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Exploring psychological need satisfaction from gambling participation and the moderating influence of game preferences

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ABSTRACT

Psychological needs are satisfied through leisure participation, which in turn influences subjective well-being. The present study explored the psychological needs reported to be satisfied through gambling participation and examined associations between need satisfaction, game preferences and subjective well-being. A heterogeneous, self-selected sample of 1446 participants was recruited, through the Internet gambling provider Kindred Group Plc, for an online questionnaire survey. Five psychological need dimensions of gambling were identified, using exploratory and confirmatory factor analyses on calibration and validation samples, respectively: mastery, detachment, self-affirmation, risk and excitement, and affiliation. Challenge and mastery need satisfaction was higher for poker than for sports betting, horse racing, slots or casino table games; both self-affirmation and affiliation were also higher for poker than for sports betting and slots. By comparison, detachment was higher for slots than for sports gambling. While there were no significant variations in stress levels between the different forms of gambling, happiness ratings were lower for slots compared with sports betting and poker. This study provides insight into how distinctive patterns of play may satisfy different psychological needs and provides preliminary insights into how gambling patterns may prove adaptive or maladaptive as leisure choices.

Introduction

The negative psychosocial impacts of gambling are well-documented with problems occurring in 2% to 3% of the population and a larger percentage of people being indirectly impacted (Williams, Volberg, & Stevens, 2012). Furthermore, there is a considerable amount of research literature exploring the nature, causes, and treatment of these negative impacts. However, gambling can be considered not only from a public health perspective (Cowlishaw & Kessler, 2016; Korn & Shaffer,

1999; Shaffer & Korn, 2002), but also through the lens of leisure (Binde, 2013; Neal, 2005; Williams, Rehm, & Stevens, 2011). Nevertheless, few studies have hitherto considered gambling behaviour and its outcomes from this standpoint. This is surprising given that the large majority of gamblers engage in this activity without reporting any problems or being considered at risk. For example, the latest figures from the United Kingdom revealed that 63% of adults had gambled in the past year, of which 0.7% were identified as 'problem gamblers' and a further 3.9% were identified as 'at risk' (Conolly et al., 2017).

Understanding the leisure aspects of gambling is important for several reasons. First, it contributes to a more complete understanding of both why people gamble and the impacts of gambling. Second, participation in leisure activities is known to have a positive impact on health and subjective well-being (SWB) (Haworth & Veal, 2004; Newman, Tay, & Diener, 2014; Rolston, 1991). Third, understanding how psychological needs are satisfied through recreational gambling in the absence of harm can also potentially help inform interventions for problem gambling. This study therefore explored the nature of psychological needs in relation to gambling participation and how these may vary according to preferences for different gambling products.

Literature review

In developing the theoretical basis for this explorative study, we necessarily reviewed the relevant literature from both leisure and gambling studies. In the leisure literature, the term leisure is conceptualized as a life domain that can have a positive impact on health and SWB (Haworth & Veal, 2004; Newman et al., 2014; Rolston, 1991). Importantly, leisure is a means by which one can meet psychological needs not currently available through other life domains (Chick & Hood, 1996; Haggard & Williams, 1991; Knopf, 1987). Following an extensive review of the leisure literature, Newman et al. (2014) propose a conceptual model for directing future research on this topic. The model consists of five psychological mechanisms triggered by leisure that may promote SWB and these include detachment-recovery, autonomy, mastery, meaning and affiliation (DRAMMA). These mechanisms and the 'unmet needs' hypothesis' were broadly consistent with findings from earlier leisure research. The most substantive body of work identified a comprehensive range of psychological needs that participants reported to be satisfied through leisure (Driver, 1983). This resulted in the development of the Recreational Experience Preference (REP) scales (Driver, 1983; Driver, Tinsley & Manfredo, 1991). In addition to mechanisms which closely resembled those outlined by Newman et al. (2014), other domains relevant to gambling including excitement, risk-taking and developing self-identity also emerged.

In reviewing the relevant literature on gambling motivation, considerable overlap was noted between the psychological mechanisms identified in the leisure literature, and those reported in gambling studies. While we found some support for the DRAMMA model and the 19 domains included in the REP scales, our consolidation of both literatures has identified six psychological needs that may potentially be satisfied through gambling. These are: detachment, excitement, mastery, autonomy, affiliation, and self-affirmation. The following review therefore

examines the six psychological needs that influence gambling motivation, but in a leisure context.

Detachment

As outlined by Newman et al. (2014), the act of detachment is intended to promote rest, increase recovery or provide an alternative focus in order to deal with task demands in everyday life. The ability to 'detach' as a means to cope with stress or negative emotional states has been identified as an important outcome from leisure participation (Hobfoll, 1989; Hutchinson, Bland, & Kleiber, 2008; Meijman & Mulder, 1998). Detachment can facilitate restoration and preparation for future coping needs (Fritz & Sonnentag, 2006; Hobfoll, 1989; Sonnentag, 2001), but may be detrimental if it is the only mechanism used to deal with stress. The gambling literature has repeatedly identified detachment or escape as an important reason for gambling (Blaszczynski & Nower, 2002; Diskin & Hodgins, 2001; Griffiths, Wood, Parke, & Parke, 2006; Jacobs, 1987; Stewart & Zack, 2008; Sundqvist, Jonsson, & Wennberg, 2016). Electronic gambling machines (slots) (Binde, 2013; Dow-Schüll, 2012; Sundqvist et al., 2016; Wood & Griffiths, 2007), casinos (Rosenbaum & Wong, 2015) and Internet gambling (Griffiths, 2003) are the formats typically identified with facilitating detachment. The gambling literature has also reported that when a person cites 'to escape' as a primary motivation for gambling, this bears a strong association to problem gambling (e.g. Weatherly, Montes, & Christopher, 2010; Wood & Griffiths, 2007), particularly for female problem gamblers (Boughton & Falenchuk, 2007; Dow-Schüll, 2012; Ledgerwood & Petry, 2006; Li, 2007).

Excitement

Although, not included in Newman et al.'s (2014) model, there is evidence from the gambling literature that excitement is an important part of the gambling experience. Ethnographic interpretations refer to excitement as the need to seek out 'physical, emotional and sensory rush' and 'feelings of being alive' (Loroz, 2004) or the experience of extreme emotional highs and lows (Cotte, 1997). Gambling by definition involves risking money or material goods. This risk, in turn, is related to the 'excitement' of gambling (Wulfert, Franco, Williams, Roland, & Maxson, 2008). Gambling 'for excitement', is identified as one of the most common motivations for participation (Boyd, 1976; Neighbors, Lostutter, Cronce, & Larimer, 2002; Pantalon, Maciejewski, Desai, & Potenza, 2008). By comparison, quantitative approaches have identified arousal, measured either objectively (e.g. by heart rate, skin conductance or blood pressure) or subjectively through rating scales, as an important motivational factor (Lee, Chae, Lee, & Kim, 2007; Lloyd et al., 2010; Platz & Millar, 2001; Wardle et al., 2011) and reinforcer of gambling participation (Boyd, 1976; Brown, 1986, Lloyd et al., 2010; Rockloff & Dyer, 2006; Wulfert, Roland, Hartley, Wang, & Franco, 2005; Wulfert et al., 2008). Functional magnetic resonance imaging (fMRI) research has shown that gambling activity can modulate activation in the nucleus accumbens, an area integral to reward and appetitive processes within the brain (Knutson, Taylor, Kaufman, Peterson, & Glover, 2005). Yet another potential feature of excitement is suspense. Research shows that suspense and

uncertainty play an important role in intrinsic motivation regarding games generally (Abuhamdeh, Csikszentmihalyi, & Jalal, 2015) and gambling more specifically (Ely, Frankel, & Kamenica, 2015; Hahn, Wilson, McRae, & Gilbert, 2013).

Engagement and mastery

Activities that engage a person are rewarding in their own right as they can facilitate 'flow' (Csikszentmihalyi, 1990; Csikszentmihalyi & Kleiber, 1991). Further, engaging activities that also provide opportunities to be challenged, to learn, and to demonstrate skill provide additional rewards relating to participants' ability to demonstrate competence (Fritz & Sonnentag, 2006; Newman et al., 2014; Seligman, 2012; Stebbins, 2007). Perceived competence is fundamentally important to optimal functioning, and thwarted perceived confidence can reduce SWB (Church et al., 2013; Tay & Diener, 2011). Mastery as a driver for gambling participation has been found in numerous studies (Binde, 2013; Canale, Santinello, & Griffiths, 2015; Cotte, 1997; Wardle et al., 2011). Not surprisingly, mastery needs have been primarily associated with forms of gambling that involve an element of skill such as poker, sports betting and horse race betting (Sundqvist et al., 2016).

Autonomy

Self-determination theory (SDT) is a general theory of human motivation that identifies that autonomy (i.e. the opportunity to direct and regulate one's own behaviour) is an important predictor of SWB (Deci & Ryan, 1985, 2000). SWB has been shown to be higher in activities where autonomy is facilitated (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Deci & Ryan, 2008; Newman et al., 2014). A phenomenological study using casino patrons aged over 55 identified autonomy as a psychological benefit of land-based casino gambling through permitting participants to make choices, set spending limits and manage emotional reactions to gambling outcomes (Loroz, 2004). It has also been demonstrated that populations who face mobility barriers regarding leisure opportunities tend to choose gambling as a more accessible leisure option relative to activities where accessibility, transport options and opening hours can be more restrictive (Loroz, 2004; Parke, Parke, Rigbye, Suhonen, & Vaughn-Williams, 2012). This can thereby facilitate greater leisure autonomy. Research has also documented that autonomy motives were less likely to be associated with problem gambling (Rodriguez, Neighbors, Rinker, & Tackett, 2015).

Affiliation

Evidence suggests that affiliation needs are powerful, fundamental and extremely pervasive (Baumeister & Leary, 1995). Most motivational theories advocate their importance. For example, SDT with reference to relatedness (Deci & Ryan, 1985, 2000), Maslow's hierarchy of needs with reference to love and belonging (Maslow, 1968) and activity theory emphasising the importance of remaining socially engaged though activities (Havighurst, 1961). The social value of leisure is well-documented (Coleman & Iso-Ahola, 1993; Iwasaki & Mannell, 2000; Son, Yarnal, & Kerstetter, 2010;

Taylor, 2006; Taylor et al., 2000) including more specific considerations in virtual environments through digital media (Cole & Griffiths, 2007; Kleban & Kaye, 2015). The gambling literature has also highlighted social motives for participation (e.g. Cotte, 1997; Flack & Morris, 2015; Lambe, Mackinnon, & Stewart, 2015; Lee et al., 2007; Schellenberg, McGrath, & Dechant, 2016; Stewart & Zack, 2008; Wardle et al., 2011). These needs may be particularly prominent for older gamblers in retirement who may have fewer opportunities for social engagement (Abuhamdeh et al., 2015; Grant Stitt, Giacopassi, & Nichols, 2003; Hope & Havir, 2002; Loroz, 2004). Binde (2013) identified three classes of social motives in relation to gambling: communion (i.e. belongingness), competition, and ostentation (i.e. status). Endorsements for affiliation motives are most commonly reported in relation to poker (Sundqvist et al., 2016) and sports betting (Sundqvist et al., 2016) and are less likely to be associated with problem gambling (Stewart & Zack, 2008; Wardle et al., 2011).

Self-affirmation

Self-affirmation is an attempt to identify what is 'me' versus what is 'not me', providing reassurance about who we are (Haggard & Williams, 1991). Social psychologists have highlighted the importance of developing one's self-concept and identity for well-being (Schlenker, 1984; Swann, 1987). While this was excluded from Newman et al.'s (2014) DRAMMA model, leisure is considered one of the few life domains which provide fertile opportunities for self-affirmation (Haggard & Williams, 1991). In particular, games in virtual environments facilitate expressions of an individual's ideal self rather than their actual self (Kleban & Kaye, 2015; Suh, 2013). Participants use online games to explore different self-representations, including the use of avatars (video graphical images selected to represent the self) and 'gender swapping' (Wood, Griffiths, & Parke, 2007). Self-affirmation is also an important driver for gambling participation among older consumers. Loroz (2004) found that self-representation becomes increasingly important with age due to immobility, physical weakness and restricted income; older consumers use gambling as a form of 'symbolic consumption' to bolster their self-concept. Given that representations of the self are external as well as internal, this need potentially has a social aspect akin to the 'ostentation' element of social rewards referred to by Binde (2013). Likewise, social recognition based on skill, knowledge and restraint has been identified as a driver for gambling participation (Cotte, 1997).

Synthesis of review and research questions

Previous research has examined a range of psychological needs which may potentially be satisfied through gambling. However, these needs have been identified in different studies. Therefore, there is a need for a direct comparative analysis of the degree to which gamblers perceive that psychological needs can be satisfied by gambling. This includes the online context given the growing impact of the Internet on gambling participation (Gainsbury, 2012; Gainsbury et al., 2015). This study addresses this gap in the literature by examining the psychological needs which are perceived to be satisfied through different forms of gambling. It specifically focuses on three research questions.

First, which psychological needs are satisfied through gambling participation? Second, do different forms of gambling satisfy particular psychological needs? Third, are subjective measurements of stress and happiness associated with various types of need satisfaction from gambling?

Method

Participants

Kindred Group Plc, part of the Kindred Group plc, is a Malta-based company offering a range of gambling products to a primarily European client base. Through them, we recruited a broad, heterogeneous self-selected sample of online adult gamblers in March of 2013. More specifically, we contacted, by e-mail, a random sample of customers who had been active in the previous 30 days. We invited them to participate in an online questionnaire survey, offering entry into a prize draw to win one of two iPads as an incentive. The randomized invitations were sent to customers in three different European countries: 10,000 from the United Kingdom; 15,000 from Sweden and 15,000 from the Netherlands, using English, Swedish or Dutch questionnaires, respectively. These three countries were selected to increase the representativeness of our sample because the gambling operator considered the residents of these countries to be among the most diverse in Europe. Participants not responding to the first e-mail were sent one further 'reminder' invitation by e-mail two weeks later. After we eliminated 121 questionnaires with duplicate IP addresses and account numbers, our data set contained 1541 questionnaires due to a low response rate (3.85%). We deleted another 95 responses because of missing values, leaving 1446 available for analysis. We then removed another 30 because their preferred forms of gambling were not one of the five that were dominant among the rest of the respondents. The remaining 1416 were included in the analysis.

Measures

We designed the survey to allow us to identify and understand psychological needs satisfied through their participation in different forms of gambling. The questionnaire had sections on gambling involvement and preferences, satisfaction of psychological needs, and demographics. The median completion time for the questionnaire survey was 7.1 minutes, and mean completion time was 17.6 minutes.

Gambling involvement and preferences
- We measured gambling involvement based on participation in a range of gambling forms in the past 12 months. Participants were also asked to identify the form of gambling on which they spent the most time, their overall frequency of play, net expenditure, length of time playing, and the number of online sites used in the last 12 months. From the 1416 who recorded a preference for the five forms of gambling which were dominant among the rest of the respondents, the breakdown was as follows: sports betting ($n = 797$), horse race betting ($n = 122$), slots ($n = 149$), poker ($n = 279$) and casino table games ($n = 69$).

Psychological needs

– For the form of gambling on which they spent the most time, we asked respondents to use a five-point Likert-type scale (i.e. strongly disagree to strongly agree) to rate the extent to which it satisfied twenty-seven psychological needs. Additionally, we provided an open ended 'other' option to capture any additional needs. However, the respondents identified no additional needs, indicating that the twenty-seven items provided comprehensive coverage of potential psychological needs. These items were derived from a review of the literature on need satisfaction in leisure and on gambling motivation. This included Driver's (1983) Recreation Experience Preference Scale, that measures the extent to which experiences are desired and expected from leisure activities. The validity and reliability of the survey items has been established in leisure need satisfaction and gambling motivation research, but not, as yet, in the specific context of gambling need satisfaction (although the items were subsequently validated in this context by this study). The items were therefore pre-tested using an independent evaluation in this context by two gambling researchers; each of the twenty-seven item statements was found to be clear and relevant for the measurement of psychological need satisfaction in gambling. The items and the psychological needs (factors) they have measured in previous research are listed in Table 2.

Health-related variables

- We asked respondents to use a nine-point scale (extremely low to extremely high) to rate their levels of stress and happiness over the past twelve months. Given the length of the questionnaire, we opted to use only single-item, face-valid measures such as these for a preliminary exploration of the possible association with need satisfaction and health-related variables and were prepared to interpret these specific findings with due caution.

Demographic variables

- We collected demographic information such as age, gender, education, marital status, employment status and household income.

Procedure

To test the dimensionality of the psychological needs, we used SPSS Version 22 to perform exploratory factor analysis (EFA) on the respondents' ratings on the twenty-seven items. We chose factor analysis over principal components analysis because the purpose of the study was to identify the underlying dimensions relating to the inter-relationships between the observed variables (Costello & Osborne, 2005; Preacher & MacCallum, 2003). We used principal axes factoring extraction to identify any weak dimensions (deWinter & Dodou, 2012) and removed items from the analysis if their factor loadings were below 0.3 (Tabachnick & Fidell, 2007) and the differences between loadings on two or more factors was less than 0.10 (Lee et al., 2007). To determine which factors to retain, we noted which factors had eigenvalues greater than or equal to 1, visually examined the scree plot, and performed a Monte Carlo parallel analysis (O'Connor, 2000; Watkins, 2008). Additionally, we calculated internal consistency.

Because we wanted to allow for factors to be inter-correlated (Dechant & Ellery, 2011; Matsunaga, 2010; Stewart & Zack, 2008) and because oblique rotation more appropriately reflects reality for most social science constructs (Costello & Osborne, 2005; Dechant, 2013), we employed promax rotation. The exploratory factor analysis yielded a five-factor model. We then conducted a thematic analysis of factor loadings and created apropos names for each factor, after which we calculated convergent and discriminant validity measures for each factor.

We used AMOS Version 22 to conduct confirmatory factor analysis (CFA). We examined the goodness of fit of the five-dimensional model produced by the EFA and compared the model fit indices with those of the four- and six-dimensional models. We used maximum likelihood estimation and assessed the model's goodness of fit using the Normed Fit Index (NFI), the Incremental Fit Index (IFI) (to address issues of parsimony and sample size associated with the NFI), the Non-Normed Fit Index (NNFI)/ Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI). We also calculated the value of the Root Mean Square Error of Approximation (RMSEA) (Steiger, 2007).

Finally, we used a series of one-way, between groups, analyses of variance (ANOVA) and two-way ANOVAs to identify any statistically significant differences in the variance in psychological need satisfaction dimensions and health-related variables on the basis of the preferred gambling forms.

Ethical considerations

Ethical approval for this study was given by IRB Services protocol number UB001. All study participants provided informed consent and were debriefed following completion of the online questionnaire.

Results

A comparison of the sample profile and Kindred Group Plc customer profile is presented in Table 1. The sample is similar to the Kindred Group Plc customer profile with respect to age and gender. While 90.6% of the sample is comprised of male respondents, there were no statistically significant differences ($p < 0.05$) in the dimension ratings on the basis of gender; as such, females were retained in the sample for analysis. Geographically, the sample consists mainly of residents from Sweden, the Netherlands and the United Kingdom.

Psychological need satisfaction

Over half (55.0%) of participants ($n = 795$) reported that they satisfied some form of need from gambling. Respondent agreement/disagreement scale ratings relating to the satisfaction of the twenty-seven psychological needs through gambling participation are shown in Table 2. There were higher levels of agreement compared with disagreement on 18 of the twenty-seven items, among which 'It gives me excitement' is notable because 81.7% of the ratings were in either the 'agree' or 'strongly agree' categories compared with much lower proportions in the other items. By comparison, there were

Table 1. Sample characteristics.

		Sample (%)	Kindred Group Plc Customers (%)
Gender	Male	90.6	82.9
Age	Mean	39.3	30.9
	SD	13.2	11.1
Country	Sweden	51.3	9.7
	Netherlands	20.1	13.6
	UK	13.6	3.8
	Norway	1.3	6.0
	Denmark	0	5.4
	Poland	0	5.1
	Finland	0.4	4.4
	Malta	0.3	4.3
	Belgium	0.3	3.9
	Other	12.7	43.8
Marital Status	Single	33.5	NA
	Common-Law	28.4	NA
	Married	30.8	NA
	Separated/Divorced	6.6	NA
	Widowed	0.7	NA
Education	Not Completed High School	7.0	NA
	High School Graduation	35.5	NA
	Trades Certificate	16.4	NA
	College or University Degree	30.1	NA
	Graduate or Medical Degree	11.0	NA
Employment	Unemployed	9.3	NA
	Retired	6.7	NA
	Homemaker	1.4	NA
	Full-time Student	8.2	NA
	Sick leave, maternity, disability	2.2	NA
	Employed Part-time	11.6	NA
	Employed Full-time	60.6	NA
Household Income	< €10,000	12.2	NA
	€11,000–30,000	21.8	NA
	€31,000–50,000	22.4	NA
	€51,000–70,000	14.4	NA
	€71,000–90,000	7.6	NA
	€91,000–110,000	4.2	NA
	€111,000–150,000	2.1	NA
	More than €151,000	1.6	NA
	Prefer not to say	13.8	NA

NA = Not available

higher levels of disagreement on nine items, which represent the majority of the affiliation and autonomy factor measures.

Exploratory factor analysis

We randomly partitioned the sample of 795 respondents who stated that they satisfied psychological needs from gambling into a calibration sample ($n = 421$) for the EFA and a validation sample ($n = 374$) for the CFA. We performed the EFA on the calibration sample and removed five items with differences in loadings between two factors less than 0.10 (following the decision criterion outlined earlier in the procedure section). Our final model contained five factors that together accounted for 63.48% of the variance in the data before rotation (See Table 3). Bartlett's test of sphericity, the Kaiser-

Table 2. Subjects' ratings on the psychological need satisfaction scale items.

Gambling Items	x̄	s	SD (%)	D (%)	N (%)	A (%)	SA (%)
Engagement and Mastery							
It helps me develop my gambling/betting skills and abilities	3.52	1.01	4.8	10.5	25.7	45.9	13.0
It allows me to test my abilities	3.46	1.06	5.3	14.6	21.4	45.9	12.8
It gives me intellectual stimulation	3.41	1.10	6.4	15.3	23.2	41.6	13.6
It causes me to learn new things	3.31	1.00	5.6	15.0	30.3	41.2	7.9
It improves my general decision-making and/or problem solving skills	3.19	1.07	7.4	18.6	30.5	34.5	8.9
It allows me to compete with the 'system'	3.16	1.11	9.6	17.0	29.9	34.7	8.8
Self-Affirmation							
It gives me a sense of accomplishment	3.48	0.99	4.7	11.8	25.0	47.6	10.9
It improves my self-esteem	2.99	1.05	8.7	22.7	35.7	26.4	6.5
It gives me a sense of control	2.92	1.12	14.1	18.7	34.1	27.3	5.9
It allows me to create an image of myself that is appealing to other people	2.68	1.08	19.5	32.3	34.7	10.4	3.1
It allows me to create an image of myself that I like	2.45	1.02	14.9	29.6	33.1	17.3	5.3
Excitement							
It gives me excitement	3.94	0.91	3.4	4.4	10.5	57.9	23.8
It allows me to take risks that I enjoy	3.43	1.04	7.0	11.8	21.7	50.6	8.9
It allows me to test my luck	3.35	1.17	10.6	11.2	24.2	40.4	13.5
It alleviates my boredom	3.14	1.13	11.2	14.6	31.7	33.6	8.9
It allows me to demonstrate courage	2.84	1.12	14.8	21.7	32.9	25.5	5.0
Detachment							
It allows me to relax	3.38	1.08	8.5	11.8	22.2	48.3	9.3
It allows me to release some stress	2.99	1.05	14.3	20.4	24.6	32.8	7.9
It allows me to escape from problems in my daily life	2.48	1.19	25.9	28.1	21.9	20.1	4.0
Affiliation							
It allows me to compete with others	3.25	1.18	9.5	18.9	22.3	36.0	13.3
It allows me to socialise with people I know (friends/family)	2.54	1.12	22.4	26.2	29.7	18.8	2.9
It allows me to socialise and/or meet new people	2.49	1.13	23.5	28.3	27.4	17.3	3.5
Autonomy							
It gives me the freedom to make my own choices	3.17	1.14	11.3	14.7	29.1	35.7	9.1
It allows me to be extravagant or frivolous	2.59	1.07	19.3	25.4	36.0	16.0	3.4
It allows me to get away from people	2.37	1.07	24.8	30.6	29.7	12.1	2.7
It gives me the freedom to be someone else	2.37	1.12	27.4	27.3	29.6	11.9	3.8
It allows me to compete with the 'system'	3.16	1.11	9.6	17.0	29.9	34.7	8.8

x̄ = sample mean of ratings on 5-point scale: 1 = strongly disagree (SD); 2 = disagree (D); 3 = neither disagree nor agree (N); 4 = agree (A); 5 = strongly agree (SA);
s = sample standard deviation of scale ratings.

Meyer-Olkin (KMO) test of sampling adequacy and Cronbach's reliability alphas for each factor (alphas > 0.7) show that the factor structure is reliable.

We labelled Factor 1 'Challenge and Mastery' because it relates to personal development, learning, intellectual stimulus, testing abilities, improvement in problem solving and decision making and competition with others. This factor included a complex item: 'It allows me to compete with others', which cross-loaded on Factor 5 because of the social aspect of competition. Factor 2 was labelled 'Self-affirmation' because it loaded on items concerning the creation of self-image and improvement in self-esteem, control and accomplishment. Factor 3 was labelled 'Risk and Excitement' because it related to items associated with risk, excitement, testing luck, demonstration of courage and relief from boredom. Factor 4 consisted of items related to stress release, relaxation and escape from problems and was labelled 'Detachment'. We labelled Factor 5 'Affiliation' because it loaded on items concerned with meeting new people, socialising with friends and competing with others.

Table 3. Exploratory factors and item loadings.

Items	Factors					Com
	1	2	3	4	5	
It helps to develop my gambling skills	**0.806**	−0.131	−0.018	0.030	−0.047	0.528
It causes me to learn new things	**0.771**	−0.062	0.005	0.036	0.022	0.573
It gives me intellectual stimulation	**0.735**	0.062	−0.055	−0.003	0.003	0.562
It allows me to test my abilities	**0.635**	0.107	0.077	−0.049	0.042	0.549
It improves my general decision making	**0.620**	0.219	−0.071	−0.039	0.027	0.540
It allows me to compete with others	**0.452**	−0.023	0.003	0.014	0.325	0.456
It allows me to create an image that I like	−0.008	**0.929**	−0.094	0.002	−0.042	0.745
It allows me to create an image that others like	−0.066	**0.838**	−0.102	0.003	0.081	0.647
It improves my self-esteem	0.212	**0.671**	−0.004	0.001	−0.101	0.581
It gives me a sense of control	0.069	**0.382**	0.189	0.128	0.041	0.412
It gives me a sense of accomplishment	0.254	**0.345**	0.224	−0.035	−0.142	0.463
It allows me to take risks that I enjoy	−0.024	−0.022	**0.843**	−0.053	−0.058	0.613
It gives me excitement	0.239	−0.204	**0.659**	0.012	−0.079	0.467
It allows me to test my luck	−0.140	−0.016	**0.562**	0.050	0.082	0.418
It allows me to demonstrate courage	−0.073	0.305	**0.456**	−0.003	0.171	0.507
It alleviates my boredom	−0.082	0.024	**0.346**	0.261	0.077	0.400
It allows me to release some stress	0.085	−0.044	−0.106	**0.991**	−0.025	0.880
It allows me to relax	0.007	−0.070	0.168	**0.631**	−0.043	0.476
It allows me to escape from problems in life	−0.108	0.202	0.017	**0.560**	0.024	0.427
It allows me to socialise and/or meet new people	0.090	−0.029	−0.073	0.021	**0.884**	0.791
It allows me to socialise with people I know	−0.019	−0.009	0.070	−0.049	**0.801**	0.634
Eigenvalue	**6.97**	**2.28**	**1.66**	**1.23**	**1.19**	
Variance (%)	**33.20**	**10.86**	**7.90**	**5.88**	**5.65**	
Cronbach's alpha coefficient	**0.85**	**0.83**	**0.74**	**0.77**	**0.83**	
Number of items	**6**	**5**	**5**	**3**	**3**	

Extraction method: Principal Axis Factoring; Rotation method: Promax with Kaiser Normalization.
The Kaiser-Meyer-Olkin measure of sampling adequacy: 0.88; Bartlett's test of sphericity: χ2 = 7195.06; df: 210; *p*<.001. Com = Communality; 1:'Challenge and Mastery'. 2:'Self-Affirnation'; 3: Risk and Excitement'; 4. 'Detachment'; 5. 'Affiliation'.

The parallel analysis, using a Monte Carlo simulation, also produced five factors based on a comparison of the raw data and the mean randomly generated data eigenvalues. However, the analysis showed a sixth factor with a raw data eigenvalue greater than 1, albeit with a higher randomly generated mean eigenvalue. There is some evidence for a sixth dimension: 'Autonomy' in the motivation literature (Deci & Ryan, 1985, 2000, 2008). Also, there were relatively high inter-correlations between some of the factors. We therefore used CFA to test the fit of the five-dimensional model and compare it with both six- and four-dimensional models.

Confirmatory factor analysis

We examined the adequacy of the five-factor model using CFA with maximum likelihood estimation to assess its validity and reliability. Five items from the EFA were deleted to provide a more parsimonious solution (Table 4). The model fit indices demonstrated a good fit with χ^2 (89) = 298.08, normed χ^2 = 3.35, RMSEA = 0.039 with a 90% confidence interval (0.034–0.044), NFI = 0.95, IFI = 0.96, TLI = 0.94, CFI = 0.96. Although the χ^2 statistic showed a significant *p*-value, the relatively large sample size offset its impact on the validity of the measurement model (Anderson & Gerbing, 1982). Collectively, the results of the CFA satisfied the recommended level of goodness of fit, indicating that the measurement model fitted the data well.

Table 4. CFA five factor model of psychological need satisfaction from gambling.

Latent Variables and Items\	Standardised Loadings	t Values (Critical Ratios)	SMCs
Challenge and Mastery (ξ₁: α = 0.83; AVE = 0.50; CCR = 0.81)			
It gives me intellectual stimulation	0.77***	88.36	0.59
It improves my general decision-making and/or problem solving skills	0.76***	84.46	0.58
It causes me to learn new things	0.73***	93.88	0.53
It allows me to test my abilities	0.72***	92.76	0.53
It allows me to compete with others	0.40***	77.78	0.32*
Detachment (ξ₂: α = 0.77; AVE = 0.60; CCR = 0.82)			
It allows me to release some stress	0.83***	71.30	0.69
It allows me to relax	0.76***	88.62	0.58
It allows me to escape from problems in my daily life	0.72***	59.35	0.52
Self-Affirmation (ξ₃: α = 0.84; AVE = 0.57; CCR = 0.80)			
It allows me to create an image of myself (as a gambler) that I like	0.79***	70.60	0.63
It improves my self-esteem	0.77***	80.85	0.60
It allows me to create an image of myself (as a gambler) that others like	0.71***	68.57	0.51
Risk and Excitement (ξ₄: α = 0.71; AVE = 0.59; CCR = 0.81)			
It allows me to demonstrate courage	0.89**	72.16	0.80
It allows me to test my luck	0.71***	81.45	0.51
It allows me to take risks that I enjoy	0.70***	93.78	0.50
Affiliation (ξ₅: α = 0.73; AVE = 0.51; CCR = 0.73)			
It allows me to socialise and/or meet new people	0.90***	62.68	0.81
It allows me to socialise with people I know	0.79***	64.27	0.62
It allows me to compete with others	0.31***	77.78	0.32*
Model fit measures			
χ^2 (df)	298.08 (89)		
Normed χ^2	3.35		
RMSEA	0.039 (90% C.I: 0.034–0.044)		
NFI	0.95		
IFI	0.96		
TLI	0.94		
CFI	0.96		

*complex item loading on 'Challenge and Mastery' and 'Affiliation'; *** p<0.001. Items removed to increase the model fit: 'It helps to develop my gambling skills'
(Challenge and Mastery); 'It gives me a sense of control' and 'It gives me a sense of accomplishment' (Self-Affirmation); 'It gives me excitement' and 'It alleviates my boredom' (Risk and Excitement). RMSEA = root mean square of approximation; NFI = normed fit index; IFI = incremental fit index; TLI = Tucker-Lewis index;
CFI = comparative fit index; SMC = squared multiple correlation; CI = confidence interval; AVE = average variance extracted: (Σ standardised λ) / n; CCR = composite construct reliability: (Σ standardised λ)² / ₍Σ standardised λ₎² + (Σ ε).

All items loaded significantly on their constructs: the average variance extracted (AVE) was equal to or greater than 0.5 and the lowest critical ratio (*t* value) of 59.35 (*p* < 0.001) indicated that the specific measurement variables were sufficient in their representation of the constructs (Hair, Anderson, Tatham, & Black, 2009). In addition, the standardised loadings (latent factor means > 0.7) and moderate or strong significant correlations between items loading on the same constructs also showed evidence of convergent validity (Bollen, 1989). To assess the discriminant validity, the square root of the average variance extracted (AVE) in each latent construct was compared to the

Table 5. Comparative CFA fit indices for four, five and six factor models.

CFA Model	χ^2 (df)	Normed χ^2	RMSEA	(LO	-HI)	NFI	IFI	TLI	CF1
4 Factor Model	366.61 (81)	4.53	0.048	0.043	0.053	0.92	0.94	0.90	0.94
5 Factor Model	**298.08 (89)**	**3.35**	**0.039**	**0.034**	**0.044**	**0.95**	**0.96**	**0.94**	**0.96**
6 Factor Model	512.43 (90)	5.69	0.047	0.043	0.051	0.91	0.92	0.91	0.92

RMSEA = Root Mean Square of Approximation; NFI = Normed Fit Index; IFI = Incremental Fit Index; TLI = Tucker-Lewis Index; CFI = Comparative Fit Index.

correlation coefficients between two constructs (Fornell & Larcker, 1981). The variances extracted for all five constructs were greater than the square of the correlation coefficients, thereby confirming discriminant validity.

The comparative analysis of CFA fit indices for the five-factor model with four and six factor models also confirmed the validity of the former (Table 5). The RMSEA statistics for all three models were within the acceptable range, although NFI, IFI, TLI and CFI indices for the six-factor model were relatively low despite exceeding 0.90. Moreover, while the fit indices for the four-factor model were broadly acceptable, the upper confidence limit for the RMSEA was greater than 0.05. The RMSEA (0.039) and TLI (0.94) indices for the five-factor model also show its appropriateness when considering the parsimony principle. Therefore, overall the five-factor model explained the data most effectively.

Psychological need satisfaction and dominant gambling preference

Table 6 contains the results from the one-way ANOVA and multiple comparison tests for differences in psychological need satisfaction by gambling form preference. The sub-groups entered into the analysis were sports betting ($n = 446$), horse racing ($n = 69$), slots ($n = 70$), poker ($n = 174$) and casino table games ($n = 40$). The unequal sample sizes reflected true differences in the numbers of respondents with particular gambling preferences (i.e. nonexperimental design) and artificial equalisation would have distorted the differences and reduced generalisability (Tabachnick & Fidell, 2007). We therefore used a Games-Howell procedure for the post hoc tests because it controls for Type I error rate while maintaining both statistical power and accuracy under these conditions (Field, 2009). We also used a Welch's ANOVA test result for the Challenge and Mastery factor and for Stress because Levene's tests showed that the assumption of homogeneity of variance had been violated (Moder, 2010).

There were statistically significant differences between the five dominant gambling preferences on four of the need satisfaction dimensions: challenge and mastery (large effect: $eta^2 = 0.08$), detachment (small effect: $eta^2 = 0.02$), self-affirmation (small effect: $eta^2 = 0.03$) and affiliation (medium effect: $eta^2 = 0.05$), but no significant differences between them in relation to risk and excitement.

We determined the differences in psychological need satisfaction derived from each of the five dominant gambling preferences in comparison with the other four using post-hoc multiple comparison tests. Only the significantly different results are reported below, with mean differences (I-J) and significance levels shown in parenthesis. Challenge and mastery need satisfaction was significantly higher for poker than for

Table 6. Differences in psychological need satisfaction dimensions by gambling preferences.

Factors/ Gambling Form	x̄	s	Sum of Squares	df	Mean Square	F	p
Challenge & Mastery			1072.981	4	268.25	16.40	< 0.001
			12,395.752	758	16.35		
Multiple Comparison Test Results:							
Sports Betting	16.01	4.02					
Horse Racing	16.87	3.78					
Slots	14.8	4.75					
Poker	18.54*	3.73					
Casino Table Games	15.06	4.76					

*Significantly higher for poker than for sports betting (I-J: 2.53; $p < 0.05$), horse racing (I-J: 1.68; $p < 0.05$), slots (I-J: 3.74; $p < 0.05$) and casino table games (I-J: 3.48; $p < 0.05$).

Detachment			140.891	4	35.22	4.35	0.002
			6111.832	755	8.1		
Multiple Comparison Test Results:							
Sports Betting	8.49	2.82					
Horse Racing	9.06	3.14					
Slots	9.94*	2.63					
Poker	9.03	2.75					
Casino Table Games	9.09	3.27					

*Significantly higher for slots than for sports betting (I-J: 1.45; $p < 0.05$).

Self-Affirmation			147.491	4	36.87	5.07	< 0.001
			5501.302	756	7.28		
Multiple Comparison Test Results:							
Sports Betting	7.92	2.75					
Horse Racing	8.06	2.65					
Slots	7.46	2.81					
Poker	8.79*	2.41					
Casino Table Games	7.17	3.14					

*Significantly higher for poker than for sports betting (I-J: 0.86; $p < 0.05$), slots (I-J: 1.33; $p < 0.05$) and casino table games (I-J: 1.62; $p < 0.05$).

Risk & Excitement			45.311	4	11.33	1.64	0.16
			5220.672	756	6.91		
Multiple Comparison Test Results:							
Sports Betting	9.63	2.58					
Horse Racing	9.18	2.67					
Slots	10.05	2.89					
Poker	9.26	2.57					
Casino Table Games	9.86	2.93					

No significant differences between the gambling forms on risk and excitement.

Affiliation			298.131	4	74.53	10.03	< 0.001
			5627.052	757	7.43		
Multiple Comparison Test Results:							
Sports Betting	7.79	2.64					
Horse Racing	8.61	2.74					
Slots	7.71	2.93					
Poker	9.25*	2.7					
Casino Table Games	7.57	3.43					

*Significantly higher for poker than for sports betting (I-J: 1.46; $p < 0.05$) and slots (1.54; $p < 0.05$).

One-way ANOVA results: x̄ = mean; s = standard deviation; 1:.Between group differences; 2: Within group differences.
Gambling preference group samples: sports gambling (n = 446); horse racing (n = 69); slots (n = 70); poker (n = 174); casino table games (n = 40).

sports betting (2.53; $p < 0.05$), horse racing (1.68; $p < 0.05$), slots (3.74; $p < 0.05$) or casino table games (3.48; $p < 0.05$). Self-affirmation need satisfaction was also significantly higher for poker than for sports betting (0.86; $p < 0.05$), slots (1.33; $p < 0.05$) or casino table games (1.62; $p < 0.05$). Similarly, affiliation need satisfaction was higher for poker than for sports betting (1.46; $p < 0.05$) or slots (1.54; $p < 0.05$). By comparison,

Table 7. Differences in respondent health-related variables by dominant gambling preferences.

Health-Related Variables	x̄	s	Sum of Squares	df	Mean Square	F	p
Stress			9.38[1]	4	2.34	0.8	0.54
			2204.49[2]	748	2.95		
Multiple Comparison Test Results:							
Sports Betting	4.93	1.65					
Horse Racing	5.57	1.46					
Slots	5.08	1.42					
Poker	5	1.77					
Casino Table Games	5.26	1.44					
No significant differences between the gambling forms on player stress.							
Happiness			**34.78[1]**	4	8.7	4.27	0.002
			605.192	747	2.04		
Multiple Comparison Test Results:							
Sports Betting	5.77*	1.38					
Horse Racing	5.57	1.46					
Slots	5.08	1.42					
Poker	5.89**	1.51					
Casino Table Games	5.53	1.5					

*significantly higher for sports betting than for slots (I-J: 0.69; $p < 0.05$); **significantly higher for poker than for slots (I-J: 0.81; $p < 0.05$).

One-way ANOVA results; x̄ = mean; s = standard deviation; 1:.Between group differences; 2: Within group differences. Gambling preference group samples:
sports gambling (n = 446); horse racing (n = 69); slots (n = 70); poker (n = 174); casino table games (n = 40).

detachment need satisfaction was significantly higher for slots than for sports betting (1.45; $p < 0.05$).

Health-related variables

Table 7 contains the results from a one-way ANOVA with multiple comparison tests using a Games-Howell procedure to examine differences in respondent health ratings (for stress and happiness) based on dominant gambling preference. There were no significant differences in levels of stress in relation to dominant gambling preference. By comparison, there were significant differences in levels of happiness reported in relation to dominant gambling preference, but with only a small effect size ($eta^2 = 0.02$). Post hoc multiple comparison tests showed that those with a dominant preference for sports betting (0.69; $p < 0.05$) or poker (0.81; $p < 0.05$) reported higher levels of happiness than those with a dominant preference for slots. Two-way between groups ANOVAs showed no significant interaction effects between dominant gambling preference and age ($F(16, 749) = 0.81$; $p = 0.68$), gender ($F(4, 749) = 0.39$; $p = 0.40$) or country of residence ($F(14, 749) = .94$; $p = 0.52$) in relation to happiness. In other words, the relationship between level of happiness and dominant gambling preference was not influenced by these variables.

Discussion

A large body of research has demonstrated that leisure participation may satisfy psychological needs that may, in turn, contribute to overall increased levels of SWB (Newman et al., 2014). Guided by previous research in leisure studies, we examined the potential psychological needs which are satisfied through gambling participation. We also examined how need satisfaction relates to preference for different forms of gambling, and, in turn, how this preference relates to different health-related variables. Moreover, the primary focus in the gambling literature is on motivation rather than psychological need satisfaction. Therefore, we were also interested in the extent to which the established motives correspond with satisfied needs in the context of gambling participation.

This study has validated a five-dimensional model of gambling psychological need satisfaction. The dimensions, which we have called challenge and mastery, detachment, self-affirmation, risk and excitement and affiliation support existing motivational theories of gambling participation and corroborate the findings of previous empirical gambling research. The individual dimensions have been found in the following studies: mastery (Binde, 2013; Canale et al., 2015; Cotte, 1997; Wardle et al., 2011); relaxation and escape (Binde, 2013; Dow-Schüll, 2002; Fang & Mowen, 2009; Lloyd et al., 2009; Wardle et al., 2011); self-affirmation (Cotte, 1997; Haggard & Williams, 1991; Hussain & Griffiths, 2008; Loroz, 2004; Wood et al., 2007); excitement (Binde, 2013; Lloyd et al., 2009; Neighbors et al., 2002; Platz & Millar, 2001; Wardle et al., 2011); social motivations (Binde, 2013; Cassidy, 2012; Lloyd et al., 2009; Sheeran & Orbell, 1999; Wardle et al., 2011). This also suggests that the gambling motivation dimensions correspond closely with psychological need satisfaction dimensions in the context of gambling participation.

Different dimensions were associated with preferences for different forms of gambling. These relationships have face validity where logical links exist between game properties and the psychological mechanisms involved. For example, games such as poker involving an element of skill and social interaction, even in digital formats, are more likely to be associated with mastery and affiliation needs (Bjerg, 2010; Cotte & Latour, 2009). It is interesting to note, however, that sports betting was not linked to mastery in the current study despite sports betting involving an element of skill (Toutkoushian, 2011; Valero, 2016). It could be that sports bettors in this study were not motivated to satisfy the need for mastery but rather to enhance the entertainment value of the sport itself by making it more exciting (Bonnaire, Bungener, & Varescon, 2006).

While we found no variation in reported levels of stress in relation to gambling preference, consistent with other literature (Binde, 2013; Dow-Schüll, 2012; Scannell, Quirk, Smith, Maddern, & Dickerson, 2000; Sundqvist et al., 2016; Wood & Griffiths, 2007), we found that a dominant preference for slot style games was associated with detachment needs. Moreover, gamblers with a preference for slot games reported lower levels of happiness compared with those with a preference for either sports betting or poker, and there were no significant differences in these findings on the basis of participant demographics. These findings merit further empirical investigation particularly with a dedicated sample of slot gamblers, considering if and how the detachment

mechanism may prompt risky behaviour. One promising line of enquiry for future research would be to explore how needs such as social interaction and the formation of social networks linked to poker (O'Leary & Carroll, 2013) may be more adaptive than the detachment needs more commonly associated with slot machine play. Such questions are important for expanding our understanding of sustainable approaches to leisure and for preventing gambling-related harm.

Conclusions

The current study makes a significant contribution to leisure and gambling research by providing greater clarity about how gambling participation can satisfy psychological needs. Forrest (2013, p. 25) in his assessment of the costs and benefits associated with gambling participation suggests '*gambling benefits very many people, each by a little, and hurts a rather smaller number of people, but each by a lot*'. This paper represents an important first step in understanding the psychological needs that may underpin such costs and benefits in a gambling context. An important next step is exploring the relations between psychological needs and disordered gambling, and with a longer-term aim to develop a model to understand how benefits and harms contribute to overall SWB of gambling participants.

Psychological need satisfaction in leisure has not previously been considered in relation to gambling participation. This study therefore makes a theoretical contribution by exploring psychological need satisfaction in this context. More specifically, it has empirically evaluated Newman et al.'s (2014) theoretical DRAMMA model in relation to gambling and verified the relevance of three of Newman et al.'s (2014) psychological needs of leisure in relation to gambling participation: 'detachment', 'mastery' and 'affiliation'. However, the findings from this study suggest that 'self-affirmation' (Haggard & Williams, 1991) rather than 'meaning' (Newman et al., 2014) and 'risk and excitement' (Pantalon et al., 2008; Wulfert et al., 2008) rather than 'autonomy' (Loroz, 2004) are more relevant needs which may be satisfied through gambling.

The finding that detachment need satisfaction was significantly higher for slots than for sports betting provides additional support for trialling certain harm minimisation and clinical initiatives. For example, where evidence suggests that players are more likely to be driven by detachment needs, this lends further support to trialling player protection tools such as reality checks and time limits in order to better manage the process of detachment. Alternatively, such gamblers presenting for treatment may benefit more from therapies emphasising proactive coping skills (e.g. cognitive behavioural therapy) or from being directed to alternative leisure options for rest and recovery from stress.

While the findings contribute to knowledge, the study should be considered in light of certain limitations. First, there is limited research on psychological need satisfaction in a gambling context with which to compare the findings. Second, the sample was derived from one Internet gambling provider and was self-selected; in combination with the low response rate and the preponderance of Swedish participants in the sample, this means that the results may not be representative of online gamblers more generally. Additionally, the large majority of the sample was male, although this is proportional to the gender imbalance in Kindred Group Plc's customer profile and

there were no significant differences in the results on the basis of gender. Consequently, while the sample represents gamblers who participate in a range of activities, this work should be replicated in a wide array of settings including both online and offline environments and also include a larger sample of female gamblers. Third, a further potential limitation of this study is that the relationship between the psychological need dimensions and different forms of gambling could only be tentatively explored because comparisons were only possible on the basis of preferences for dominant gambling forms. This did not permit straightforward analyses since customers may play more than one activity on a frequent basis.

Further research should establish the external validity of the psychological need dimensions which were found to be satisfied through gambling participation. Previous research found autonomy to be an important motivation for gambling participation (Loroz, 2004; Parke et al., 2012; Rodriguez et al., 2015), but this was not found in this study. While the five-factor model showed the best fit with this particular sample, the nature of autonomy both as a driver and as an outcome of gambling participation warrants further empirical investigation.

Another critical next step in this research is to examine how the satisfaction of psychological needs might relate to disordered gambling behaviour and gambling-related harm. While this study identified reports of various needs being satisfied through gambling, we were unable to say to what extant need satisfaction through gambling is maladaptive and harmful. However, there is preliminary evidence that pursuing detachment needs through gambling presents greater risk than other needs. Further research should prioritise comparing the needs and experiences of gamblers engaged in different gambling activities, paying particular attention to how need satisfaction can be enhanced, and associated harms prevented or reduced. Future research should also include more established instruments such as the General Health Questionnaire (GHQ; Goldberg, 1972); or the Oxford Happiness Inventory (OHI; Hills & Argyle, 2002) and some measure of disordered gambling to examine its potential mediating role between gambling participation and SWB.

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Competing interests

Constraints on publishing

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