult through pointing results in a distributional and sequential relation amongst these two initiation categories. The peculiarity in the patterns of responses and initiations denotes a distinct functionality of the two subcomponents, and the role they play in establishing joint attentional skills. The category of 'Responding to Name' retains similar ratios across the two-time points (T2:3.2; T3:3.5), showing infants' increased awareness of social stimuli. This is further evidenced by the growth in proportionality of the look pertinent to 'Orient to a Voice', showing its highest peak at Time 3 and surpassing 'Initiations of Social Interaction' looks. The higher prevalence of

this orienting category can be attributed to infants' ability to process information more effectively and rapidly⁴⁸.

Thirdly, the most dramatic reduction in frequency measures - besides 'Watching the Adult' - corresponds to another observational category pertinent to 'Watching the Adult Perform an Action'. This concept showed the highest increase at Time 2, and it is characterised by infants' knowledge construction of adults' intentional actions. Taking into account that this looks shows a considerable frequency reduction at Time 3, postulations related to infants' competencies in joint attentional skills can be proposed and evidenced by the reduction in the proportionality of 'Watching Others Interact' looks also. Additionally, the remaining observational category of infants' observations of adults' conversations showed decreased measures from Time 2 to Time 3 also, maintaining low proportionality ratios across the timelines.

Another category that reduces its frequency considerably at Time 3 is 'Child Emotionality'. This concept represents spontaneous and affective looks to the adult, and its reduced incidence might be linked to the increased measures of 'Initiates Social Communication Engagement' at Time 3 (M:7). This effect provides further evidence of a possible association between spontaneous affective displays and the development of specific components of initiations of joint attention, specifically pertinent to shared attention (Kuroki, 2007).

Lastly, patterns related to social referencing show a similar distribution between the two timelines. The incidence of both types of referential looks occurred sequentially, with 'Post-Action Social Referencing' concept showing a significant higher frequency than 'Pre-Action Social Referencing', thus both categories scoring lower ratios at Time 3 than Time 2. Indeed, post-action looks show a considerable reduction at 24-26 months, denoting perhaps a lesser need to gather information from adults following infants' actions.

To summarise, the longitudinal distribution of social looks shows significant changes in infants' attentional acts across Time 2 (15-17 months) compared to Time 3 (24-26 months). It is represented by the increase in monitoring looks

⁴⁸ As demonstrated by the highest prevalence of the 'Glancing' looks at Time 3.

and orienting to social stimuli as well as a decrease in observational learning of adults' actions and social interactions with others. Although similar patterns are observed for the category of 'Responding to Social Interaction' between Time 2 and Time 3, a novel distribution surfaced at Time 3 for initiations pertinent to both, communicative intents, and social interactions. This associative pattern might be influenced by the less prominent - but interrelated - 'Child Emotionality' category at Time 2, where measures showed its highest frequency. Social referencing looks remain within the least frequent type, showing a reduction by the time infants reached their second year of life.

7.4. Developmental patterns within dimensions and across stages

In order to gather information on possible developmental patterns across time points, the mean of each category within its pertinent social dimension was obtained, which revealed distinct patterns of social looks. In this thesis, each social dimension represents an attentional function; six distinct dimensions were identified in the process of analysis: (1) Observational dimension, (2) Joint Attention dimension, (3) Social Referencing dimension, (4) Orienting dimension, (5) Monitoring dimension and (6) Affective dimension. Each dimensionality possesses properties of demarcation exclusivity; thus, dimensions are inter-related in order to facilitate infants' knowledge construction.

7.4.1. Observational dimension

	Watching and Adult	Watching Others Interact	Watching Others Perform an Action	Watching Others Communicate
Increased Looks Overtime	0	1	0	0
Decreased Looks Overtime	2	7	0	3
Highest Prevalence at Time 1	0	1	1	0
Highest Prevalence at Time 2	8	1	9	2
Highest Prevalence at Time 3	1	1	1	2

Table 7. 2. Distribution of observational dimension looks overtime

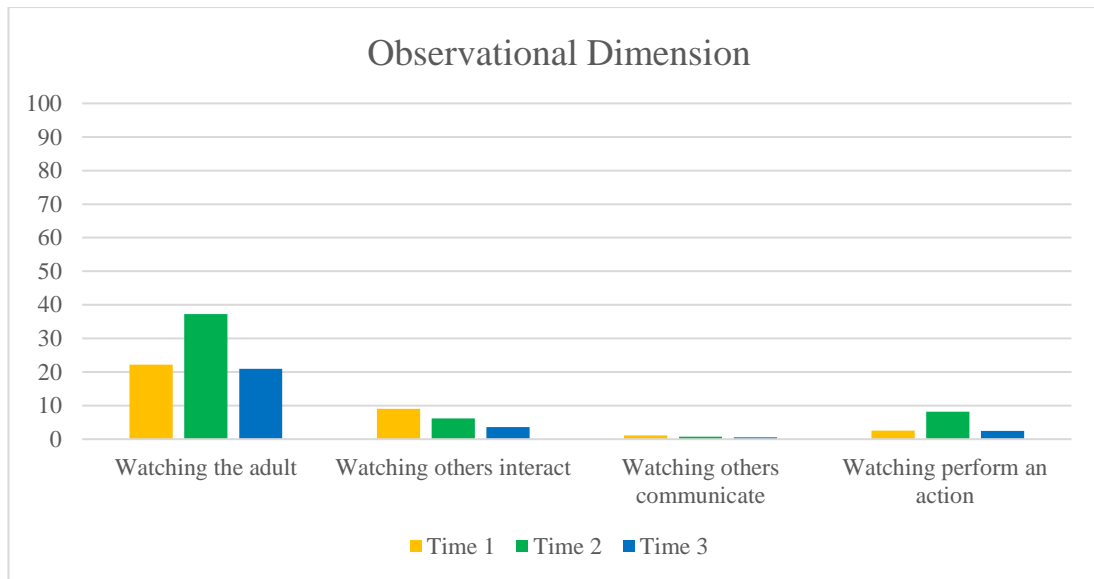


Figure 7.2. Inter-categorical analysis within the observational dimension.

There are significant patterns for the categories denoting infants' observations of adults, as shown in Figure 5. Younger infants (12-14 months) looked more at adults interacting with other infants at Time 1 ($M = 17.5$) compared to Time 2 ($M = 10.1$) and Time 3 ($M = 7.5$). In contrast, 15-17 months infants engaged in observational learning of adults' intentional actions more than any other age group. The category of 'Watching Others Communicate' did not represent a significant look for infants between 12 and 26 months ($T1 = 2.5$; $T2 = 1.5$; $T3 = 0.5$), corroborating the findings of Clyman et al., (1986) but providing different results than the Clearfield, Osborne & Mullen's (2008) study. The authors found that 9.5-month-old infants looked at adults' communicating more than 14-month-old infants.

The pattern of looks pertinent to 'Watching Others Interact' is interlinked with the joint attentional dimension, as infants' indirect learning of adults' social interactions with other infants allow them to gain knowledge of social frameworks and interactions. This direct association is evidenced by the developmental trajectory that this specific dimension takes.

7.4.2. Joint Attentional Dimension

	Responding to Name	Responding to SI	Initiates SI	Initiates SC
Increased Looks Overtime	3	1	0	2
Decreased Looks Overtime	1	1	3	0
Highest Prevalence at Time 1	0	3	4	0
Highest Prevalence at Time 2	3	3	3	4
Highest Prevalence at Time 3	4	3	1	4

Table 7.3. Distribution of joint attentional dimension looks overtime

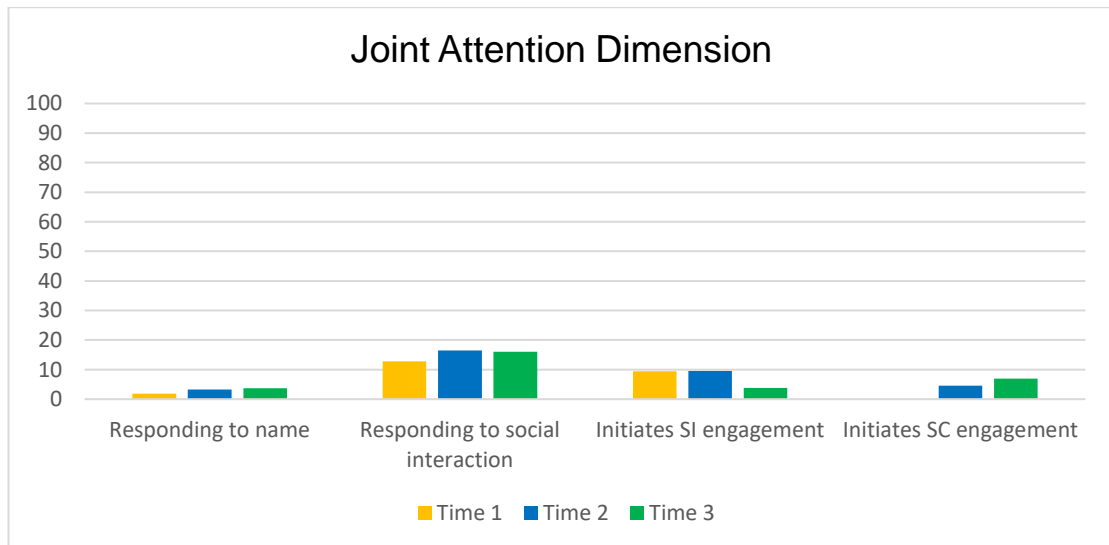


Figure 7.3. Inter-dimensional analysis of joint attention.

Analyses of social looks for the dimension of joint attention revealed unique intra-dimensional patterns as well as inter-dimensional commonalities effects with both subcomponents. In this study, infants displayed a linear growth of frequencies of ‘Responses to Social Interaction’ between the ages of 12-14 and 15-17 months ($M = 16.4$), followed by consistent measures at Time 3 ($M = 16$). Alternatively, the category of ‘Initiates Social Interaction Engagement’ displays a distinct developmental pattern, showing stability of frequency measures between the ages of 12-14 months and 15-17 months ($M = 9.4$; $M = 9.5$ respectively) and a considerable decline when infants reached their second year ($M = 3.8$). Relations amongst the two categories of joint attention

are detected, with results showing similar mean scores between both responses and initiations in infants between the ages of 12-14 months, (Responses = 12.7; Initiation = 9.4) but a lesser inter-dimensional association between the ages of 15-17 months (Responses = 16.4; Initiations = 9.5). This developmental trajectory suggests that younger infants might have a strong social motivation to engage in social interactions with an adult that might be reduced with interpersonal practices, i.e., through the development of social skills competencies. Nonetheless, inter-dimensional stability at Time 2 - between both components of joint attention - is provided when both types of initiation looks, i.e. 'Initiations of Social Interaction Engagement' and 'Initiations of Social Communication Engagement'⁴⁹, are combined (Responses = 16.4; Both initiations = 15), providing similar measures between the ages of 15-17 months.

Frequencies of 'Responses to Joint Attention' are associated with involuntary (reflexive) social orienting processes (Mundy et al., 2007; Mundy, 2016). Data indicates similar age-related growth patterns for both categories, showing incremental frequencies ratios across the three timelines and providing a possible developmental relation between responses to social interaction and orientations to social stimuli in infants between 12-26 months.

Furthermore, responses to joint attention included an attentional subcomponent consisting of infants' orientations to adults' direct attentional requests, i.e. 'Responses to Name'. This type of social looking included orienting behaviours, believed to be components influencing the development of joint attention. The interplay of this category with other behavioral-related looking concepts (orienting), suggests a similar pattern of incremental growth of how infants respond to adults' name-calling, that do not show significant associations with either responses to social interaction or orienting to voices, suggesting perhaps that infants' self-other awareness (Hobson & Meyer, 2005; Hobson & Hobson, 2007) might facilitate their ability to respond to names.

⁴⁹ In this study, a conceptual distinction was formulated between infants' social attentional processes involving initiations for interaction using handout and give gestures and proto-declaratives requiring the use of pointing, which represent divergent functional processes.

Conversely, initiations present a differential cognitive function involving distinct executive processes, influenced by positive affect activation (Kuroki, 2007). Data from this study show no direct effect between infants' spontaneous and positive displays – represented by the 'Child Emotionality' category - and infants' 'Initiations of Social Interaction'. Infants' affect presents a non-age-related effect, increasing considerably at 15-17 months (M= 4.8) compared to 12-14 months (M= 3.8), but significantly declining by infants' second year (M= 0.4).

7.4.3. Social Referencing Dimension

	Pre-Action SR	Post-action SR		
Increased Looks Overtime	0	0		
Decreased Looks Overtime	1	2		
Highest Prevalence at Time 1	1	0		
Highest Prevalence at Time 2	3	5		
Highest Prevalence at Time 3	1	0		

Table 7.4. Distribution of SR looks over time

Longitudinal analysis of social referencing patterns across the three timelines shows a similar distribution for both categories, whereby post and pre-action looks show a gradual increase in frequency between Time 1 and Time 2 and a significant decrease in ratios by Time 3. This reduction is most prominent for the classic form of referencing, constituting the least common look by the time infants reached their second birthday. Despite both referencing looks reaching their highest ratios at Time 2, 'Post-Action' looks represent the most prominent type between the ages of 12-14 and 15-17 months (T1= 5.5; T2=6), compared to the classic referential look (T1= 1.5; T2= 3.3). Infants cognitive proficiency might contribute to fewer ratios of referencing looks at Time 3, as demonstrated by the increased number of looks denoting monitoring processes. Thus, glances represent the most frequent type in 24-26-month-old infants, as shown in Figure 7.5.

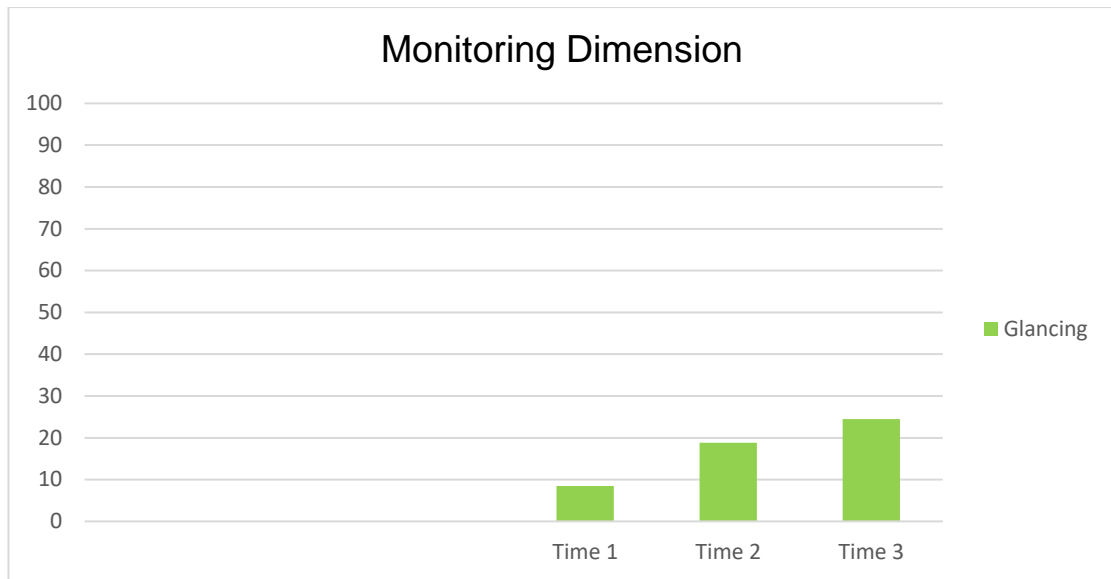


Figure 7.5. Measures of glancing looks.

In summary, patterns and distribution of social looks in typically developing infants across developmental timelines show some convergent and divergent associations amongst specific dimension of social looking functions. Overall, 12-14 and 15-17-month olds' infants construct knowledge of their social realities primarily through observations of adults' behaviours. Younger infants (Time 1) spent a considerable amount of time engaged in observing adults interact with others. Alternatively, and between the ages of 15-17 months, infants experience a significant attentional shift, not solely as overall numbers of looks show the highest frequencies, but incremental ratios also of specific categories: 'Child Emotionality', 'Pre and Post-Action Social Referencing', 'Orienting to a Voice', 'Responses to Social Interaction' and 'Glances'. Most noticeable is the increase in measures of looks permitting infants to observe adults' intentional actions. This period sees the emergence of the category of 'Initiates Social Communication Engagement' also. Older infants acquired cognitive competencies allows them more instances spent monitoring others rather than gathering information from the adult.

The main characteristic of the distribution of looks is the individual differences and variability in looking behaviours that infants displayed, a quality found in the Clyman et al., (1986) study also. This variance might be attributed to

developmental peculiarities leading to differences in attentional processes that, ultimately, influence how infants construct social meaning. Despite the notable differences, social looks present distinct patterns across timelines, providing insightful information on qualitative changes in looking behaviours within the first and second years of life.

7.5. Conclusion

This chapter has provided additional quantitative information pertinent to frequency measures of social looks, allowing the extrapolation of the distribution and patterns of looks amongst participants and across the three developmental timelines. Quantitative data analysis showed some explicit trends emerged within the data, more specifically, the importance of observing adults' behaviours as a consistent form of infants' social knowledge acquisition, the establishment of steady associations amongst the two joint attentional categories across the three timelines and the lower rates of social referencing looks, for both pre and post action.

The next chapter details the process of data collection, analysis, and outcomes of two infants at risk of being autistic, by virtue of having an autistic sibling. As previously noted, one of the aims of this research was to compare types of social looks with those elicited by infants at risk. Difficulties with recruiting participants for the second study resulted in the conduction of a longitudinal study of infants' looks, shifting the nature and formulation of this thesis from a comparative inquiry to a longitudinal study.

Chapter 8

Infants at-risk

8.0. Introduction

One of the lines of inquiry for this thesis established the examination of social looks with a cohort of infants at-risk of being identified as autistic, by virtue of having an autistic sibling. The aim was twofold: (1) to explore what types of social looks infants at-risk of being autistic displayed in naturalistic settings. This component aimed to understand how infants at-risk make meaning of their social realities, and (2) to compare patterns of looks amongst the two cohorts: typically developing and infants at-risk, to determine possible early attentional differences that might contribute to a divergence in social-cognitive processing.

As mentioned in chapter 6, difficulties recruiting participants resulted in the conduction of a longitudinal study – in the form of timeline 3 (rather than a comparative one. Nonetheless, the study was able to include two participants at-risk of being autistic.

A detailed explanation of the process of data gathering and analysis and quantitative measures for these two participants are provided below.

8.1. Recruitment

The recruitment process for this study followed similar procedures than the longitudinal study. This is, nurseries across the UK were contacted via email and provided with initial information about the research and criteria for participation. In addition, national organisations such as The National Autistic Society (including each regional group), Children's Centres, autism charities, parent forums and support groups were contacted via email also.

The recruitment process proved to be overly challenging and exceptionally unsuccessful. One explanation for the inability to find participants at-risk of being autistic was attributed to the narrow research criteria as it required

infants at-risk to be between 12-18th months of age and to have an already identified autistic sibling.

Nonetheless, two infants at-risk were able to take part in this study. One participant was recruited via the Director of Studies assigned to this project. The second participant was recruited following a recruitment post on social media. Both infants at-risk met the necessary research criteria.

8.2. Data gathering and analysis

The research methodology followed the same procedures than those undertaken in the previous study, consisting of the gathering of naturalistic visual data. However, one set of visual data was obtained in the home and not the nursery environment, due to the infant at-risk not yet attending nursery. Data recordings followed the same processes than in the main study. They involve the use of a hand-held camera to record parent-infant interactions in the home and natural interactions in the nursery setting; a tripod camera was used also to capture more comprehensive physical elements.

The different contexts provided both commonalities and indexes of variation to this at-risk study. For instance, both contexts retained the naturalistic components; this is, it permitted the observation and examination of social looks in the absence of any manipulated variables (Tunnell, 1977). Nonetheless, the home environment brought significant differences in the quality of the data that, ultimately, might have affected the reliability and validity of findings. First, home environments relied on dyadic interactions, limiting engagements with solely one adult, in this instance, the mother. In contrast, nursery settings permit infants to have access to - and engage with - more than one caregiver, providing more varied interpersonal experiences. Second, parent-child engagements involve qualitative differences pertinent to the degree of involvement, responsiveness and scaffolding provided (Ainsworth et al., 1972; Bruner, 1975; Tronick, 1998). Alternatively, nurseries are spaces where structured routines and free-play facilitate infants' exposure to emotional and behavioural response-driven interactions (Jamison, Cabell, LoCasale-Crouch, Hamre & Pianta, 2013). Additionally, early-years settings require caregivers to be aware of infants' abilities and readiness for interaction

as well as the need to provide opportunities for facilitated exploration (Jamison et al., 2013). Third, both settings bring idiosyncrasies related to levels of contextual and external stimulation. Nurseries include additional components of macro-social representativeness (Ahnert, Rickert & Lamb, 2000), characterised by an increase in the amount of sensory and social stimuli that are significantly reduced in home environments.

These contextual differences influenced attentional processes amongst the two at-risk participants, resulting in missing opportunities to learn through observation as well as to engage with other adults besides the mother for the at-risk participant observed in the home. Despite the qualitative disparities, both environments permitted the examination of looking behaviours in a context that was not artificially manipulated with the sole purpose of gathering data for this research.

Time constraints with the project derived in the gathering and analysis of data at a single time point⁵⁰. Once visual data was collected, coding used the same analytical procedures undertaken in the main study; equally, data was stored and organised using the NVivo software program. Micro-units of behaviour were inductively coded and conceptual descriptions compared with the typology of social looks developed at Time 1 study and consolidated in Time 2 and 3 of the analytical process.

Qualitatively, instances of looking behaviours did not present significant descriptive differences compared with the typology developed in the main longitudinal study. This characteristic can be attributed to the level of operationalization - used in this thesis - to classify social looks. The assignation was based on social functions of attentional processes, and not on descriptions of lower psychological processes such as infants' reactions to external stimuli. The creation of socially mediated concepts provided what Valsiner (2001:87) considers 'relative stability'; this is the encapsulation of infants' attentional experiences of the social world.

⁵⁰ Gathering and analysis of data coincided with the collection and analysis of data at Time 3.

8.3. Quantitative data analysis

The main characteristic found in the data is the variance in the types and frequencies of looking concepts. Twofold explanations can be provided for such differences: (1) the ages of the two participants, corresponding to 18 months for Participant 24 and 12 months for Participant 25, which might have influenced the emergence and consolidation of specific cognitive and social processes, and (2) as mentioned previously, distinct qualitative social, physical and interpersonal experiences of the two naturalistic settings, that impacted in the elicitation of social looks.

The patterns of looks for the at-risk group, compared to the typically developing cohort at Time 1 and 2, is shown below. Note that the incorporation of two timelines and not three was based on the chronological ages of the two at-risk participants (12 and 18 months), which mostly aligns with the ages of the typically developing participants⁵¹.

8.3.1. Key differences between the original cohort and the at-risk group

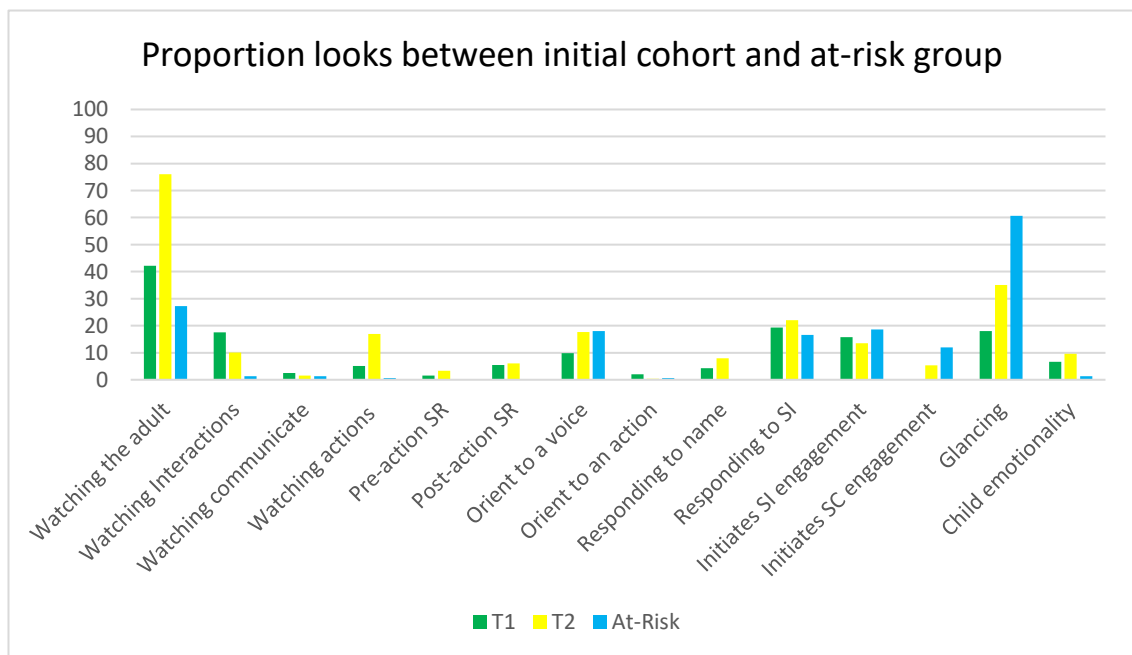


Figure 8.1. Measures of looks for the at-risk group compared to typically developing cohort.

⁵¹ The second timeline comprised 15-17^{-month} infants, whereas one of the at-risk participants chronological age was 18 months at the time of data collection.

The most significant finding gathered from the data is the prevalence of 'Glancing' looks for the at-risk participants ($\bar{x}=60.6$) compared to the initial cohort at both, Time 1 ($\bar{x}= 18$) and 2 ($\bar{x}=35.1$). In the typically developing cohort, this look represented the second most prominent type at Time 1 and 2 and becoming the most frequent category at timeline 3. Glancing looks are characterised by infants' rapid checks to the adult, requiring attentional processes of inhibition and attention disengagement (Mundy, 2016), The high prevalence of this monitoring look for both infants at-risk, might have different connotations based on the overall pattern of looks. These differences might denote possible executive control differences between the two groups.

An unexpected finding found related to the patterns of frequency for categories pertinent to joint attentional processes. Analysis indicated that both subcomponents showed similar frequencies, with ratios for both 'Initiations of Social Interaction' ($\bar{x}=18.6$) and 'Responses to Social Interaction' ($\bar{x}=16.6$) showing similar distributions. This finding differs from the typical developing cohort, where frequencies of responses remained prominent for both younger and middle-aged infants. Still, such looks were not followed by initiations, somewhat younger infants spent more time observing adults' interactions with others, and middle-age participants showed more orientation to adults' voices. The disparity in joint attentional processes amongst the two groups might be due to differences in settings for both at-risk infants, specifically, when it came to interpersonal engagements with adults.

Three distinct categories did not appear in the at-risk data: those pertinent to referencing looks ('Pre and Post-Action) and 'Orient to an Action'. The social referencing categories represented low-frequency ratios for younger and middle-aged infants, with Post-Action looks scoring higher than the classic referencing at both times. The lack of social referencing scores in the at-risk group might be associated with lack of uncertainty, particularly for the at-risk participant observed in the home environment, reducing the need for infants to seek information from the adult. The lack of orientations to action aligns with the patterns found in the initial cohort as well as the findings from the Clearfield, Osborne & Mullen 's (2008) study, showing lowest frequencies for this look.

Despite 'Watching the Adult' looks scoring the second most prominent for the at-risk group, average measures represented particularly low incidences compared with the typically developing cohort at both times ($\bar{x}=42.2$ and $\bar{x}=76.1$ respectively) rating one of the lowest frequency measures for Participant 25.

Lastly, peculiarities in patterns of looking were found for the at-risk group, compared to the typically developing cohort, for looks pertinent to observations of adults' intentional actions and initiations of social communication. Measures of observations of adult's actions represented one of the lowest frequencies for the two participants ($\bar{x}=0.6$), reflecting the methodological differences previously mentioned that affected social looking elicitation. Conversely, scores pertinent to initiating social-communicative looks rated, on average, higher ($\bar{x}=12$) for the at-risk group than the initial cohort at Time 2⁵² ($\bar{x}=5.3$). A peculiarity within the at-risk data was noted as higher occurrences of this look were assigned to the younger at-risk participant (12-month-old). This look is associated with more sophisticated forms of shared attention, through pointing gestures, and the early manifestation of this look displayed by Participant 25 might denote differences in joint attentional components.

To summarise, data analysis for these two participants provided preliminary information related to how infants at-risk used social looks to construct meaning of their social realities. Both infants showed a high prevalence of monitoring looks and distinct patterns of joint attentional processes. Additionally, referencing looks were not coded for either infant, which might suggest some differences in how infants gather information from the adult.

8.4. Conclusion

This chapter has provided preliminary information on looking patterns in two infants at-risk of being autistic that provides some insights about how attentional processes might present different distribution in at-risk infants compared to typically developing infants. Although no valid claims can be

⁵² Note that this category did not appear in analytical coding at Time 2, appearing within the data at Time 2.

inferred from the reduced data available, these initial findings might pave the path for further research. The quantitative analysis highlighted how the two settings influenced the elicitation of looking behaviours, an element to take into consideration when deciding on methodological approaches to examining social looks. Despite the methodological acumens encountered, findings did show some divergence and convergence effects in looking behaviours that indicate possible differences in attentional processes. In the next Chapter, I discuss in more detail the qualitative and quantitative repercussions of this research and the contributions that this thesis has made to infants' social and emotional development.

Chapter 9

Discussion

9.0. Introduction

This chapter reviews the outcomes of this research; this is, the conceptual development of social looking categories and the quantitative findings presented in chapters 7 and 8. This section of the thesis details how both qualitative and quantitative data have contributed to the understanding of infants' construction of their social realities using attentional processes across three different time points. To begin, this chapter provides a conceptual summary of how the novel categories add to previous literature in infants' social development as well as providing evidence of knowledge contribution in the field of infant psychology.

9.1. A novel typology of social looks

The present thesis had three main lines of inquiry: first, the identification and classification of naturally occurring social looks in typically developing infants. To date, no previous research has undertaken the task to operationalise looking behaviours outside paradigmatic boundaries and across developmental stages. Second, the longitudinal examination of patterns of looks, to gather individual variability of attentional processes across three specific time points. Third, the comparison of social looks patterns between two distinct groups: typically developing infants and infants at-risk of being autistic, by virtue of having an autistic sibling.

The following sections provide detailed discussions of each of the aims of this study.

9.1.1. Research Inquiry 1

What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?

Previous research in social referencing has explored referential looking using mainly paradigmatic methods (Hornik, Risenhoover & Gunnar, 1987; Stenberg & Hagekull, 2007; Walden & Baxter, 1989; Walden & Ogan, 1988; Walden &

Kim, 2005). These studies have manipulated variables, such as uncertainty and adults' affective messages, to measure infants' referencing looks and behaviour regulation. The consensus is that infants' perceived uncertainty about an object, event and/or situation elicits referential looks to the adults' face and that - as a result - adults' affective messages influence infants' behaviour regulation. At the time, the lack of research in environments with less variable control prompted the conduction of a semi-naturalistic study by Clyman et al., (1986) to conceptualise social looks - besides referencing - to stipulate broader types looking used by infants to seek information from an adult. The authors identified a typology of 8 distinct social looks, and data analysis found that the most frequent look consisted of 'Bids for Social interaction' and the least prominent was pertinent to the classic social referencing model of gathering information.

A subsequent semi-naturalistic study by Hornick & Gunnar (1988) identified four different descriptive categories of referential looks. As with Clyman et al.'s study, this research found a low prevalence of social referencing looks and higher frequencies of looks denoting interpersonal engagements. These findings were replicated by a more recent study by Clearfield, Osborne & Mullen (2008) whereby, using the Clyman et al.'s typology, examined infants' social looking at the transition from crawling to walking. As in previous findings, outcomes of the study indicated a higher prevalence of 'Bids for Social Interaction' looks. Although these studies provided information about infants' looking in situations where the need to seek information was established, through control of variables, no studies have investigated broader conceptualisations of social looking in the absence of any variable control.

Within paradigmatic models of social referencing, the main characteristic of the phenomenon relies on infants' ability to seek information (reference) the adult in situations of uncertainty and regulate their behaviour according to the adult's affective message displayed. It has been argued that this sequential process is indicative of infants' cognitive capabilities to understand (1) the content of the message (2) their ability to form appraisals of the situation and (3) associate the adult's message with a specific referent (Feinman, 1992; Klinnert et al., 1983; Walden & Ogan, 1988; Walle, Reschke & Knothe, 2017).

Moreover, social referencing has been conceptualised as a socially guided process through direct meaning, helping infants to construct an understanding of their social realities (Feinman, 1992). Furthermore, theories differ with regards to whether social referencing is an early form of joint attention (Carpenter et al., 1998; Pelaez, 2009) or to the contrary, there is no relation between social referencing processes and the emergence of joint attention (Slaughter & McConnell, 2003). More recently, some scholars have postulated the notion of social referencing being a form of social appraisal rather than a social learning process (Clément & Duke, 2017; Walle, Reschke & Knothe, 2017). What these theories have in common is the emphasis placed on cognitive processes underpinning the phenomenon.

9.1.1.1. Observation of adults' behaviours

The most significant finding of this study is the identification of a dimension of social looks, functioning beyond referential and joint attentional forms of gathering information, that function as indirect forms of acquiring knowledge about adults' behaviours. This novel social dimension is constituted by categories characterised by observational processes directed toward adults' behaviours and action operating congruently within the norms and values of the setting. This form of infants' knowledge acquisition has not previously been identified in previous studies, due possibly to the manipulated nature of the designs that have restricted information-seeking processes to infants' exposure and reaction to external stimuli.

In this study, adults became infants' primary source of information but, unlike social referencing models, where uncertainty was the driving force eliciting referential looking, the knowledge that infants create from the adult is exempted of ambiguous components as well as indirectly acquired. Additionally, observational looks are implicitly intertwined within broader social structures of the setting, made explicit through adults' behaviours and actions. Thus, there is a strong relation between infants' observational looks, adults as mediators of information and the social context. This tripartite entanglement provides the landscape and the social standards for infants to create social meaning.

Broadly, this study shows that social attention involves intention beyond the acquisition of knowledge about adults' actions, as demonstrated by the in-depth categorical classification identified in this study. This finding differs from social-cognitive models of joint attention (Carpenter et al., 1998; Tomasello, 1995; Tomasello et al., 2005) whereby the acquisition of intentionality is the single, most fundamental component for the development of joint attention.

The findings provide a detailed understanding of the broader nature of attentional processes and evidence of infants' gradual proficiencies in social-executive functions (Mundy, Car & Fox, 2000; Mundy, 2016; Mundy, Gwaltney & Henderson, 2010), that results in infants gradually acquiring the capacity for 'multi-source attention deployment and information processing' (Mundy, Gwaltney & Henderson, 2010:415). Furthermore, this thesis' findings provide a conceptual explanation about self-other information processing beyond sensory-perceptual propositions, as proposed by Mundy, Gwaltney & Henderson (2010), by contextualising social looks within socially mediated acts in non-contrived environments.

It has been proposed that infants' understanding of others' actions as intentional, a skill emerging in the second half of the first year, is fundamental for the development of social cognition (Baldwin & Moses, 1988; Carpenter et al., 1998; Tomasello et al., 2005). The scholars adhering to these theories presuppose that others' goal-directed actions serve as a precursor for infants' development of a theory of mind. Results of this study show that infants' 'cultural learning' (Tomasello, 2004:52) – being significant between the ages of 15-17 months - does not constitute the most preferred form of acquiring knowledge for infants between the ages of 12-26 months of age. Rather, observations of adults' behaviours (not actions) provide infants with the most salient social knowledge. Adults monitoring free-play activities or walking around the room, for instance, constituted the main focus of infants' attention.

Watching adults' behaviours outside relational associations between adults' intentional actions and interactions permit infants to integrate and associate knowledge about others' acts related to the social setting that, in some instances, are mostly interpreted within rules and norms of the specific context.

Therefore, it is demonstrated here the relevance that social contexts, performing as cultural spaces, have in helping infants create meaning of social realities. The role that social contexts play in supporting infants' social development is a component that is repeatedly absent in experimental studies of social looks and social referencing, where contexts are used exclusively as physical spaces. The inability of infants to access contextual information in these paradigmatic studies might explain the need of infants to reference the mother when exposed to a novel object, person and/or situation.

That infants engaged in this form of observational looks to gather information about adults' behaviours - outside interpersonal engagements - demonstrate how naturalistic settings facilitate incidental and spontaneous attentional experiences of non-reactive behaviours. This finding emphasises the importance of non-interactive and dynamic situations. This is further confirmed by the reduced number of referential looks in this thesis, demonstrating that, outside contrived environments, infants use attentional processes in a variety of forms.

9.1.1.2. Observations of adults' performing actions

Within this social dimension, a specific look was identified as denoting infants' observations of adults' specific actions. According to Tomasello et al., (2005), infants' understanding of intentionality is the fundamental social component forming the basis for the development of shared intentionality and, ultimately, the establishment of joint attention. Results of this study confirm that infants' learning about intentionality represents an important attentional component, between the ages of 15-17 months, but this component solely does not seem to be responsible for the development of joint attention. Rather, this thesis' outcomes show that it is the combination of indirect and direct forms of attentional processes, this is, of adults' behaviours *as well as* specific actions emanating within the environment that help infants' acquisition of social knowledge.

Tomasello and associates (2005) postulated that - around the 15 months of age- infants exhibit an increased awareness of other's internal states through learning about goal-directed actions. Nonetheless, this study demonstrates

that infants observed others' goal-directed actions in non-cooperative activities, suggesting that attention to adults' actions might remain perceptual through observations and not interpersonally coordinated as Tomasello et al., (2005) postulated. This characteristic is significant as posits learning about intentionality as an observational experience, leading to action understanding (Hunnius & Bekkering, 2014), and not as a joint attentional process solely (Tomasello et al., 2005). Additionally, it provides new evidence of the relational associations that exists between infants' observations of actions and action understanding.

Infants observations of adults' actions and their effects, especially between the ages of 15-17 months (Time 2), contribute to their understanding of intentionality as a process embedded within social frameworks, suggesting not solely that information related to adults' actions is age-dependent but that the social context contributes to this distinct social learning also. Moreover, infants were able to integrate adults' non-verbal and affective information and contextual information alongside actions in order to create meaning of intentional acts.

The context of nursery settings 'surrounded' infants with routines and established social frameworks that possessed specific properties and meanings. This 'immersion' was evidenced during infants' observations of adults' actions prior to snack time, where adults placed cups on the table or placed young infants in highchairs. Infants, watching the adult perform these actions, anticipated the meaning of the situation, and started to smile, flap their hands in excitement and/or clap. These behaviours demonstrate that observations of adults' actions - congruent with social frameworks - might facilitate not solely associative and statistical learning processes (Mundy, 2016; 2018), but learning about intentionality also. Hunnius & Bekkering (2014) argue that infants form associations about events by accumulating information from repeated occurrences, that permit the extraction of patterns that inform future experiences. Mundy (2016) states that infants' capabilities to learn about intentionality can be facilitated as much from their own actions than through observing others' actions. Based on findings of this study related to infants' observations of adults' specific actions and their subsequent

anticipatory reactions, the establishment of infants' associative learning - through observations - can be considered. Thus, the characteristics of nursery settings might have contributed to this statistical learning by exposing infants to repeated and routinized activities that aided infants' ability to create predictions through adults' executed actions.

Finally, that infants in this study presented a non-gradual increased pattern of observations of adults' goal-directed actions across the three-time points, showing its peak between the ages of 15-17 months (Time 2) then a decline, denotes possible specific cognitive and social mechanisms as to when infants are able to create meaning of others' intentional actions, most likely through the emergence of self-awareness (Mundy, 2016). This process is influenced by other forms of attentional learning established between 12-14 months, such as infants' observations of adults' play actions as well as practices in responding to joint attention.

9.1.1.3. Observations of adults' joint attentional engagements

Current theories of joint attention postulate that infants' direct experiences in joint attentional engagements contribute to their understanding of intentional actions (Brandone, Stout & Moty, 2019; Carpendale & Lewis, 2004; Carpenter et al., 1998; Mundy, 2016; 2018; Tomasello et al., 2005). This study suggests that, alongside infants' participatory experiences in direct triadic interactions with adults, observational learning of adults' interactions might influence infants' knowledge acquisition about others' actions within joint attentional frameworks also. In this present study, infants' social attention to adults' interpersonal engagements with other infants might have stimulated the necessary motor activation to (passively) engage in mimicking adults' actions. These imitative behaviours, on occasions, led to infants approaching and actively participating in the same social engagements (previously observed). Infants' *imitation* of actions, therefore, operated under different conditions represented by observations of adults' *interpersonal* actions. Adults' interpersonal actions play a significant role in infants' acquisition of social knowledge and infants' observational learning, aiding their ability to apply that knowledge within direct engagements a posteriori. This conceptual finding contributes to reports claiming a causal relation between motor perception and

motor activation in pre-verbal infants (Paulus, 2014). This attentional process represents a novel contribution to the understanding of how infants come to know about interpersonal skills, that might lead to the development of elements of symbolic play and social cognition. That this component was more prominent in 12-14 months old infants, provides further evidence to Tomasello's (2004) assertion that infants under two learn through imitation about symbolic play through observations of others' behaviours. Also, observations of adults' interacting with others partially align with theories postulating that infants' production of actions contributes to action understanding (Hunnius & Bekkering, 2004; Brandone, Stout & Moty, 2019) within joint attentional practices as incidentally, infants moved their hands whilst watching adult's actions and interactions.

Barresi & Moore's (1996) asserted that infants acquire intentional knowledge via two distinct processes (1) through the first-person experience of their own actions and (2) through a third-person experience via observations of adults' intentional actions. As mentioned previously, infants did combine these two elements, but their prevalence differed developmentally. Young infants displayed similar ratios of looks denoting observations of adults' play actions as well as responses to adults' attempts for interaction. Middle-aged and older infants spent less time observing joint attentional acts and more time participating in joint attention.

Young infants' lack of social and cognitive skills might explain these increased looking ratios and a greater need for establishing motor resonance (Paulus, 2014), this is, the stipulation of contingencies between perceived actions and infants' motor experiences as an information gathering process through mimicking (Paulus, 2014). It is plausible that, as infants develop more complex social-cognitive skills, active involvement in joint attentional engagements surpasses the learning function established through observations, providing infants with direct learning experiences of joint attentional processes.

This motor activation (mimicking) - through observation - shows the importance of social motivation in directing infants' spontaneous attention to others' play-based actions. Also, it demonstrates possible arousal effects

guiding infants' action production. Paulus (2014) views action control as a pre-requisite for imitation, but findings of this study indicate that observations of others as well as simultaneous action control production, guide imitation.

Bandura (1986) stipulated a 4-staged model of imitative learning, consisting of (1) infants' attention to action (2) the encoding of the observed behaviour (3) the action requires reproduction and (4) motor productions needs to be influenced by reward/punishment. Cognitively, observed and executed actions share a common representational format (Paulus, 2014), guided by infants' rewarding experiences of observations of others' joint attentional engagements. These emotional experiences facilitate the simultaneous rather than sequential occurrence of these four components. Moreover, participants in this study did not need to observe themselves whilst simultaneously mimicking the actions of adults. Rather they used adults' unfolding actions as scaffolding for their own intentional action control. Social contexts mediated between adults' actions and infants' imitative skills. The present data showed that infants' familiarity with the activities of the setting, such as singing and/or enacting actions whilst reading a book, provided infants with the necessary understanding of social frames required to execute imitative actions.

9.1.1.4. Joint attentional processes

As mentioned previously, according to the research literature, action experience facilitates action understanding of intentional acts (Hunnius & Bekkering, 2018; Mundy, 2016; Paulus, 2014). In this thesis, infants learnt about self and others' joint actions by (1) directly engaging in joint attentional engagements (Goswani, 2006; Mundy, 2016; 2018), and (2) responding to adults' requests for interaction as well as initiating interactions with adults. These two subcomponents of joint attention are characterised by distinct mental processes related to attentional control (Mundy, 2016; 2018; Mundy et al., 2007).

Data from this study shows that a significant quality characterising younger infants' attempts to engage the adult in social interactions is their failed attempts to establish joint attention. Infants initiated the necessary actions to gain adults' attention but did not culminate in interpersonal encounters, due

most significantly, to infants' lack of awareness of adults' availability. This peculiarity provides partial corroboration to Emde's (1992, 2009, 2012) postulation that adults' emotional availability is the key component underpinning social interactions. Thus, the assertion was contextualised within social referencing processes, where mothers' unavailability to provide affective messages to the infant - following episodes of uncertainty - impacted infants' behavioural regulation. In this thesis, infants' lack of awareness of others' attention constituted a crucial cognitive gap preventing successful attempts to establish joint attention engagements with the adult. Infants' cognitive immaturity provides a plausible explication for this effect, contextualised here in the form of self-other interference (Milward & Carpenter, 2018), and more specifically related to younger infants' egocentrism, affecting their ability to consciously consider other's attentional focus and actions as different from ourselves, which resulted in averted attempts for 'jointness' with the adult (Milward & Carpenter, 2018).

Infants' failed initiations were influenced by the characteristics of the naturalistic setting also, contributing to infants' diversion of attention from their own actions and intentions to other focal points in the environment. Infants' social immersion with the setting as well as with others, enhanced their distractibility and their propensity to shift attention away from pursuing their intention of interacting with the adult, which highlights the modulated nature of attentional processes in highly stimulating environments.

This characteristic represents a novel property in the examination of how (young) infants attempt to establish joint attention with the adult, as most studies have used either laboratory rooms (Perra & Gattis, 2012; Striano, Chen, Cleveland & Bradshaw, 2006; Van Hecke et al., 2007) or home environments (Bakeman & Adamson, 1984; Tomasello & Farrar, 1986), but have disregarded other naturalistic settings. This thesis contributes to the understanding of how social looking is elicited in more dynamic settings.

Instances where infants attempted and subsequently failed to establish joint attention provide a broader view of young infants' learning experiences prior to becoming proficient and successful in establishing joint attentional

encounters; one that provides scope for considering the alternative conceptualisation of joint attention suggested by Tasker & Schmidt (2007). The authors proposed an operationalisation of joint attention that includes not solely the establishment of joint attention (EJA) but the consummation of joint attention (CJA) also. Despite this thesis' rejection of Tasker & Schmidt's view that current constructs of joint attention, pertinent to definitions related to Responding to Joint Attention (RJA) and Initiating Joint Attention (IJA), are problematic, most studies base their epistemology on behavioural measures in already established joint attentional engagements (Baldwin, Moore & Durham, 1995; Morales et al., 2000), neglecting the initial stages prior to the establishment of joint attention.

Theoretically, this thesis' conceptual classification of joint attentional looks provides a distinct operational specification away from behavioural measures, commonly associated with both initiations and responses (Mundy et al., 2003). A point of diversion with ordinarily functional definitions of initiation of joint attention is the identification of two distinct behavioural manifestations characterising infants' attempts to establish joint engagements. Research literature defines initiations as a single social dimension, characterised by infants' ability to use gaze direction and gestures to gain adults' attention (Adamson & Bakeman, 1985; Hobson & Hobson, 2007; Mundy et al., 2003; Mundy et al., 2007; Mundy, 2016, 2018). However, infants in this study showed alternative forms of non-verbal communicative acts alongside looking behaviours, specifically the use of gestures and physical proximity to gather adults' attention. Moreover, gestures constituted the most significant manifestation in initiations of social interaction as they provided the point of convergence for infants to establish the basis for joint attention (Cochet & Byrne, 2016; Grice, 1957; Siguan, 1984; Valloton, 2009). Gestures represented the divergent demarcation within joint attentional looks as they represented a form of conceptual relativism between low-levels of joint attention (by infants use of simple gestural forms such as holdouts and give) and higher-levels of joint attention through pointing gestures. This finding provides further evidence to social-cognitive models of joint attention (Carpenter et al., 1988; Tomasello, 1995; Tomasello et al., 2005; Tomasello,

Carpenter & Liszkowski, 2007), positing that referential communication facilitates infants' acquisitions of more triadic forms of joint attention. Thus, this novel conceptualisation of initiations diverts operationally from the definition proposed by Clyman et al., (1986), whereby initiations were characterised by being a communicative tool used by infants to gain adults' attention and characterised by the offering of a toy and/or raising their arms.

This thesis' novel proposition, therefore, possesses higher levels of specificity than current definitions of initiations of joint attention (see Carpenter et al., 1998; Milward & Carpenter, 2018; Mundy et al., 2007; Mundy, 2016; 2018) and suggest the possibility of a more linear developmental trajectory embedded in infants' initiations, evidenced by the communicative gestures that participants used across the three developmental stages. Thus, initiations are characterised by fundamental and incremental changes in infants' communicative acts, prior to acquiring language, denoting more complex forms of interpersonal relations with the adult that lead to instances of shared attention using deictic pointing gestures.

In this study, younger infants' initiations showed predominantly 'holdouts and give' acts alongside social looks, constituting simpler cognitive forms of declarative behaviours (Carpenter et al., 1998). These gestures were accompanied by physically approaching the adult also (Milward & Carpenter, 2018). Often, infants positioned themselves outside the adult's line of view (and attention) resulting in adults not noticing the infants' intention (as their attention was directed towards others) and the intention for interaction. This characteristic shows the reciprocal nature of social interactions and how the adults' role in noticing and responding to infants' initiations is fundamental to establishing joint engagements (Bakeman & Adamson, 1984).

The element characterising initiations at 12-14 months remained prevalent in middle-aged infants (15-17 months) also; middle-aged infants maintained the elicitation of holdouts and give gestures as their main form of attempting to engage the adult, but these communicative intends presented significant qualitative differences. At this developmental age, 'holdouts and gives' transformed into giving gestures. This variance is attributed to infants'

advanced cognitive changes resulting in an awareness of the need to establish a 'common ground' (Tomasello, Carpenter & Liszkowski, 2007:707) for the successful creation of joint attentional frames.

A consequence of this higher cognitive ability was demonstrated by infants actively locating adults within the environment, prior to moving in front of the adult to give the object. This multifaceted process required infants to direct their attention toward the adult, process spatial as well as visual information of self-other, prior to physically approaching the adult to establish interactions. The cognitive efficiency and intentionality behind these complex stages corroborate existing theories stating that practices in joint attention, specifically self-other attention processing, facilitate learning and the acquisition of social competence (Mundy et al., 2007; Mundy, Sullivan & Mastergeorge, 2009; Mundy, 2016; 2018).

Additionally, involvement with initiated giving gestures during interactional acts permitted infants to attempt to form pointing gestures also. Middle-aged infants used give gestures as scaffolding for attempting to point, often by holding the object whilst swiftly extending the index finger and/or by opening the palm of their hand. The emergence of early forms of pointing demonstrates infants' motivation for sharing attention with the adult despite not having the optimum motor coordination to do so effectively.

That older infants were able to successfully establish joint attention engagements with the adult, using both pointing and giving gestures, demonstrate that - by their second birthday - a more sophisticated set of cognitive-pragmatical skills are acquired. These abilities permit infants to establish episodes of shared attention with the adult, through the use of a variety of communicative signals. More specifically, gestures and vocalisations and, to a lesser extent, physical proximity. In this study, older infants used pointing gestures as a social function intended as (1) proto-imperatives, by attempting to gain adults' attention toward a situation and/or event and as (2) proto-declaratives in order to establish shared attention with the adult (Bates, Camaioni, & Volterra, 1975; Moore & Corkum, 1994; Serra, 2000).

The context played a significant role in stipulating which of the two functionalities best served the infants' intention for initiating interaction. For instance, infants who had established attention with the adult - by having a clear view of the other - used pointing as a relational tool, whereas infants who did not have adults' direct attention used pointing as a referential tool in order to gain adult's attention about the external event and/or object *prior* to sharing an experience. Thus, the emergence of language skills facilitated the use of vocalisations alongside gestures exempting infants from relying on physical proximity to gain adults' attention.

Infants' active experiences in joint attentional encounters were not reduced to infants' attempts to engage the adult but included responses to adults' invitations also. As mentioned previously, conceptualisations of joint attention include a subcomponent of responses to joint attention defined by infants' ability to follow gaze and gestures of others (Ghazvini, Rafiee, Yadegari & Pourshahbaz, 2016; Markus et al., 2000; Morales et al., 2000; Mundy, 2018). The conceptualisation of infants' responses to overt adults' actions was not considered in the study by Clyman et al., (1986) due to twofold reasons: (1) the authors' design used less manipulated variables, preventing the mother from spontaneously engage with the infant in a dynamic manner, and (2) coding looks were restricted to those functioning as referencing to gather information from the adult, exempting infants' looks associated with adults' social behaviours toward the infant.

The most significant element pertinent to responses is the novel conceptualisation of this look. Common constructs of joint attention define this component based on observable behaviours that infants display following adults' actions; however, no definition describes the role that the adult plays in gaining infants' attention in order to engage in interactions. Models of joint attention are interested in exploring developmental characteristics of infants (and children) joint attentional processes that are responsible for the emergence and development of this cognitive milestone (Bates, Camaioni, & Volterra, 1975; Brooks & Meltzoff, 2005; Milward & Carpenter, 2018; Tomasello et al., 2005; Tomasello, Carpenter & Liszkowski, 2007). This thesis operated under the notion that if joint attention involves information processing

of self-other reference (Mundy, Car & Fox, 2000) then it is fundamental to understand how others, in this instance the adult, contribute to the development of joint attention.

Focusing on the role of the adult, one of the effects observed in this study is the adults' application of motor resonance, this is, adults aligned (mirrored) their initiated actions with the corresponding motor developmental level of the infant. For instance, adults displayed 'holdouts and give' gestures when initiating interaction with younger infants, whereas they made more use of language and direct social clues with older infants. Research findings show evidence that adults' actions and vocalisations such as labelling scaffold infants' social experiences (Adamson & Bakeman, 1986; Bodrova & Leong, 2007; Brooks & Meltzoff, 2014; Cameron-Faulkner et al., 2015; Vygotsky, 1980). It is not clear whether adults' motor resonances are responsible for influencing infants' gestural exhibits within their own initiations or the combination of responses and infants' initiations contribute to competencies in joint attention. Data from this thesis allows the postulation that adults scaffold their actions to infants' cognitive abilities to *enhance* infants' competencies during social engagements.

Nonetheless, adults' motor resonance did impact positively in successfully engaging infants in social interactions. Here, the quality of social engagements aligned with previous findings (Bakeman & Adamson, 1984; Perra & Gattis, 2012), showing that younger infants displayed onlooking forms of social engagements by attending (and in some instances fixating) to adults' actions and comments, and gradually becoming more actively engaged in interpersonal frameworks through coordinating their attention and actions to those of the adult. Imitations became an important component for the sustainability of social interactions, particularly in older infants (24-26 months). Younger and middle-aged infants did not show any imitative actions during responses to social interactions. Rather, they remained fixated in what the adult was doing, however on occasions, it was the adult who actively aided infants' imitative skills by physically moving their arms alongside their own actions to create somewhat synchronised movements.

An unexpected finding was the prevalence of infants' positive facial expressions when adults-initiated interactions. This effect was consistent across the three developmental timelines, although it was more salient in younger and middle-aged infants. The disparity of this finding comes from current assertions stipulating that positive affective displays are associated with 'Initiation of Joint Attention' (Kuroki, 2007) and not with responses. Little is known about how infants' positive affect influence responses to joint attention; thus, it is plausible that affect contributes to an increment of infants' arousal levels impacting on social attentional components.

Bandura (1992) supports the notion that adults' facial expressions serve as a vehicle for 'vicarious activation' (p.179). Affect - in Bandura's view - possesses arousal properties of mediated modelling where adults display affective and vicarious expressions, the environment influences levels and patterns of arousal activation and, ultimately, infants meaningfully interpret the messages. Bandura's theory, nonetheless, was conceptualised within the context of social referencing, providing a plausible explanation of why infants in this study, and not adults, showed this vicarious activation effect. Tomasello et al., (2005) view that infants' acquisition of 'dialogic cognitive representation' contributes to the development of shared intentionality. This social and cognitive representation includes infants' sharing of emotional states with the adult. Looks denoting responses to social interactions did include infants' positive affect-sharing providing a more established link (than previously postulated) between affect and responses to social interaction.

Bandura's theory noted that the environment mediates between adults' messages and infants' interpretations, facilitating knowledge. The social context revealed to be an important component for looks denoting responses not solely for the execution of attentional control processes but for the successful establishment of joint attention also. Nursery settings created the necessary social-structural conditions for interpersonal and social learning to occur (Hedegaard & Fleer, 2008; Vygotsky, 1978). Furthermore, and similarly to looks pertinent to initiations, the naturalistic context influenced how adults' successfully engaged infants in social interactions. In this thesis, the accessibility and availability of other social partners as well as multiple play

activities, particularly during non-structured times, competed against adults' actions for interaction, that on occasions, resulted in infants directing their attention toward other situations. Moreover, structured activities and frameworks within normative practices of nursery settings proved to enhance infants' responses to adults' initiations, for instance, activities such as 'showing time', 'carpet time' and 'story time' facilitated infants' responses to adult's attempts for interaction.

Behaviourally, the naturalistic setting influenced components pertinent to executive control processes. The dynamicity of non-contrived environments required infants to inhibit their attention from an activity and to redirect their focus towards the adults' face, and the toy offered, establishing attention deployment between the two elements. Mundy (2016) attributes inhibitory processes to responses to joint attention, especially to infants' names being called, which represent - according to the author - a requisite for infants to positively engage in social interactions. This was the case for the infants participating in this study across the three timelines. Hence, it is plausible that the social environment facilitated (and enhanced) the interplay of inhibitory and activation systems, whereby the exposure of infants to multiple engagements and a variety of activities and interactions, resulted in the acquisition and display of more proficient executive control processes.

Broadly, infants' attention shifting constituted the main behavioural property characterising most (if not all) social looking categories longitudinally, demonstrating that infants are motivated and able to deploy attention away and toward external stimuli from an early age in order to learn from their environment and others. Tomasello et al., (2005) postulated that true joint attention is achieved when infants are able to deploy attention between the adult and the object. That younger infants were able to use attention shifting skills in the absence of more complex forms of shared attention provides contrary evidence to this assertion. Younger infants, however, did exhibit longer looking times through an increase of fixating behaviours, and appeared slower in disengaging from the adult's face toward other stimuli, demonstrating perhaps more rudimentary executive skills than older infants. Despite this, the qualitative components embedded in joint attentional processes were present

across timelines proving that executive skills - including attention shifting - contribute to the consolidation rather than (exclusively) the establishment of joint attention.

9.1.1.5. Responses to Name

A novel concept that emanated from this study was adults' use of more direct forms of gaining infants' attention (besides giving and holdout gestures) by calling the infants' names. Contrary to its counterpart look, 'Responses to Social Interaction', this look creates a causal association between the adult's verbal input and the infant directing their attention towards the adult. On occasions, adults used the infants' name in already established interactions to sustain infants' attention toward the shared activity. A small percentage of looks pertinent to 'Responses to Name' constituted forms of information sharing and boundary settings related to norms and expectations of the setting, particularly for young infants. For example, infants climbing a table or opening a door represented events where adults directly used the infants' names to modify their behaviour. This peculiarity diverts from the functional structure found in looks denoting 'Post-Action Social Referencing' in that referencing looks did represent events where infants *intentionally* violated social expectations, then referenced the adult. In contrast, looking behaviours pertaining to 'Responses to Name' instigated infants to look at the adult calling their name but remained unaware of the intention and meaning behind the adults' use of their names.

In this study, the naturalistic setting enhanced infants' orienting behaviours toward the person calling their name, particularly for middle and older infants, as they required to widen their attentional frame into broader environmental stimuli as well as to shift their focus and orient towards the adult. Orienting behaviours, therefore, represented a salient feature characterising this specific social look. Conceptually, formal definitions of 'Responses to Joint Attention' attribute gaze following properties to this component of joint attention (Loy, Masur & Olson, 2018; Markus et al., 2000; Morales et al., 2000; Salo, Rowe & Reeb-Sutherland, 2018).

This conceptual and behavioural variance can be attributed to twofold reasons: (1) methodological differences in the examination of responses (including to name) and gaze following processes. Gaze following is considered a perceptual ability, contributing to the development of infants' responses to joint attention (Brooks & Meltzoff, 2002, 2005; Goswami, 2006; Itier & Batty, 2009). Most studies have used paradigms such as the 'Eye-Status' and/or the 'Barrier Paradigm' to examine infants' gaze following and direction in manipulated tasks (Butler et al., 2000; Caron, Butler & Brooks, 2002; Chow, Poulin-Dubois & Lewis, 2004; Moll & Tomasello, 2004; Moore & Corkum, 1994; Senju & Csibra, 2008). Additionally, research examining infants' responses to joint attention have used standardised measures (Mundy et al., 2003) to evaluate this subcomponent of joint attention (Markus et al., 2000; Mundy et al., 2000; Mundy et al., 2007). The experimental approach used to study gaze following and responses to joint attention requires adults to perform specific actions and behaviours, preventing the emergence of situations where adults' spontaneously call the infant's name to initiate interaction and/or stipulate social norms and, (2) the lack of consensus amongst researchers of the mechanisms responsible for the emergence of gaze following processes, resulting in conceptual disagreements between what constitutes orienting behaviours. The lack of conceptual cohesion amongst the academic literature brings semantical disparity between orientations and gaze following, specifically in reference to (a) infants' direction of attention, i.e. what do they select and (b) its intensity, this is, the amount of cognitive effort that infants require in order to process that information (Fiske & Taylor, 2017).

It is plausible that naturalistic environments impose a level of maturation and attentional control to be able to consolidate orienting behaviours. The elicitation of looks pertinent to 'Responses to Name', more specifically, the direct and causal associations established between adults' verbal input and infants' reactions to hearing their name being called, facilitate maturation processes. It is unclear, however, whether effective practices with 'Responses to Social Interaction', particularly in younger infants, contribute to the consolidation of orientations or whether the emergence of other attentional

components, such as referential as well as orienting looks, are responsible for supporting infants' understanding of their social realities.

Infants' reactivity to their names being called was not restricted to their hearing their own names but toward adults calling the names of other infants also. This peculiarity establishes the possibility of infants' ability as well as internal motivation to attend to social stimuli as a source of information and, attending to adults' name-calling, might serve as a discriminatory tool to discern the adults' focus of attention (Rossano, Carpenter & Tomasello, 2012).

In this thesis, infants' social motivation to direct their attention towards the adult, in instances when both their names or other names were called, was enhanced by adults' pragmatic use of language. Specifically, variance in tone, volume and prosody that made this direct social signal more prominent and easier to discriminate amongst all sensory stimuli from the environment (Presmanes et al., 2016).

9.1.1.6. Orientations

Outside infants' responses to their name being called, orientations occurred as a discriminatory tool to discern auditory signals. Data showed that orienting behaviours were elicited from two distinct sources: voices and actions. Conceptually, the Clyman et al.'s (1986) study described these two types of orientation looks as non-salient effects of infants' reactions to adults' actions and vocalisations, by either defining infants' orientations to voices as a linear and non-reactive process (see chapter 4) or by categorising action-based orientations as reactions to ambiguous external stimuli. For instance, by defining such orientations as infants' reaction to 'a person sudden or noisy movement' (p.79). From this conceptualisation, it was difficult to clearly postulate the relativist components that form the basis of this look, due to the lack of specificity of their definition.

Data from this study demonstrated that infants' orienting behaviours constitute an attentional process of encoding salient (and often unexpected) external stimuli and re-directing attention toward the source of sensory input. Infants noted unexpected noises and/or exaggerated adults' voices - often during instances of non-interactive social engagements - and oriented their attention

to the adult to gather information about the situation. The processes embedded in orienting to voices show the existence of complex mental processes, as infants require to process and monitor multi-sensory information from both the environment and others. This cognitive ability provides evidence of infants' attentional competencies to effectively detect and discriminate salient (and unexpected) social stimuli within the environment and respond to it by orienting toward the adult's face. Orientations, therefore, constitute a sequential and reactive form of infants' gathering information that involves not solely perceptual abilities directed toward a specific spatial direction but requires infants' meaningful interpretation of the situation also (Carpenter et al., 1994; Brooks & Meltzoff, 2014).

The social context played an influencing role in both types of orientations as infants' gaze direction required the visual-spatial location of the adult within the environment. Some incidental tracking was detected also, to help infants locate the source of salience and appraise the situation. This spatial detection is characteristic of naturalistic environments where the absence of manipulated and contrived physical spaces contributes to the establishment of levels of perceptual skills, permitting infants to spontaneously identify the correct area within the environment where the unexpected noise and/or voice occurs. The natural environment, nonetheless, increases the chances of infants' incurring in referential mapping errors also (Baldwin, 1995).

These cognitive and perceptual processes resulted in distinct behavioural features associated with both categories in the form of infants' turning and/or lifting their heads in order to direct their attention to the adult. The importance of orientation looks is as much behavioural as it is cognitive, as it requires infants to inhibit attention from an object, activity and/or event to follow the direction/location of the voice or noise *prior* to looking at the adult. These processes resemble some of the cognitive components characterising joint attentional engagements, specifically conceptualisations of 'Responses to Joint Attention' (Mundy et al., 2003; Mundy, Sullivan & Mastergeorge, 2009; Mundy, 2016), including gaze following behaviours (see previous sections) with the qualitative difference found in this study, that infants displayed of orienting looks did not ascribe to mutually gazing engagements (Brooks &

Meltzoff, 2014), but represented reactive forms of attention in order to gather and interpret information. The type and source of information represented fundamental components in facilitating orientations looks. Influxes in adults' voice such as differences in speech production, exaggerated tone of voice and prosody, elicited infants' orienting behaviours. In contrast, reactions to non-social stimuli were commonly elicited by unexpected adults' actions.

9.1.1.7. Social Referencing

Gaze following is conceptualised as infants' early skills related to social referencing processes (Corkum & Moore, 1995; Slaughter & McConnell, 2003), as involves infants' understanding of the relationship between another person's gaze direction and the object of attention (Kuroki, 2007).

As mentioned in chapter 2, social referencing alludes to the process of infants gathering and using emotional information from the adult about an ambiguous event, situation and/or object in order to regulate their behaviour (Campos & Stenberg, 1981; Feinman, 1982; Klinnert et al., 1983; Rosen et al., 1992; Schieler, Koenig & Buttelmann, 2018; Sorce, Emde, Campos & Klinnert, 1985). Theoretically, the function of social referencing has been attributed to one of seeking information to reduce infants' uneasiness about uncertainty (Feinman, 1992). Qualitative data from this study demonstrates that overall, social referencing constitutes a process to understand pro-social behaviours, whereby infants learn about the appropriateness of their actions within the norms of institutionalised contexts. This learning is developed through infants' practises with intentional actions that violate social expectations.

The two categories identified in the Clyman et al., (1986) study, 'Pre-Action Social Referencing' and 'Post-Action Social Referencing', constituted looks that were elicited by infants' perceived uncertainty about an event, object and/or activity. In this study, a novel functionality of infants' information gathering from the adult was stipulated, functioning as infants' behaviour regulation about intended actions that can be interpreted as normative violations of the cultural setting. In this study, infants' grabbing and/or taking objects from others, climbing on tables or pulling things constituted forms of anti-social behaviours that prompted referencing to the adult.

The differential component providing categorical demarcation is the timely occurrence of the action and the elicitation of referential looks, pre or post-action. A peculiarity noted in younger infants was the conduction of non-normative actions simultaneously as referencing the adult, rather than executing the action *then* looking at the adults' face, as observed in middle and older infants. The younger infants' embodiment of actions within referential looks can be explained by a (yet) lack of internalisation of norms and expectations of the setting. It is plausible that younger infants are still conducting and learning about valuations (Emde, 2009). However, this possibility is deemed improbable due to the intentionality behind infants' actions (and subsequent pre/post referencing looks) showing levels of cognitive understanding between the meaning of their actions and the social standards of the setting. This was evidenced by infants pausing *prior* or immediately after conducting the action.

This attentional control behaviour is fundamental, as it demonstrates that intention and action are interrelated. The lack of clear demarcated pauses in younger infants can be attributed to developmental immaturity of executive control and not to a lack of social understanding of broader structural components of the context. Not pausing was a pre-requisite for positively coding instances of pre-action referencing looks in the Clyman et al., (1986) study, as pausing was considered an effect affecting the association between the situation and infants' feelings of uncertainty. In this thesis, the absence of uncertainty and the differential conceptualisation of referencing looks show how, in naturalistic settings, referencing looks function as facilitators of knowledge about social norms and expectations and not as predictors of (a lack) of perceived uncertainty.

That associative learning between (anti-social) actions and consequences is consolidated in middle-aged and older infants - by infants pausing and looking at the adult - and provides evidence of the knowledge that is created about the self in relation to others and within the norms of the social contexts (Kohlberg, 1984). Additionally, the mediated role of the adult, who provides consistent feedback and the consequences to infants' actions. It is not yet clear, however, to what extent attentional experiences within social

referencing frameworks contribute to infants' ability to create knowledge about pro-social behaviours and, ultimately, about empathy. It is apparent from this study's naturalistic data that social referencing - particularly 'Post-Action Social Referencing' – contributes, to a greater capacity, toward infants' learning about social development (social norms) and, to a lesser extent, emotional development. The need for more research is required in order to examine in more detail the possible relations between referencing looks and infants' understanding of pro-social behaviours in naturalistic settings that ultimately lead to moral development.

Uncertainty constitutes a fundamental component in paradigmatic referencing research. This element proved to be inconspicuous in this study, as most referential looks occurred in the absence of uncertainty. The naturalistic approach might explain this outcome, as nursery settings provided infants with consistent and structured routines, and framing activities around familiar frameworks that, most certainly, reduced the emergence of uncertainty. Therefore, it can be postulated that uncertainty was *not* a putative element to elicit referential looks.

Behaviourally, infants shifted their attention between the object and the adult consistently, in both pre and post-action referencing. This deployment of attention denoted infants' awareness of the meaning of their actions and intentions as well as their effects. Appraisals were important in looks denoting pre-action referencing as infants were yet to act on their own intentions. Much as joint attentional looks, attention shifts within social referencing episodes required infants to inhibit and activate executive control processes involved in attention (Mundy, 2016).

In the limited number of occasions that referential looks were elicited as a result of uncertainty, the sequential components found in experimental designs (uncertainty, referential looks, adults' affective messages and infants' regulatory behaviours) were observed also, but with some significant differences. First, infants' feelings of uncertainty were qualitatively different than the existing definitions (see chapter 2). In this study, infants experienced incongruence about an unexpected event occurring as a result of manipulating

an object. Instances such as the toy breaking or making an unexpected noise elicited referential looks to the adult. Incongruence and novelty, rather than uncertainty, seemed to elicit referential looks. This finding brings a different coherence to proponents of the classical and paradigmatic social referencing models where infants are passively exposed or introduced to uncertainty. To the contrary, naturalistic settings provide infants with opportunities to take a more active social role which, as a result, changes the relationship with the third event⁵³. Additionally, it provides evidence of the absence of a fission effect (see chapter 2), as objects did not intrinsically function as uncertain during referential episodes. Still, some of the effects that resulted from infants' exploration with the objects did.

Second, in this study, adults' messages were displayed without experimental constrictions, allowing the offering of multi-modal forms of feedback spontaneously. Its richness characterised the quality of adults' messages through - not solely affective cues - but gestures and vocalisations also. These various forms of information exchange influenced the effectiveness and directness of the affective messages, helping infants to create meaning of the situation rather than reducing uneasiness (Feinman, 1992). This characteristic constitutes a diversion from paradigmatic studies of social referencing where the manipulation of adults' affective messages into binary, non-verbal forms (happy/sad) is controlled in order to measure infants' behaviour regulation (Klennert et al., 1986; Mumme & Fernald, 2003; Schmitow & Stenberg, 2015; Sorce, Emde, Campos & Klennert, 1985; Walden & Ogan, 1988; Zaratany & Lamb, 1985).

Additionally, the multi-facet aspect of adults' content messages provides a different interpretation to Walter-Andrew's (1997) 'sign of emotion' (p.143), as infants did not require to go beyond perceptual elements of the affective message. This is due to adults combined facial expressions with verbal input and gestures, which permitted the embedment of affect as well as the conduction of appraisal within a single message.

⁵³ Clyman et al., (1986) referred to the third event as the source of uncertainty i.e. object.

Last, the behavioural regulation component was characterised by its variability in how infants reacted to affective messages. Most infants redirected their attention back to the toy, following adults' affective message, with a reduced number of infants across the three timelines displaying congruent behaviours following interpretation of affective messages. This non-congruent effect aligns with few empirical studies showing infants' disregard for adults' messages and not displaying regulatory behaviours (Gunnar & Stone, 1984; Hornick, Risenhoover & Gunnar, 1987; Walden & Ogan, 1988).

A significant finding was infants' interpretation (and congruent responses) of adults' positive messages as invitations for social interaction and not as emotional feedback about the situation and/or object. This effect can be explicated by how infants create meaning of affective messages within more socially bounded environments. This assumption provides an alternative view to experimental designs examining social referencing, where contexts are viewed as solely physical spaces, whereby infants are required to binarily execute either approaching and/or refraining behaviours based on appraised, affective messages. Within paradigmatic boundaries, infants' non-congruent responses (to adults' affective messages) are interpreted as infants' lack of referential association between the adults' message and the referent, in this instance, the object and/or situation. Feinman (1992) states that in order for regulatory behaviours to occur, infants need to determine that adults' affective messages are referential. In this study, it is proposed that infants (particularly younger participants) have not (yet) consolidated the ability to form such referential associations, hence the interpretation of messages as invitations for interaction. If this postulation is correct, then a presumption that naturalistic environments might enhance infants' distractibility and disseminate causality effects can be put forward.

9.1.1.8. Emotionality within attentional processes

An unexpected finding was the identification of a novel social look that possesses affective qualities. The specific category, 'Child Emotionality', constitutes the single axiom category that represents infants' spontaneous displays of affect toward the adult within non-reactive situations and not as a

result of interpersonal interactions with the adult⁵⁴. Infants that were engaged in independent activities looked briefly at the adult with an affective facial expression. That this look occurred as infants' spontaneous elicitation of affect and outside direct or indirect joint attentional frames, provides a disassociation from properties of shared attention and intersubjective meaning. The type of emotional display noted for this look was pertinent to positive facial expressions - in the form of anticipatory smiles - although rare forms of negative emotions, such as crying, were observed also.

It is yet unclear, the true functionality of this look and how it contributes to infants' construction of social meaning. According to Kuroki (2007), a correlation exists between infants' affective displays - particularly anticipatory smiles- and the development of joint attentional processes for the subcomponent of initiations of joint attention. In this study, these correlations were not established, rather, positive affect was observed within looks pertinent to the category of 'Responses to Social Interactions'. Moreover, the context did not influence the elicitation of 'Child Emotionality' looks as they occurred outside of any environmental influences. The spontaneous nature of this look brought a peculiarity in younger infants characterised by a lack of awareness of adults' availability, as evidenced by the elicitation of this look prior to checking adults' attention. This lack of awareness resulted in expressions of this look exempted of adults' responses. Simply stated, infants' affective displays went mostly unnoticed by adults and resulted in no effects whatsoever.

This characteristic denotes a lack of reciprocal and intentional quality to infants' spontaneous affective expressions that cannot be explained solely by infants' developmental immaturity. An alternative explanation can be postulated within the context of arousal activation theories (Fiske & Taylor, 2017; Bandura, 1992) whereby internal and affective states elicit infants' displays of facial expressions. This hypothesis, therefore, represents a reversal form of vicarious activation (Bandura, 1992). According to Bandura

⁵⁴ Categories pertinent to joint attentional looks as well as infants' observations of adults' interaction with others did elicit positive facial expressions in infants that do not constitute child emotionality looks.

(1992), adults - through their exaggerated facial expressions - are responsible for the increase in infants' arousal levels. However, the fact that this look lacks the mediated property claimed by this scholar (by being displayed in the absence of any social engagements), allows for the notion of an internal excitation effect (Fiske & Taylor, 2017) to be postulated instead. Thus, it is possible that infants' own direct experiences in the nursery setting increased their arousal levels, prompting spontaneous displays of affect through social looking. That would certainly explain the absence of any intention from infants to engage socially with the adult. Cognitively, this look aligns with the majority of social looking behaviours as it requires the execution of attentional control processes, characterised by infants (momentarily) disengaging from an activity and spontaneously looking at the adult with a positive/negative expression then redirecting their attention back to the activity.

9.1.1.9. Monitoring components of social looking

Lastly, an unexpected conceptual finding was noted pertinent to the identification of a type of looking denoting infants' glances to the adults' face. The novelty of this look is equally functional as it is durational. This look constitutes infants' ability to monitor the adult within the environment in a swift manner, evidenced by the short duration of this look - 2 seconds or less. Previous studies (Hobson & Hobson, 2007; Hornick & Gunnar, 1988) have conceptualised checks and/or glances as attentional processes, albeit with different functions. Whereas Hobson & Hobson (2007) operationalised checking looks as a component of self-other identification, Hornick & Gunnar (1988) categorised glances as a type of social referencing. The disparity in conceptual definition can be attributed to the age difference of the participants in each study, 6-14-year-olds in the case of Hobson & Hobson (2007) and 12-month-olds infants in the Hornick & Gunnar's study, relating to cognitive maturation processes. This notion is evidenced by patterns of this look shown in this study, presenting an increased in frequency in 24-26-month-old infants, compared to younger participants (see next section for a more detailed explanation).

Behaviourally, this look is characterised by not solely its short manifestation but by infants' shifting of attention also, demonstrating properties of executive

control. Glances were primarily (but not exclusively) elicited when adults engaged in social interactions with others, although instances in which the adult entered/left the nursery room, elicited this look also. It is plausible that infants' cognitive abilities allow them to notice others and the environment as a relevant and salient component, prompting swift glances for monitoring and checking purposes. The rapid execution of attentional control processes demonstrates infants' ability to attend to and process social information effectively, permitting to monitor social environments instantly. Nonetheless, more research is needed to determine how these forms of monitoring processes contribute to infants' cognitive and social development.

9.1.2. Research Inquiry 2

What patterns of social looking behaviours do infants display across different developmental timelines?

Quantitative methods were used to extract frequency data related to intra and inter categorical measures of social looks dimensionalities. The various graphs presented in chapter 7 provide the visual information pertinent to patterns and distribution of social looks in typically developing infants.

The main finding from the quantitative analysis is the attentional variance found amongst participants across the three timelines. Turning to the data, the sum of looking scores show that Time 2 (15-17 months) represents the timeline with the highest number of instances of looking, compared with the two other developmental stages. This finding indicates a non-age-related distribution of looks and provides evidence of possible significant attentional changes occurring within this developmental period. Despite individual differences in social looking, this study shows clear patterns and distribution of specific looking behaviours that support the notion that some (but not all) attentional processes are developmentally connected and contribute to infants' social-cognitive capacities in a distinct manner. Although some models of joint attention adhere to the notion that all measures of joint attention are developmentally associated (Bates, Camaioni, & Volterra, 1975; Carpenter et al., 1998; Tomasello, 1995), the patterns of looking data extracted from this thesis provide contrary evidence to these assumptions, but partially

corroborates studies postulating that joint attentional measures are differentially related (Mundy et al., 2000; Mundy et al., 2007; Mundy, 2016). Looking patterns showed differentiated measures between dimensions and within categories - including indirect forms of infants' looking - that provide additional information related to measures of social cognitive processes not previously accounted for.

Overall, frequency measures show that infants use - most consistently and prominently - indirect forms of looking, explicitly 'Watching the Adult' between the ages of 12-14 and 15-17 months. These results mean that infants engage more in attentional experiences to gather information about behaviours of adults that are embedded within the social norms and expectations of the setting. This finding not solely provides a different stance to previous social looks studies (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Hornick & Gunnar, 1988), showing that joint attentional looks represented the most prevalent type, but provides an alternative view of the role of the adult within naturalistic contexts also; this role is characterised by mediating social learning - albeit indirectly - about cultural elements of the environment.

By the second year of life (Time 3), a significant shift occurs, consisting of infants qualitatively diverting their social attention from observing adults to glancing *at* the adult, permitting infants to use rapid swifts of attention rather than more prolonged observations of adults. The higher frequency of 'Glancing' looks between the ages of 24-26 months provides evidence of this significant change. Infants' gradual acquisition of cognitive competencies in executive control, self-other monitoring (Mundy et al., 2007; Mundy, 2016), as well as internalisation of the frames and norms of the setting, provide an explanation for this variance.

Similar findings to previous studies (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Hornick & Gunnar, 1988) were noted in low measures of both social referencing looks, most prominently for the category of 'Pre-Action Social Referencing', across the three timelines. The characteristics of the naturalistic settings - more pertinently the distinct attentional forms that infants have of acquiring knowledge from the adult and the environment - combined

with low occurrences of perceived uncertainty, provide contextual cohesion to the low measures of pre-action referential looks.

Additionally, and as mentioned previously, 'Post-Action Social Referencing' looks possess a function of learning about pro-social behaviours leading to moral development (Emde, 2009), which infants learn more consistently through attending to adults' behaviours than social referencing looking. This peculiarity, therefore, might explain the low frequencies of 'Post-Action Social Referencing' look.

The lowest frequency measures across the three timelines were pertinent to orientations to action. This finding aligns with the study by Clearfield, Osborne & Mullen (2008) showing orientations of actions to be the lowest-rated look. The authors attributed this low effect to infants' locomotion abilities, but in this thesis, an alternative explanation is postulated based on the naturalistic methodology used, bringing high levels of sensory and social stimulation that might have hindered infants' abilities to discern or discriminate adults' unexpected and/or noisy movements.

9.1.2.1 Intra-associations of social looking within timelines

Frequency measures from this study indicate that infants not solely show consistent age-related changes in looks, but that attentional development is characterised by individual differences also. Social looks variability can be attributed to the dynamic context influencing the quality and patterns of looking behaviours.

(a) Intra-associations of looks at Time 1 (12-14 months)

The most significant finding at Time 1 is the higher frequency of infants' looks representing indirect forms of learning about adults' interactions with other infants, through higher frequency ratios of the 'Watching Others Interact' category, in comparison to the two subsequent developmental time points also. Clearfield, Osborne & Mullen (2008) suggested that infants learn about social interactions by process of observing and practising initiations of social engagements with the adult. The higher prevalence of observations of adults' social engagements partially corroborates this assertion, as observational learning of joint attentional engagements did contribute to infants'

understanding of social engagements. However, infants interpersonal learning did not occur exclusively through initiations but by engaging in both types of joint attention: initiations *and* responses also. That Clearfield and associates, as well as Clyman et al., (1986), restricted joint attentional looks to exclusively initiations of social interaction, might explain the divergence of results with this thesis.

Frequency measures of 'Watching Others Interact' at Time 1 demonstrate that infants' preferred attentional forms of joint attentional engagements are conducted through active participation and not observation. This observational look rated lower than both joint attentional categories, which suggests that infants' first-hand experiences in social engagements provide *in situ* knowledge and skills to triadic forms of interactions. These results corroborate Carpendale & Lewis' (2004) notion that children's active involvement in social interactions is fundamental for the construction of social knowledge. As the authors postulated (2004:82):

our approach to the development of children's social understanding focuses on the relations between people. From a relational, action-based perspective the developing child is embedded in social interaction, and an involvement in social activity itself is an integral part of constructing knowledge of this activity.

Younger infants did engage in both forms of joint attentional looks more prominently, although frequency ratios amongst the two categories presented minimal differences. Developmentally, infants engaged in more 'Responses to Social Interaction' looks than did 'Initiations to Social Interaction'. As mentioned previously, current literature conceptualises the dimension of 'Responses to Joint Attention' as associated with behaviours pertinent to gaze following, orientations and pointing gestures that are measured using standardised tests within experimental designs (Carpenter et al., 1998; Markus et al., 2000; Morales et al., 2000; Mundy et al., 2007; Vaughan Van Hecke, 2013). The naturalistic setting provided measures of responses to social interactions as well as orienting looks that showed no associations amongst these two components. Lack of conceptual linkage suggests that non-contrived environments provide more inter-dimensional variation.

'Responses to Social Interaction' looks are characterised by infants' looking at the adult when adults' invite infants to interact. On occasions, responses were elicited by adults as a result of noticing infants observing their interactions⁵⁵ with others. Mundy (2018) states that infants' responses to joint attention constitute a form of imitation, but data from this study shows that emulation of adults' actions was embedded in initiation looks and not responses. As mentioned in the previous section, adults used motor resonance (Paulus, 2014) for initiating interaction, which suggests the possibility that adults' gestural attempts for interaction (and infants' responses as a result) serve as a modelling tool for infants' initiations. The existence of a link between looks denoting initiations of social interaction and observation of adults interacting with others can be postulated here. Both categories would serve as facilitators of infants' imitative skills, as evidenced by the consistent ratios of both categories. However, more research is needed to explore these possible associations.

To reiterate, initiation looks displayed significantly lower frequencies than responses, not constituting the most prevalent look within this developmental timeline. This finding provides contrary results to previous studies claiming that looks pertinent to initiations for social interaction are the most common (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Hornick & Gunnar, 1988), in addition to a study by Wu & Chiang (2014) - examining the sequence of early social-communicative skills – that postulated the notion that initiations are the first set of abilities to emerge in infants followed by responses, object imitation and referential language.

It is important to emphasise that initiations in 12-14-month-olds did not always result in the successful establishment of shared attention. As mentioned previously, younger infants attempted (through looking, proximity to the adult and gestures) to engage the adult in interaction but often failed to do so. Attempts that resulted in the non-establishment of shared attention were a common occurrence within younger participants, but such looks, nonetheless, were coded as initiations, as infants *did* look at the adult face with the means

⁵⁵ Through the category of 'Watching Others Interact'.

to interact. This peculiarity is significant, as ratios of initiation looks, within this timeline, might provide the erroneous belief that every entry code for initiations looks resulted in successful joint attentional episodes.

The question here is what the validity is in rating unsuccessful attempts as initiations of social Interactions? Looks to the adult, in the absence of interpersonal experiences, remains an early form of sharing attention, governed by infants' physical and cognitive affordances. Nonetheless, practices (attempts) within initiations help infants develop self-awareness skills, in the form of attention to self (Bates et al., 1975; Hobson & Hobson, 2007), that lead to effective information processes of self-other referenced (Mundy et al., 2007; Mundy, 2016), necessary for the successful establishment and maintenance of joint attention.

(b) Intra-associations of looks Time 2 (15-17 months)

The most significant and unexpected finding within this developmental age is the increase in the overall number of looks, presenting the highest frequency scores compared to the other two timelines. This finding suggests that, between the ages of 15-17 months, significant qualitative changes in attentional processes take place. This developmental stage sees an increment of attentional processes functioning as observation of adults, responses to name, monitoring the adult and orientations to voices. The shift in frequency and quality of looking behaviours can be explained by infants' engagement in repeated and consistent attentional practices within social contexts, resulting in a gradual increase in effectiveness and efficacy in processing self-other information within as well as outside interpersonal experiences (Mundy, 2016, 2018).

The category presenting the most dramatic frequency increased is 'Watching an Adult Perform an Action', shifting from a modest mean of (M:2.5) at Time 1 to an average frequency of (M:8.1) at Time 2, and constituting the highest-increased ratio across timelines. It is possible that, infants' observations of adults' actions and behaviours, as well as active interpersonal, practises, contribute to an increase in social awareness of others' intentions. Tomasello et al., (2005) postulated that, between the ages of 12-15 months, infants

become more aware of adults' choice of plans and ultimately of understanding others' intention through collaborative practices. In this study, infants appeared to create meaning of adults' intentions outside interpersonal encounters also, by looking at adults' specific actions that were congruent within social frameworks of the nursery. This fact suggests the existence of broader influences, i.e., knowledge about the setting, to make meaning of adults' actions.

Furthermore, Tomasello et al., (2005) argued that intentionality as a singular process is not sufficient for the acquisition of self-awareness of others' mental states. Rather, the establishment of shared intentionality and 'true' joint attention is fundamental through a twofold process (1) infants' increased self-awareness and (2) the mastery of true components of joint attention. The authors' theoretical postulation is validated by the patterns of looks corresponding to this developmental timeline, particularly by categories such as 'Orient to a Voice' and 'Responses to Name,' denoting infants' awareness and active engagement with external, social stimuli and that increase minimally. The marginally higher frequency measures and stable associations for both joint attentional looks provide evidence that infants become more competent at engaging in both subforms of joint attention.

Nonetheless (and as mentioned previously), contrary to Tomasello and associates' notion of what constitutes 'true' joint attention, this is, that infants' gaze alternation constitutes understanding of shared attention, this study shows that it is the deictic pointing gesture that is what provides infants with the opportunity (and subsequent understanding) to establish more sophisticated forms of shared joint attention. This specific look - conceptualised as 'Initiations of Social Communication' - emerges within this developmental stage through infants' active attempts to direct the adult toward a third event (object). Additionally, the emergence of this relational look might be facilitated by the increase in ratios of social looks denoting positive affect (Child Emotionality). Although this look does not singularly contribute to the emergence of more sophisticated forms of shared attention (as Time 1 showed no strong associations with 'Initiations of Social Interaction' looks), it is possible that more consistent practices with self-other processes resulted in

the significant increase of this affective look's ratios. That infants showed positive affect sharing within responses to social interaction looks provides further evidence (Bakeman & Adamson, 1984; Mundy, Sigman & Kasari, 1990) of how these social looks contribute to infants' development of intentional and joint attentional processes.

The notion that infants' cognitive and social maturity leads to more efficient and competent forms of social learning (Mundy, 2016; 2018) is evidenced by the significant increase in the frequency of glancing looks. This attentional component requires infants to swiftly deploy their attention from an activity and/or engagement to the adult and redirect their attention back, within 2 seconds or less. These results show how infants become more proficient in monitoring adults and interpret their actions and behaviours from glances. Moreover, patterns of this looks reflect infants' more competent attentional control processes, facilitating the execution of gaze shifts in order to gather information.

Within this timeline, an unexpected finding corresponded to the increased in frequency of referential looks, for both pre and post-action categories. That social referencing constitutes (mostly) a function for behaviour regulation that helps infants understand pro-social behaviours, and possibly empathy, brings cohesion to the argument postulated in this thesis, that infants, between the ages of 15-17 months, experience important qualitative shifts in attentional processes. This study contemplates the possibility that practices with referential processes, more significantly with post-action referencing looks but including some pre-action looks also, contribute to the understanding of self in relation to others *within* frameworks of cultural affordances. Infants intentionally select and actively participate in situations that involve violation of social expectations, possibly to appraise adults' reactions and make inferences about the 'correctness' of their actions. The broader implication is that infants engage in pre and post-action looks in order to gather information about how adults' interpret *their actions* so to establish a feedback loop and ultimately for infants to create shared, cultural meaning about social norms and appropriate behavioural responses within explicit instruction.

(C) Intra-associations of social looks at Time 3 (24-16 months)

The last developmental stage examined in this thesis shows a pattern of looking behaviours characterised by a higher prevalence of monitoring processes and reduced frequencies of observational looks. This attentional shift from indirect forms of learning to direct checks *to* the adults suggests a gradual acquisition of more complex social-cognitive competencies, possibly attributed to information processing components and the understanding of intersubjective relations of self-other referenced (Mundy, 2018). This shift permits infants to monitor more frequently rather than observe and interact *with* the adult. Additionally, the category 'Orient to an Action' - rating as low frequency in previous timelines - did not measure at Time 3, making looks pertinent to the classical social referencing model the least frequent in 24-26-month-old infants.

The most significant finding in the distribution of looks within this developmental stage is the differential patterns presented by single categories pertinent to joint attentional processes. Whereas Time 1 and 2 are characterised by consistent and similar frequency measures of both initiations and responses to social interaction categories, Time 3 sees the steadiness in increased ratios of responses to social interaction looks compared to Time 2 and the reduction of instances where infants initiated social interactions. The differences in frequency scores can be attributed to infants becoming more competent in establishing shared meanings and intentionality through communicative acts using pointing gestures. The counterpart category of 'Initiates Social Communication Engagement' shows a significant increase in frequency and, despite combined measures of both initiations looks not equating for numeral scores of 'Responses to Social Interaction', it does suggest that infants are motivated to establishing more elaborated forms of joint attention. Some theories (Tomasello, Carpenter & Liszkowski, 2007; Liebal, Carpenter & Tomasello, 2010) postulate a dual functionality of pointing, one corresponding to attentional reference - where infants direct adult's

attention to a third event - and a second involving infants' intention behind the communicative gestures.

In this study, differential patterns of looks pertinent to communicative attempts provide evidence of this dual postulation as infants' practices within joint attention engagements facilitated the understanding and establishment of shared meanings (Liebel, Behne, Carpenter & Tomasello, 2009). Nonetheless, joint attentional experiences alone did not facilitate the development of intentionality. The context, alongside other attentional components such as indirect forms of looking, played a seemingly important role in contributing to social knowledge.

The increased frequency of looks denoting infants' initiations for communicative purposes explains the reduced measures of infants' observations of adults' goal-directed actions. The latter category provides indirect forms of learning about adults' intentional acts. Hence, the wider age-gap between Time 2 and Time 3 measures is indicative that infants might have already acquired (but perhaps not fully consolidated) an understanding of others' mental states (Carpenter et al., 1998; Onishi & Baillargeon, 2005; Tomasello, 2004; Tomasello et al., 2005; Yamaguchi, Kuhlmeier, Wynn & vanMarle, 2009), which results in lesser time spent in gathering information about this distinct form of performative knowledge and an increased time in attempting to establish shared meanings with the adult.

Further evidence of this gradual acquisition of more sophisticated forms of information processing abilities (Gredeback, Fikker & Melinder, 2010; Mundy, 2018) is provided by the steady increment of looks pertinent to the category of 'Orienting to a Voice'. Measures of this social look scored the highest ratios within this timeline, showing infants' increase motivation to attend to social stimuli and their ability to discriminate and monitor adults' voices within dynamic contexts more effectively.

Infants' valuations of cultural knowledge are internalised by their second birthday, as evidenced by the lower frequency ratios of referential looks for both looking categories. This acquired social knowledge, facilitated by broader components of the setting, might be influenced by joint attentional

experiences, including self-regulatory processes and coordination with the partner (Bakeman & Adamson, 1984; Carpenter et al., 1989; Mundy, 2016; Tomasello et al., 2005). Additionally, glancing looks might provide the necessary information about infants' own and others behaviours through monitoring processes.

9.1.2.2. Dimensional associations across timelines

The distribution of looking behaviours across the three timelines provides significant information of how differences in attentional processes' ratios - among infants and across developmental stages - reflect social and environmental processes related to the creation of knowledge.

The results of this study illustrate peculiarities with patterns of social looks that provide a more in-depth understanding of individual differences in attentional behaviours leading to cognitive and social competencies. As mentioned in chapters 5 and 6, social looks concepts were classified within a higher-order level representing different functionality. Clyman et al., (1986) conceptualised categories based on their degree of sociability, but this study operationalised categorical propositions based on infants' motivation in constructing knowledge (function), which was stipulated across distinct social dimensions. The different dimensionalities consisted of (1) Observational dimension, (2) Joint Attention dimension, (3) Social Referencing dimension, (4) Orienting dimension, (5) Monitoring dimension and (6) Affective dimension. Each dimensionality possessed demarcation exclusivity but included some degrees of variance to reflect how infants create social knowledge.

(a) Observational dimension

The development of indirect forms of learning shows divergent age-related patterns across different timelines. Most significant is the distribution of looks pertinent to the categories of 'Watching Others Interact' and 'Watching Others Communicate', showing a gradual decrease across ages. Frequency measures obtained for younger infants within the category of 'Watching Others Communicate' provides a diversion from the Clyman et al., (1986) study, where the lack of statistical significance resulted in the non-inclusion of this look within their data. According to the authors, this category represents a form

of triadic relationship functioning within two different attentional parameters: (1) a visual exploratory process of observing social interactions and/or (2) infants' feelings of being excluded. Natural environments showed that infants did establish a triadic form of information processing but - unlike Clyman's definition - this tripartite component is characterised by attention deployment from infants' activities to the two adults having a conversation as well as attention shifting between the speaker and the listener. That younger infants show more preferential attention to observe adults in conversation may include salient cognitive components, as adults' prosodic tones of exaggerated voices and/or laughter resulted in infants' elicitation of this look.

Both types of looks, 'Watching Others Interact' and 'Watching Others Communicate', require infants to attend to adults' social-communicative interactions with others, but the source of referent adopts differential social forms: dyadically, in the case of infants' observations of adults' conversing with another adult, and triadically, as in the case of observations of adults' interactions with other infants. Cognitively, these looks require infants to process multi-modal information by attending to pragmatic and communicative signals of others communicating or by processing joint attentional information pertinent to adults' actions with objects and others. That these two categories are most prominent between the ages of 12-14 months denotes younger infants' ability to acquire social knowledge without their active involvement, due to perhaps a developmental immaturity.

The categories of 'Watching the Adult' and 'Watching the Adult Perform an Action' show a different distribution characterised by displaying similar frequency patterns across timelines. Both looks presented their highest frequencies at Time 2, in addition to stable ratios at Time 1 and Time 3. This distribution correlates with the qualitative attentional shift observed by infants between the ages of 15-17 months. It provides evidence of how infants intentionally direct their attention towards adults' behaviours as well as their specific goal-directed actions in order to create knowledge about mental states (Tomasello et al., 2005). Additionally, the increase in infants' looks towards adults' intentional actions corroborates with previous findings positing that infants do learn about intentionality at around 15 months of age (Brooks &

Melzoff, 2015; Carpenter et al., 1998; Franco & Butterworth, 1996; Liszkowski, 2014; Tomasello, 2004; Tomasello et al., 2005). It is plausible that, as infants gain a greater understanding of their cultural contexts during Time 1 (by their acquired familiarity and experiences in nursery settings), are able to direct attention to more specific social domains such as adults' intentions and actions.

(b) Joint attentional dimension

The distribution of joint attentional processes shows differential growth of 'Responses to Social Interaction' and 'Initiations to Social Interaction' across ages, demonstrating dissimilar variance in growth patterns, in support of existing literature (Dawson et al., 2004; Mundy et al., 2007; Mundy, 2016). This study's analysis revealed that both responses and initiations present a reversed growth pattern, whereby ratios of responses show an increase in frequency between Time 1 and 2 but remains stable between Time 2 and Time 3. In contrast, initiations measures are consistent between Time 1 and 2 but decrease considerably at Time 3.

This distribution suggests that both joint attentional components possess distinct but equally stable joint attentional processes (Mundy et al., 2007). That responses show its peak in frequency at Time 2 provides further evidence to studies demonstrating higher responses to joint attention measures in infants at 15 months (Ghazvini, Rafiee, Yadegari & Pourshahbaz, 2015; Mundy et al., 2007), which adds to the notion of qualitative changes observed at this developmental stage. Patterns for the category of 'Initiations for Social Interaction' across the three points provide contrary evidence to previous findings showing a marginal decline in initiations between the ages of 12 to 15 months and a rebound at 18 months (Mundy et al., 2007) and to the notion that the emergence of initiations occurs first in development followed by responses (Wu & Chiang, 2014). Differences in methodological and analytical approaches provide an explanation for the variance in distribution, which includes infants failed attempts to initiate engagement with the adult, resulting perhaps in higher ratios of initiation.

Combined measures of the two initiations categories ('Initiations to Social Interaction' and 'Initiations to Social Communication') equate to very similar comparison patterns between responses and (both) initiations across ages⁵⁶. These findings provide not solely new evidence of the existence of a distinct deictic function of looking as previously stipulated by Bates et al., (1980), but demonstrates more stable patterns of joint attentional measures across the three timelines than previously anticipated (Mundy et al., 2007). That initiations are embedded in pragmatic aspects of linguistic development is an important finding, as most studies have examined the associations between responses to joint attention with language development (Brooks & Meltzoff, 2005; Ghazvini, Rafiee, Yadegari & Pourshahbaz, 2015; Goswami, 2006; Moll & Tomasello, 2004), but have excluded how behavioural components of initiations, found within attentional processes, contribute to social-cognitive abilities.

(c) Orienting, affective and monitoring dimensions

As mentioned previously, within conceptual definitions of 'Responses to Joint Attention' included are behavioural components associated with orienting and gaze following measures. In contrast, descriptors of 'Initiations of Joint Attention' are linked with positive affect (Kuroki, 2007). In this thesis' conceptual framework, however, categories pertinent to 'Orientating to Voice' and 'Child Emotionality' possess arousal properties that might contribute to joint attentional processes. Frequency comparisons amongst the two concepts show a link between responses and infants' orientations to voices, although the differential conceptualisation of these two categories requires the stipulation of a broader rather than a specific association⁵⁷ between them. Conversely, no associations are established between initiations and infants' spontaneous displays of affect, suggesting a more robust pragmatic component characterising initiations that might contribute to language development (Carpenter et al., 1998; Mundy, 2016; Tomasello et al., 2005).

⁵⁶ When combined both frequencies of initiation categories, the patterns established consist of higher measures of both at Time 2, compared to Time 1 and a reduction in frequencies at Time 3, compared to Time 2.

⁵⁷ The broader associations refer to the fact that 'Orienting to Voices' looks represent a distinct attentional look and not a behavioural manifestation, as commonly stipulated.

A contributing explanation for the associations between joint attentional processes, affective as well as orienting looks can be postulated based on cognitive aspects of social attention, indicated by glances looks. This category displays a gradual, age-related frequency increase, which shows infants steadily and consistently acquisition of self-other referenced information, allowing the rapid integration and effective processing of multi-modal information (Mundy, Gwaltney & Henderson, 2010). Nonetheless, more research is needed to explore the real function of this monitoring look in relation to infants' social-cognitive development.

(d) Social referencing dimension

Overall, the distribution of referencing looks shows that infants display a gradual increase in both - pre and post-action referencing - between the ages of 12 and 17 months. This finding suggests that infants seek information from adults consistently within the first year of life, corroborating studies postulating that social referencing processes are consolidated by 12 months of age (Baldwin & Moses, 1996; Klinnert et al., 1986; Blackford & Walden, 1998; Mumme, Fernald, & Herrera, 1996; Rosen, Adamson & Bakeman, 1992; Sorce et al., 1985). Thus, despite consolidation processes of social referencing occurring around 12 months of age, this study shows that the most relevant period for infants' information gathering processes corresponds to the ages of 15-17 months. This characteristic provides further evidence from previous research demonstrating a qualitative shift in the function of social referencing in older infants (Hornick & Gunnar, 1988; Walden & Baxter, 1998; Walden & Ogan, 1998), characterised by infants' negotiating meaning rather than reacting to adults' appraisals.

Moreover, and unlike existing literature examining classical forms of social referencing as the most relevant type of social learning (Dickstein et al., 1984; Feinman & Lewis, 1983; Zaratany & Lamb, 1985), this thesis shows that post-action looks are the most prominent of the two referencing categories. As mentioned previously, 'Post-Action Referencing' looks are operationalised here as a behaviour regulation tool, permitting infants to learn about macro-structures of the social context in relation to their own behaviour, and not as a reduction of uncertainty as commonly postulated. The lower ratios of both

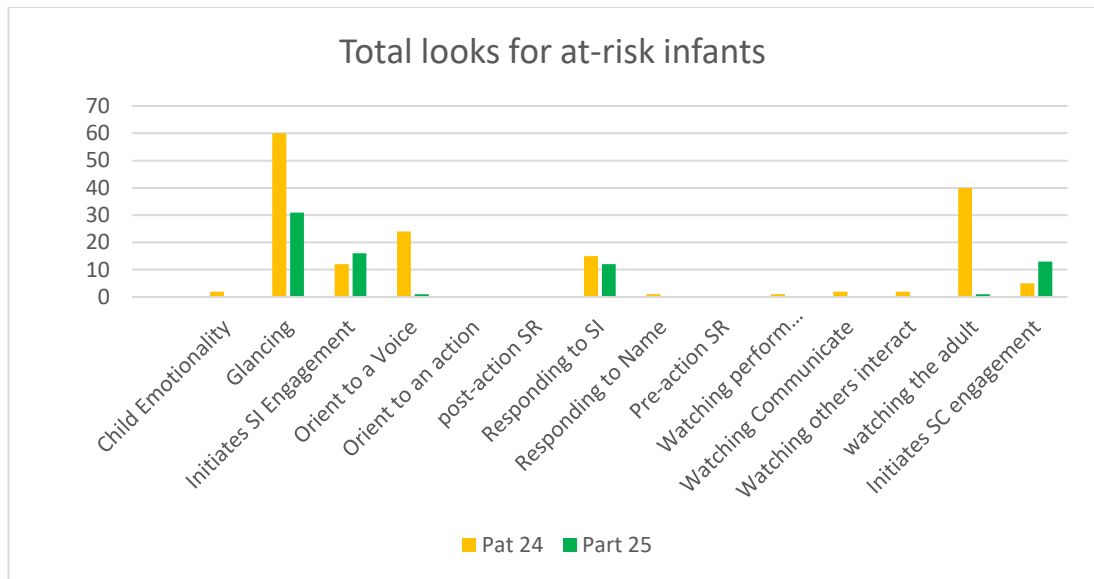
looks at Time 3, suggests that - as infants acquire more complex skills - they need not rely on adults' messages to inform their behaviour. This effect might be explained by a more effective cognitive proficiency, providing infants with the cognitive integration required to create their own meanings and appraisals.

9.1.3. Research inquiry 3

What are the differences in social looks between typically developing infants and infants at-risk of being autistic?

The difficulties encountered with recruiting infants at-risk of being autistic resulted in a cohort of solely two participants available for analysis. This small sample provided limited data to make valid inferences about possible differences in looking patterns in the at-risk group, compared with typically developing infants. It is the view of this thesis that limited data from small samples still allows the researcher to make probable extrapolations as well as modest speculations about the data available. This belief is rooted within the ontological and epistemological postulations underpinning this research, based on the notion that, in naturalistic settings, attentional processes are context dependent. The lack of variable manipulation provides this study with a criterion of generalisability due to the transferability of findings to similar cultural contexts. Furthermore, if levels of generalisability are acquired from detail epistemological explanations, then a degree of extrapolation is possible from the small cohort of the at-risk group, as the content of this thesis provides scope for replicability of findings in same naturalistic contexts.

Conceptually, the qualitative analysis undertaking in this thesis affords a level of descriptive understanding of naturally occurring attentional processes that serve as a tool for internal generalisability and 'natural' validity (Miles & Huberman, 1994:278). Taken together, some of the research components embedded in this project grants a degree of discussion and modest conjectures from the two participants at-risk of being autistic.



This study attempted to compare patterns of operationalised looking behaviours between two populations: typically developing infants and infants at-risk of being autistic, by virtue of having an already identified older autistic sibling. Findings from this small cohort indicate that the two at-risk infants use glances most saliently. As previously stated, this look is characterised by rapid checks to the adult’s face as a form of monitoring the adult. In this instance, however, glances were not used exclusively as a source of monitoring but denoted attentional control difficulties to sustain visual attention toward the adult effectively and consistently.

That infants at-risk showed poor social looking abilities might suggest early presentation of executive function difficulties that are detected later on in development (perhaps due to being more pronounced), as empirical studies of autistic children have indicated (Forgeot d’Arc et al., 2017; Gillespie-Lynch et al., 2013; Kleinman et al., 2008; Nakano et al., 2010; Pantelis & Kennedy, 2017; Rutherford & Towns, 2008; Senju & Johnson, 2009; Speer et al., 2007). This peculiarity, however, seems to take place independently of any influence of the naturalistic setting, as both infants observed in two distinct qualitative contexts, displayed similar ratios of glancing looks.

Potential difficulties with attentional control might be linked to the lack of referencing looks revealed in the data. Whereas the home environment might have contributed to the absence of both types of referential looks for Participant 25 (due to the infant’s familiarity with the setting), it is plausible that

- broadly speaking - the absence of referencing denotes developmental differences in how at-risk infants gather social information from the adult. Studies have shown that autistic children present difficulties with social referencing components (Bacon et al., 1998; Dawson et al., 2004; Grim et al., 2009; Maestro et al., 1999; Osterling & Dawson, 1994; Zwaigenbaum et al., 2005). Cornew et al., (2007) found that 67% of high-risk infants did not reference the adult within the classical social referencing model.

The lower ratios of referencing looks found in at-risk infants align with measures of typically developing infants, not solely in this study, but in previous findings (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Hornick & Gunnar, 1988) suggesting a non-autism-specific presentation of social referencing. The high proportion of looks denoting observations to adults' behaviours in Participant 24 might reveal a delay in acquiring knowledge about social standards resulting in the lack of referential looks, if taken into consideration that, in this study, referencing constitutes a process of helping infants understand behaviour regulation within broader social structures of the context. Conversely, measures of observations in Participant 25 revealed to be one of the least frequent looks, attributed to this at-risk infant's familiarity with the setting, which minimised the need to acquire knowledge about the context.

The seeming difference in social attention for these two infants at-risk does not appear to impact on the types of social engagements they undertake, as indicated by findings within the joint attentional dimension. These results provide tentative evidence against previous studies (Campbell et al., 2015; Nichols et al., 2014; Ozonoff et al., 2010; Rozga et al., 2011) showing that infants at high risk of being autistic present significant differences in social engagements, compared to infants at low-risk. That both infants here presented similar frequency ratios of joint attentional looks show a (possible) unique pattern of joint attention, one that provides tentative evidence of homogeneity in the onset and manifestation of joint attentional processes in the at-risk group, compared to typically developing infants.

Participant 24 displayed higher ratios of responses than initiations, which aligns with patterns of typically developing infants in this study at Time 2. More detailed analysis of the attentional components known to contribute to the emergence and consolidation of responses to joint attention, such as orientations and observations of adults interacting with others, show significant variance for this at-risk infant. Orienting to voices presented a higher prevalence than responses, which might suggest *involuntary* forms of social attention (Mundy et al., 2007) rather than an overt intention to direct the attention toward the adult's voice, which is interpreted here as reflexive orienting due to poor executive control. This assumption is supported by the higher prevalence of glances, as both looks share similar neurobehavioral components. Equally in typically developing infants, 'Responses to Social Interaction' are influenced by early observations of adults' interactions with others, facilitating the mimicking of joint actions. The lower ratios of observational learning of adults' joint engagements for this at-risk participant suggest a different form of learning about joint encounters, one that perhaps requires more input and scaffolding from the adult. In this study, responses to social interaction involved coordinated attentional engagements (Bakeman & Adamson, 1984) where adults' exaggerated voices and facial expressions served as scaffolding to infants' sustained attention (Carpenter, Nagell & Tomasello, 1998; Mundy, 2016). The context, nonetheless, did influence individual differences in presentation of both subcomponents of joint attention, evidenced by the reverse pattern identified between the two at-risk participants within measures of responses and initiations.

It is plausible that Participant 24 experienced qualitative differences in constructing social meaning, as demonstrated by the distribution of looking patterns pertinent to categories such as glances, observations of an adult and joint attentional encounters. This variance is further evidenced by looks pertinent to infants' learning about intentionality, which in typically developing infants represent a high-frequency look for the at-risk's developmental stage (Time 2), representing one of the lowest ratios which might suggest a possible delay in shifting attention from adults' behaviours to adults' goal-directed actions.

Conversely, Participant 25 showed higher frequencies of initiations than responses. Most pertinently, this at-risk infant displayed unexpected ratios of 'Initiations of Social Communication', a look that involves more complex forms of shared attention through the use of pointing gestures. These somewhat unusual high ratios of initiations represent a diversion from studies of typically developing infants, showing a distribution characterised by a decrease of initiations between the ages of 12-15 months and a rebound at 18 months (Mundy et al., 2007). Additionally, shows a diversion from studies showing how infants at-risk display fewer communicative intents (Winder et al., 2013) and more difficulties with declarative gestures (Bryson et al., 2009; Campbell et al., 2011). The age of this infant at-risk being 12 months at the time of this study suggests a significantly advanced onset communicative intents.

As mentioned previously, the setting represented a component of significant influence in the elicitation of social looks for Participant 25. The home environment and mother-infant interactions affected the emergence of looks pertinent to 'Watching Others Communicate', 'Watching Others Interact', and 'Child Emotionality', this latter look requiring infants to spontaneously look at the adult usually whilst engaged in independent activities. 'Watching an Adult Perform an Action' was also absent within the social looking repertoire of this at-risk infant, due possibly to the dyadic nature of social engagements established in the home, which prevented the mother from conducting more performative actions.

In summary, patterns of looking behaviours amongst these two participants at-risk are characterised by cohesive intra-case similarities, compared with their specific age-related of the typically developing cohort. These findings suggest the existence of a homogeneity quality characterising patterns of social looks in the at-risk group that differs from the typically developing cohort. Additionally, difficulties in attention control were observed also, evidenced by the high prevalence of 'Glancing' looks.

The homogeneity in looking patterns brings some ethical and moral considerations related to the validity and appropriateness of comparing looking behaviours between these two seemingly divergent populations. The

inter-dimensional similarities amongst the two infants at risk as well as the differences in patterns of looks - compared with typically developing infants - advocate for a shift in how we explore and interpret social-cognitive components amongst the at-risk and autistic populations. From data of this study, it is evident that commonalities in looking patterns for the at-risk group do exist, suggesting a more substantial homogeneity than the typically developing cohort. It might be more appropriate and representative for future research to examine individual differences of social looks amongst larger samples of the at-risk population, in order to understand whether social looks do show similar intra-case distributions, that lead to more appropriate research measures of generalisability and representativeness of data and ultimately, a greater understanding of the differences in the social development of infants at-risk of being autistic.

9.2. Original contribution to knowledge

The findings of this project have made an original contribution to knowledge in the field of infants' social development, specifically pertinent to our understanding of how infants gather information beyond social referencing processes.

This study is the first research to explore infants' social looks in naturalistic settings and across three developmental time points. Most prominently, non-contrived settings have permitted the analysis of looking behaviours at the intersection between the infant, the adult and the social context. While a range of relevant literature has examined infants' referential looks and social looks, these have been conducted using experimental or semi-naturalistic methodologies (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Hornich & Gunnar, 1988; Martin, Crnic & Belsky 2003; Mireault et al., 2014); this current project, therefore, is the first to narrow the epistemological gap by using a naturalistic approach.

The examination of looking processes in nursery settings has provided an understanding of how infants use attentional processes to learn about others' behaviours, intentions and affective expressions as well as to gather evidence of how environments influence infants' construction of social knowledge. The

creation of an in-depth typology of social looks brings novel conceptual meaning to previous research studies that operationalised social looks within the realms of social referencing solely (Hornick & Gunnar, 1988; Clyman et al., 1986). This study's conceptualisation of looking behaviours within six different social dimensions - including but not exclusively referential looks – does evidence broader functions of looking behaviours that expand our understanding of social and attentional development in infancy.

Conceptually, the observational analysis identified a set of novel categories related to indirect forms of infants' social attention and monitoring processes that, in combination with active forms of participatory engagements, serve infants with the non-participatory knowledge necessary to gather social information from the adult. These findings are significant for various reasons: first, it provides new evidence that observational learning is important, if not, a fundamental component for the development of infants' social cognition. Many theories postulate that social interactions are the cornerstone for social development (Hobson, 2002; Tomasello, 1999; Vygotsky, 1978) but this research indicates the importance of infants' observations of others in constructing meaning beyond social interactions and into broader aspects of adults' behaviours and specific actions also.

Second, the novel conceptualisation of social looking contributes to our knowledge of how adults play an important and mediatic role in facilitating infants' attentional processes beyond social referencing models. This thesis presents compiled evidence that adults' explicit, spontaneous, and intentional multi-modal communication, behaviours and actions encapsulate components of the social world that contribute to and influence infants' social experiences, both indirectly and directly. Adults' roles related to scaffolding go beyond interpersonal encounters (Bodrova & Leong, 2007; Brooks & Meltzoff, 2014; Bakeman & Adamson, 1986; Cameron-Faulkner et al., 2015) toward non-participatory frameworks also. This finding provides a diversion from social referencing models, where adults' roles are restricted to exclusively providing affective and binary information. following infants' referential looks (Hirshberg & Svejda, 1990; Rosen et al., 1992; Walden & Baxter, 1989; Walden & Ogan, 1988).

Third, this thesis provides strong evidence of the importance of contexts as social landscapes for infants to construct meaning of others' behaviours and actions within normative boundaries of the setting that ultimately, contribute to infants' acquisition of moral aspects of human behaviour (Emde, 2009; Hedegaards & Fleer, 2008). This thesis, therefore, is the first study to position attentional processes within social structures and to demonstrate the importance of contextual social expectations, rules and norms, in facilitating infants' meaning making.

Within the social referencing framework, this thesis is the first study to provide a different functionality to the construct of social referencing, away from the notion that referential looks are elicited exclusively in the presence of uncertainty (Carver & Vaccaro, 2007; Hornik et al., 1987; Stenberg & Hagekull, 2007; Walden & Ogan, 1988). The evidence presented in this study shows that instances of social referencing looks occurred outside paradigmatic components, i.e., exempted of uncertainty. Moreover, that referencing looks possessed primarily properties of behavioural regulation, specifically of infants' learning about valuations and, ultimately, moral development (Emde, 2009), and not of affective attributes related to uncertainty.

The longitudinal study of social looks provides originality to this thesis as the research on looking behaviours have examined infants at specific developmental times (Clearfield, Osborne & Mullen, 2008; Clyman et al., 1986; Martin, Crnic & Belsky, 2003; Mireault et al., 2014). Patterns of social looks provide new evidence of a qualitative shift in infants' attentional processes occurring between the ages of 15-17 months. This developmental stage is characterised by the highest production of looks as well as the existence of a qualitative shift in looking behaviours, characterised by (1) infants becoming more actively engaged in joint social engagements with the adult, (2) becoming more interested in observing adults' intentional actions, and (3) engaging in relatively more referencing looks. Additionally, this study shows a potential developmental progression of monitoring looks, in the form of

glances, that demonstrates infants' gradual acquisition of more complex information processing abilities⁵⁸.

Lastly, this thesis provides tentative new evidence of qualitative differences in looking patterns in two infants at-risk of being autistic. Current literature within the at-risk population postulates differences in social engagement and referential looking, but no other studies to date have examined how looking behaviours - elicited naturally - contribute to social-cognitive abilities in infants at-risk. In this thesis, modest extrapolations demonstrate that infants at-risk show not solely differences in the types of looks they display but provide preliminary evidence of the existence of an intra-case homogeneity in their patterns of looking.

9.3. Limitations of this research

The considerations detailed in the previous section are associated with limitations with this research' design and processes that require attending to. These relate to the following: (1) the size of the research sample, for both the neurotypical and infants at risk, (2) the lack of available data, (3) the validity and reliability of conceptual data, (4) the specific context chosen for this study and (5) the narrow research criteria.

- **The size of the research sample:** Robson & McCartan (2016) - citing Mertens (2005) - suggest that the optimum sample size or group observations are 15 in order to establish generalisability of findings. In this thesis, the longitudinal stance of the research required the same

⁵⁸ The high prevalence of glancing looks in typically developing infants at Time 2 and 3 is considered here a more effective information processing but in the two at-risk glances are attributed to attentional control difficulties. These different interpretations are based on the following assumptions: (1) findings of this study showing differences in the overall patterns of looking between both groups (and their corresponding timelines). Whilst typically developing infants display more integration and convergence of social looks within social dimensions, the two at-risk cases show less coherence of looking patterns, and (2) current research literature has demonstrated that autistic children present visual-perceptual difficulties, orienting more to objects than faces (Dawson, Meltzoff, Osterling, Rinaldi & Brown 2004; Maestro et al., 1999; Osterling & Dawson, 1994; Zwaigenbaum et al., 2005) and displaying longer latency times to disengage from an stimulus (Landry & Bryson, 2004). Equally, at-risk infants demonstrate less attention to objects (Bedford, Elsabbagh, Gliga, Pickles, Senju, Charman & Johnson, 2012), and less fixation to people (Chawarska et al., 2013). This evidence therefore grants broader generalisations related to the functionality of glances for the at-risk group.

sample sizes across the three-time points to be able to make valid and reliable comparisons of social looks data obtained at each timeline. The sample in this study comprised of 23 neurotypical infants at Time 1; 17 neurotypical infants at Time 2 and 11 neurotypical infants at Time 3. Additionally, the research included 2 infants at risk of being autistic. While the sample is relatively small, particularly at Time 3 of the longitudinal study, it did align well with the purpose of this research (Awoko, 2004). Most pertinently, based on the purposeful sampling of this study, the number of infants proved sufficient in identifying and comparing social types and looking patterns as the length of video data gathered for each participant permitted the in-depth exploration of social looks. Therefore, the sample size aligned with the aim and objectives of this study.

- **The lack of available data:** a second possible limitation to this study pertains to the lack of available data from the cohort of infants at-risk, that limited qualitative and quantitative analysis to case studies and, therefore, the inability to extrapolate inferences related to patterns of looking behaviours against the neurotypical cohort. This said, the two infants at-risk of being autistic provided preliminary data on the use of social looks in naturalistic environments that permitted the establishment of some tentative arguments.
- **The validity and reliability of conceptual data:** a third limitation relates to the validity and reliability of the social looks conceptual descriptions, that reduced the inter-coders' agreement rates at Time 2, as explained in chapter 5. The lack of reliability was created by the (1) richness and in-depth of categorical descriptions, limiting the ability of observers to accurately understand and identify categorical elements of inclusivity and (2) naturalistic methodology, making behavioural manifestations of categories variable and flexible, resulting in difficulties assigning behavioural manifestations to concepts categories. It is plausible that the lower inter-rater agreements were exacerbated by the researcher's assumption of categories possessing 'face validity' (Heyman, Lorber, Eddy & West, 2014:36), i.e., assuming self-evident

validity of the categorical descriptions. This implicit assumption was created by the lengthy and laborious coding procedures that permitted the researcher to gain in-depth familiarity with the looking concepts, the analytical process as well as the assumption that categories possessed self-evident behavioural descriptions. Despite difficulties related to validity and reliability, categorical consensus amongst observers was reached once detailed explanations about categorical function and behavioural associations were provided. Nonetheless, future longitudinal research should increase the number of inter-coders and conduct reliability tests within each time point to ensure the accuracy and validity of conceptual descriptions across times.

- **The specific context chosen for this study:** a fourth limitation is associated with the situated context in which observations of looking behaviours were conducted. This research selected nursery settings as naturalistic spaces to explore the elicitation of social looks. The peculiarities of the social context provided a snapshot of the different ways looking behaviours were elicited and mediated by others and the specific context. The generalisation of the typology to other social contexts will be dependent on the representativeness of the categories to other social contexts with different macro-structures. In this thesis, the social looks concepts are characterised by its heterogeneity and variability amongst participants, reflected in the patterns and distribution of social looks. These individual differences were also found in the previous semi-naturalistic study by Clyman et al., (1986). As a result, this variability can also be said to be present in other natural contexts, bringing qualities of representativeness amongst different contexts.
- **The narrow research criteria:** finally, potential limitations to this research are related to the establishment of an age criterion and the narrow research criteria for infants at risk. Some sociological approaches have argued that using an age dimension limits the possibility to see and study children as individuals (Christensen & James, 2017). Furthermore, studies that constrain methodologies to a

variable such as age view the child as possessing the desired characteristic rather than being an integral part of the research. As discussed in chapter 5, I uphold the validity of using an age criterion for the longitudinal exploration of looking behaviours, as this research is fundamentally a behavioural study of infants' attentional processes; therefore, the identification of looks within the parameters of age aligns with the main research enquiry. This said, the age gap between timelines (3 months between Time 1 and 2, and 12 months between Time 2 and 3) provides broader and inconsistent comparative processes. Further research should explore longitudinal changes in looking behaviours at consistent and significant ages, i.e. every 6 months, to examine social looks at key developmental stages.

9.4. Implications for further research

The successful completion of this research study and the creation of an in-depth typology of social looks provide some possible avenues for future research. Furthermore, the naturalistic and longitudinal nature of this study provides methodological value to the study of social looks, providing new scope for further examination of not solely social referencing but social looks also. Based on this study's outcomes, further research areas are proposed:

- **Exploring social looks to a larger sample:** The age criterion for this study was decided based on the Clyman et al., (1986) study. The authors used 12-month-old infants to create the typology of social looks; therefore, in order to provide reliable conceptual comparisons, the use of the same age participants was established. The age corresponding to the second timeline was chosen based on a developmental criterion, specifically on studies showing that around the age of 15 months, infants consolidate joint attention (Brooks & Meltzoff, 2002; Mundy, 2016), engage in more complex attentional processes (Adamson & Bakeman, 1984; Perra & Gattis, 2012) and develop an understanding of others' actions as intentional (Tomasello et al., 2005). The age of participants within the third timeline was selected incidentally due to difficulties in recruiting at-risk infants for this project. The application

and analysis of the typology to larger numbers of participants for both, typically developing infants and those at-risk sharing same developmental stages and within similar naturalistic settings, will provide better replicability and reliability measures. The typology of social looks and our understanding of how looking types and patterns influence infants' meaning making of social realities can be strengthened and refined by repeating this research study.

- **Exploring specific social components influencing social looks:** this study provides an in-depth conceptualisation of social looks based on the intertwined relationship between infants, social partners and the context, permitting the delimitation and identification of looking behaviours, but restricting the exploration of other significant components such as learning frameworks, i.e., structure/non-structured activities, adults' pragmatic language, adults' availability and/or imitative skills. These components constitute significant social elements influencing the elicitation of attentional processes that can contribute to an in-depth understanding of how infants create knowledge.
- **The expansion of exploration of social looks to other social figures:** this research has demonstrated the influence and mediated role that familiar adults, specifically nursery staff, have in supporting infants' constructing social knowledge in natural contexts. Nonetheless, in early years setting other social partners such as peers do play an essential role in the acquisition of social understandings. How peers influence the elicitation and function of infants looking behaviours are yet to be explored. For instance, in teaching and/or attempting to interact and behave in ways that adults do not can provide useful insights into interpersonal relationships through social looks.
- **The application of the typology to other populations such as infants at risk, autistic children and other neurodivergent groups.** This study aimed to compare types and patterns of looks amongst two cohorts: neurotypical and infants at risk. As explained in chapter 8, recruitment difficulties due to strict research criteria, resulted in the lack of participants within the at-risk group. Additionally, as detailed in

previous sections, the possibility of the existence of a homogeneous distribution of looks within this specific cohort can provide important information about the peculiarities and intricacies of developmental trajectories characterising this specific group. Further research in this area is needed to assess not solely the feasibility of the looking concepts in neurodivergent groups but to explore patterns of looks within and between cohorts.

9.5. Conclusion

This chapter has discussed how the outcomes of this study facilitate typically developing infants' constructions of their social realities. Similarities and differences with the semi-naturalistic study and their operationalised nomenclature have been noted. Additionally, detailed and preliminary explorations of results from data pertinent to two participants at-risk of being autistic have been explained. This chapter has illustrated how this thesis contributes to knowledge in the field of social development as well as has identified restrictions of this research and has stipulated possible future research avenues. This thesis concludes with the next chapter, where a summary of conclusions is provided.

Chapter 10

Conclusion

10.0. Introduction

This research was conducted in order to longitudinally explore social looks within naturalistic settings in typically developing infants as well as two infants at-risk of being autistic. To achieve this, this study focused on two components: (1) the observation of infants in naturalistic settings and (2) the exploration of social looks across three different developmental time points (T1= 12-14 months; T2= 15-17 months and T3= 24-26 months). In alignment with the constructivist notion that infants create meaning of their social realities through social interactions with others and the influence of cultural contexts (Hoff, 2006; Rogoff, 1990,2003; Wang, 2018), the focus of this research was to identify social looks in order to create a typology of looking behaviours, serving as a vehicle for infants' social knowledge construction.

Emphasising the longitudinal and naturalistic approach to the phenomenon, this study used behavioural observations of social looks to conceptualise looking behaviours as elicited naturally and used quantitative analysis to gather patterns of looks across timelines. The research sample comprises of 23 participants at Time 1, 17 participants at Time 2 and 11 participants at Time 3. Two participants constituted the cohort for the group of infants at-risk, with data analysed through inductive coding and comparative processes with the pre-determined typology created by Clyman et al., (1986).

The main research question of this study was:

What types of looks do infants display in naturalistic contexts that provide a foundation for constructing social realities?

This final chapter provides the conclusions of this research based on the three study questions outlined in chapter 1.

10.1. Study conclusions

(A) What types of looks do infants display that provides a foundation for constructing social realities? Exploring social looks from a constructivist perspective and with the selection of observations as the methodological approach, this study involved the identification of instances of looks - discretely defined as infants' looks to the adult's face – for the creation of a typology, based on a pre-existing set of concepts from a previous study. Each category consisted of (1) an axial concept, denoting the function (goal-derived) of the category and (2) its associated descriptions, pertinent to the most salient behavioural manifestations. The typology represents the various ways in which infants use social looks to construct an understanding of their social world.

Analysis of observational data revealed thirteen different social looks at Time 1 study, compared to the original eight⁵⁹ identified in the previous study, and classified within six social dimensions of attentional processes: observations, social referencing, joint attention, monitoring, affect and orientations. Time 2 coding revealed an additional category, pertinent to the dimension of joint attention, that described infants' use of the pointing gesture to attempt to communicate with the adult in order to establish shared attention and meaning.

The naturalistic study showed that infants construct an understanding of their social realities by eliciting acts of looking that serve as (1) indirect ways to gather information about adults' actions and behaviours that are congruent with the norms, values and cultural setting through observations (dimension of watching), (2) as a way to practise social interactions through active participation in joint engagements and responses to adults' attempts for engagement (joint attentional dimension), (3) as a way to gather information about their own actions and behaviours through referential looks, in order to regulate their own behaviours (social referencing dimension), (4) as a way to spontaneously show affect (affective dimension), (5) as a way to gather

⁵⁹ Clyman et al., (1986) created 8 categories but the concept pertinent to 'Gaze Aversion' was excluded in their pilot study due to lack of instances of this look during analytical coding.

reactive information about social/non-social stimuli elicited in the environment (orientation dimension) and (6) as a way to monitor the environment (monitoring dimension). These different types of looking experiences provide a broader perspective of attentional processes than the original typology, where social looking concepts retained a single functionality based on infants' gathering information from the adult, that provided restricted feedback through a modified version of the 'Stranger Situation' paradigm.

The novel typology of social looks revealed the importance of social partners in facilitating and mediating infants' constructions of meaning by the establishment of joint attentional engagements and the indirect modelling of actions and social play with others. Adults' initiations provide the social framework for infants to apply social learning acquired through observational looking behaviours. Equally, adults' actions and behaviours observed by infants permit the acquisition of knowledge about broader cultural components, by infants' associating adults' goal-directed actions and behaviours with background congruencies pertinent to the norms and values characterising social contexts. Adults, therefore, constitute a fundamental source for the scaffolding, modelling and the transferring of social information, both directly and indirectly, necessary for infants' meaning making.

Social contexts provide the landscape for infants to learn about macro-structures within nursery settings through participatory and non-participatory roles. These roles serve infants as a means to understand others' social behaviours and actions as well as to learn about behaviour regulation, through referential looks, prior to taking action or following infants' execution of an action that constituted a violation of the norms of the setting. The typology of social looks demonstrates the important role that social settings have in helping infants understand macro-layers of social information. Contexts, therefore, are components of social knowledge and not merely physical spaces, much as social referencing experiments conducted in laboratory rooms.

(B) What patterns of social looking behaviours do infants display across different developmental timelines? A second research aim consisted in the longitudinal

exploration of looking behaviours to extrapolate patterns of looks that infants use most prominently at different chronological times. This study conducted a quantitative analysis, extracting frequencies of social looks, at three different time points (T1= 12-14 months; T2= 15-17 months and T3= 24-26 months).

Clear patterns emanated within the three time points, showing infants' preferences for looking towards adults' behaviours congruent with the social setting and for engaging in monitoring processes (mostly during independent activities) of adults and the setting. These patterns were consistent across the three time points, providing evidence of the importance of looks that incorporate both adults' actions and implicit information about the norms and values of the social contexts. Equally, infants glanced at adults possibly as a relational process of self-other monitoring, that allowed participants to conduct swift checks about their own and others behaviours. The importance of glancing looks is as cognitive as it is social, as requires infants to acquire proficiencies in shifting attention and relating information about self and others within a setting. It is not surprising that glances become more prominent as infants develop more competent social skills.

Time 1 of this study was represented by infants of the same age than participants from the Clyman et al., (1986) study, allowing to draw some similarities and differences in looking patterns between both groups, based on differences in methodology: semi-naturalistic versus naturalistic. Quantitative analysis showed similarities pertinent to low-frequency measures of referential looks amongst the two study findings but with the semi-naturalistic, social referencing study by Hornick & Gunnar (1988) providing evidence that - outside paradigmatic walls and under less and non-contrived conditions - referential looks are not the preferred (and perhaps most suitable) form of infants to gather information. Additionally, this study demonstrated that classical forms of referential looks are not dependent on the presence of uncertainty but require infants to understand specific social norms and expectations of the setting, functioning as forms of behaviour regulation and not as a vehicle for reducing uncertainty (Feinman, 1992). A more prominent way for infants to gather information – in addition to observations of adults –

is by responding to adults' initiations for interactions, providing infants with opportunities to practice joint attentional engagements.

Time 2 represented a timeline characterised by the significant increase in looking behaviours denoting adults' goal-directed actions, showing infants' preferences to attend (and ultimately learn) about intentionality. The dimension of joint attention shows positive associations with the clustering of both responses and initiations and the emergence of shared attentional acts, through a novel category of 'Initiates Social Communication Engagement'. These patterns of looking behaviours provide evidence of the importance of infants' attention to adults' actions and behaviours and practices with joint attentional components in facilitating meaning about social realities.

Time 3 represents an increase in glancing looks, observations of adults' behaviours as well as the consolidation of joint attentional looks - specifically for communicative purposes. These findings provide evidence of how the elicitation of broader functions of attentional processes contributes to more efficient and rapid information processing, through monitoring looks.

Patterns of looking behaviours provided additional information about how the distribution of looks across timelines facilitate infants understanding of social realities, offering important insights on the intertwined relationship between infants' social looks, adults' and behaviours/actions and nursery contexts in facilitating infants' meaning-making.

(C) Are there any differences in social looks between typically developing infants and infants at-risk of being autistic? The reduced sample size for this cohort negated the possibility to conduct analytical comparisons of looking patterns between neurotypical infants and infants at risk of being autistic. Nonetheless, the two participants provided tentative insights in the homogeneity of the distribution of looks, compared with patterns from the neurotypical cohort at their corresponding timeline (based on age criterion). Both at-risk participants showed similar prevalences of glancing looks, providing preliminary evidence of possible difficulties in attentional control. Additionally, clusters of looking

categories belonging to joint attentional processes, including those denoting shared attention, showed peculiarities that were different from those from the typically developing group. These findings show intra-group similarities as well as heterogeneities in how social looks are distributed amongst the two cohorts, raising issues about the appropriateness of comparing attentional processes between two fundamentally different neurodivergent groups. More specifically, it raises issues related to what Milton (2014) describes as 'interactional expertise' (p.794), this is, a lack of common ground (intersubjectivity) between autistic and non-autistic researchers, resulting in the creation of partially heuristic, scientific models. Moreover, it promotes recurrent knowledge practices based on gathering and disseminating data about autism, including claims related to cognitive and social processes of at-risk infants and autistic individuals, that are mostly developed by and from a non-autistic perspective. Stipulating what is normalcy - in developmental terms - from a typically developing perspective and applying such standards to a distinct and neurodiverse group may result in a polarised and somewhat reductionist view of potential neurological and social differences, that can lead to misinterpretations and formulations of truths about autism conditions based on non-autistic ontologies.

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Appendices

Appendix 1. Pre-Existing Typology of Social Looks

TYPES OF SOCIAL LOOKS	DESCRIPTION
Orient to a voice	The child looks at an adult who either begins speaking or adds a strong emphasis to an ongoing vocalisation
Orient to an action	The infant looks in reaction to a person's sudden or noisy movement.
Social Referencing (Pre-Action)	The infant looks at an uncertain event or object and then looks to an adult before acting in response to that event or object.
Post-Action Reference	The infant performs an activity, feels uncertain about the activity, and then looks at an adult.
Bid for Social Interaction with Pause (long bid)	The infant appeals to an adult to share an emotional reaction to an object or event or appeals for interaction with an adult, as in offering a toy or raising his-her arms
Bid for Social Interaction without Pause	Same as the category of "bids for Social Interaction with Pause) but the look only lasts for 2 seconds.
Watching others Communicate	The infant looks at two people communicate. A triadic relationship is established, which may have multiple meanings.
Gaze Aversion	The infant fixates on an adult's face and then looks away, but not to another adult or to a toy.

Appendix 2. Consent Forms

Consent to Participate in a Research Study

Sheffield Hallam University. PhD

Title of Study:

Identifying and Categorising Social Looks in 12-14 month-old Infants

Investigators:

Name: Silvia Panella-Peral. **Dept:** Education **Email:** details omitted

Name: Dr Luke Beardon **Dept:** Education **Email:** details omitted

Name: Dr Tim Jay **Dept:** Education **Email:** details omitted

My name is Silvia Panella-Peral and I am a PhD student at Sheffield Hallam University, conducting the above research study.

I would ask you to read this form and consider for your child to be part in this research study.

Introduction

Social knowledge about the world develops by gathering information from others in order to build knowledge. Social Looking refers to a form of affective communication allowing children to appraise and cope with the emotional demands of the environment (Clyman et al., 1986). One type of social looks is Social Referencing, which referees to the ability to use other person's emotional expression to interpret a situation and to regulate behavior according to the other person's reaction (Feinman, 1992).

The aim of this research study is to be able to understand the following:

- what type of social looks infants use to gather social information
- to explore the interpersonal nature of social looking behaviour.
- Frequency of social referencing looks

Purpose of Study

The aim of this study is to explore the individual differences in social looking behaviours in 12 to 14-month-old infants. More specifically, I would like to examine what types of initiated looks infants use during free play interactions with adults in a natural setting (nursery). Once data is analysed, an in-depth categorisation of the different looks will be created. The findings will contribute greatly into the knowledge of social development in infants as well as the function of looking behaviour in understanding and making sense of the world.

The methodology proposed involves the video recording of the child (or children) for 45 minutes during free play time. Staff members do not need to do or change anything during the video recordings, just conduct themselves as they would normally.

Ultimately, this research will be published as part of my PhD Thesis and may be presented as a research paper.

Description of the Study Procedures

If you agree for your child to take part in this study but need further information, I will arrange a visit to the nursery to further explain to you the purpose of the research, will answer any questions you might have as well as collecting the signed consent forms.

If you are happy with the information provided, I will agree a time directly with the nurse manager to visit and video record the naturalistic interactions. I will not be involved in any interactions with your child and my presence at the nursery will exclusively involve setting up the equipment prior to the recordings as well as remaining in the play room to ensure that the free-play activity gets recorded properly.

Risks/Discomforts of Being in this Study

There are no known risks for your child to take part in this study.

Benefits of Being in the Study

Your participation in this study will help us understand about the different types of initiated social looks displayed by infants in a natural environment. Also, who do they go to access relevant, social information.

The findings will have direct implications in understanding social-cognitive processes. After this study, you will be able to notice and recognise different looking patterns displayed by your child in different contexts and situations as well as understanding when your child might seek and use information to make sense of the world and to regulate his/her behaviour. Understanding the information seeking aspect of the social referencing type of look, will help you not only to guide your child in situations of uncertainty, but also in determine how affective messages can influence your child's behaviour.

Confidentiality

The information provided will be used solely for the purposes defined by the project and the children will be identified by a code number so names will not be used.

The records of this study will be electronically kept in a secured file within the University of Sheffield Hallam server, which will be password-protected. Some of the interactions might need to be watched by my supervisors, Dr Luke Beardon and Dr Tim Jay and viva examiners.

Data will be kept securely stored for up to five years if study is published.

Right to Refuse or Withdraw

The decision of your child to participate is entirely voluntary. You can withdraw from this study at any time. However, if you decide not to take part in this study once data has been collected, you have a two-week notice period to let me know via the email provided in this information sheet.

There are no negative consequences if you decide to withdraw from this study.

Right to Ask Questions and Report Concerns

You have the right to ask questions about this research study and to have those questions answered by me before, during or after the research. If you have any further questions about the study, at any time feel free to contact me, Silvia at [details omitted](#). If you have any other concerns about your rights as a research participant or for any further information, you can contact my Director of Studies Dr Luke Beardon (e-mail: [details omitted](#)) or my supervising researcher Dr Tim Jay (e-mail: [details omitted](#)).

Consent

Your signature below indicates that you have decided for your child to volunteer as a research participant for the study titled: **Identifying and Categorising Social Looks in 12-14 month-old Infants**, and that you have read and understood the information provided above. You will be given a signed and dated copy of this form to keep.

1.	I have read and understood the information about the project, as provided in the Information Sheet above	<input type="checkbox"/>
2.	I have been given the opportunity to ask questions about the project and my child's participation.	<input type="checkbox"/>
3.	I voluntarily agree for my child to participate in this research.	<input type="checkbox"/>
4.	I understand I can decide for my child to withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	<input type="checkbox"/>
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, data protection, etc.) to me.	<input type="checkbox"/>
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	<input type="checkbox"/>
7.	I, along with the Researcher, agree to sign and date this informed consent form.	<input type="checkbox"/>

Participant:

Name of Participant

Signature

Date

Researcher:

Name of Researcher

Signature

Date

Appendix 3. Consent Form for Spanish Nurseries



Permiso para participar en el estudio de Investigación de Universidad de Sheffield Hallam, Inglaterra.

Título del estudio:

Identificación y Categorización de las Miradas Sociales en niños de entre 12-14 meses

Investigadores:

Nom: Silvia Pañella-Peral.	Dept: Educacion	Email: Details omitted
Nom: Dr. Luke Beardon	Dept: Educacion	Email: Details omitted
Nom: Dr. Tim Jay	Dept: Educacion	Email: Details omitted

Hola, soy la Silvia Pañella Peral y estoy haciendo un doctorado en Educación en la Universidad de Sheffield Hallam, UK

Este informe detalla mi investigación y adjunta el permiso para que tu hijo/a forme parte de esta investigación.

Introduccion

El conocimiento social del entorno se desarrolla a través de la adquisición de información de manera social, con otras personas. Las miradas sociales es un término que denota una forma de comunicación afectiva que permite a los niños el entender y manejar las demandas emocionales del entorno. (Clyman et al., 1986). Un tipo de miradas sociales es la Referencia Social, que se refiere a la capacidad de utilizar las expresiones emocionales de otra persona, influenciado por la reacción de la otra persona (Feinman, 1992), para interpretar una situación y regular el comportamiento.

Los objetivos de esta investigación se basan en intentar entender los siguientes puntos:

- ¿Qué tipo de miradas sociales utilizan los niños para acumular información social?
- El explorar la naturaleza interpersonal del comportamiento de miradas sociales
- Frecuencia de las miradas de referencia social

Propósito de la Investigación

El objetivo de esta investigación es el investigar las diferencias individuales en las miradas sociales en niños de entre 12-14 meses de edad. Concretamente, quiero mirar que tipo de miradas sociales iniciadas por el niño aparecen durante interacciones de juego entre el adulto y/o otros niños en guarderías. Una vez los videos se hayan analizado, se creará una descripción exhaustiva de las diferentes miradas sociales. Los resultados contribuirán en gran medida al entendimiento, dentro del ámbito del desarrollo infantil social y emocional, así como a la función que las miradas sociales tienen en el niño y su conocimiento del entorno.

La metodología propuesta utiliza las grabaciones en video del niño/as de entre 12-14 meses durante 45 minutos en momentos de juego con la profesora. La guardería no tiene que hacer nada o cambiar nada, únicamente el interactuar y jugar con el niño, como lo hacen diariamente. Al final, esta investigación será publicada como tesis y posiblemente presentada en publicaciones y conferencias.

Descripción del proceso de investigación.

Si quieres que tu niño/a forme parte de esta investigación, por favor firma la hoja de consentimiento al final de este documento y dásela a la guardería o envíamela directamente por email.

Si, por otra parte, quieres que tu niño/a forme parte de esta investigación, pero tienes más preguntas, no dudes en contactar conmigo en la dirección de correo arriba escrita y estaré encantada de explicar con más detalle esta investigación.

Una vez la hoja de permiso este firmada, iré a la guardería con dos cámaras para grabar durante 45 minutos. Las grabaciones las analizare y cuando los resultados estén disponibles, estaré encantada de comentarlos contigo y/o con la guardería.

Riesgos de formar parte de esta investigación

No se conoce riesgo ninguno para que tu hijo forme parte de esta investigación.

Beneficios

Tu participación en esta investigación ayudara a entender que miradas sociales los niños de entre 12-14 meses inician en entornos naturales durante situaciones de juego. También ayudara a ver, como acceden a dicha información social relevante y necesaria para entender el entorno.

Los resultados tendrán implicaciones directas en el conocimiento de los procesos sociales y cognitivos del desarrollo infantil.

Confidencialidad

La información obtenida será utilizada exclusivamente para el propósito de esta investigación y los niños de este estudio serán identificados por un código y ningún nombre será utilizado en ningún momento.

Las grabaciones serán guardadas electrónicamente en un archivo seguro dentro del servidor de la Universidad de Sheffield Hallam, que está protegido por una contraseña secreta. Es posible que trozos de las grabaciones las tengan que ver mis dos supervisores, Dr. Luke Beardon y Dr. Tim Jay, algunos estudiantes de psicología y los examinadores de la tesis.

Los datos serán guardados de manera segura un máximo de cinco años.

Derecho a decir que no.

La decisión de que tu hijo participe es completamente voluntaria. Puedes decidir que tu hijo no forme parte del proyecto en cualquier momento. No obstante, si decides que tu hijo no entre en la investigación una vez que las grabaciones se hayan hecho, tienes dos semanas para notificarlo a través del correo electrónico.

Derecho a Información

Tienes derecho a preguntar lo que quieras respecto a esta investigación, antes, durante y después del estudio. Si tienes cualquier pregunta, puedes contactar conmigo al correo: **details omitted**.

Permiso

Con tu firma das permiso para que tu niño/a forme parte de esta investigación, que lleva el titulo: **Identificación y Categorización de las Miradas Sociales en niños de entre 12-14 meses**, e indicas que te has leído la información sobre esta investigación.

1.	He leído la información sobre el proyecto	<input type="checkbox"/>
2.	He tenido la oportunidad de preguntar sobre el Proyecto y el papel de mi hijo/a en esta investigación.	<input type="checkbox"/>
3.	Acepto el que mi hijo/o forme parte de esta investigación.	<input type="checkbox"/>
4.	Se que puedo decir no a formar parte de esta investigación en cualquier momento.	<input type="checkbox"/>
5.	Entiendo los aspectos de confidencialidad de esta investigación (protección de datos, uso de nombres, etc).	<input type="checkbox"/>
6.	Entiendo el uso de datos para publicaciones y como parte de la tesis doctoral.	<input type="checkbox"/>
		<input type="checkbox"/>

Sujeto:

Nombre

Firma

Fecha

Investigadora:

Silvia Pañella Peral

Nombre

Firma

Fecha

