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Effects of Personality and Gender on Fantasy Sports Game Participation: The Moderating Role of Perceived Knowledge

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Abstract Although 30 million individuals are engaged in fantasy sports games in the United States, little is known about the personality, attitudes, and intentions of fantasy sports game participants. This study ($N = 244$) explored the role of gender, sensation seeking (SS), locus of control (LOC), and need for cognition (NFC) in predicting attitudes and intentions relative to participating in fantasy football league. A domain-specific construct (e.g., perceived football knowledge: PK) was employed as a moderator to control the potential attenuating effects of personality and related human behavior. A moderated multiple regression technique (MMR) examined the first-order and lower-order interaction effects on attitudes and behavioral intentions toward fantasy games. For males ($n = 123$), SS, LOC, and PK were related to both attitudes and intentions toward participating and PK acted as a moderator between LOC and intentions. For females ($n = 121$), none of the personality traits was associated with attitudes or intentions. The applied and theoretical implications of the findings are discussed along with future directions for research.

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Introduction

Participation in sport-related fantasy games is one of the hottest trends among internet users (Kelly 2008). According to Fisher (2008), an estimated 29.9 million people in the United States and Canada participate in some type of fantasy sports game, representing a 54% increase from previous years. Fantasy football is largely considered the most popular and widely used fantasy game with an estimated 11.7 million unique users (Fisher 2007b). Fantasy game participants spend more than $1.5 billion per year with an approximate market size expansion of 7-to-10% annually (Roy and Goss 2007). Despite the proliferation of fantasy games, the participants engaged in them have received little attention from scholars. The present study adds to the body of knowledge related to fantasy games by investigating individual differences among fantasy game participants and the effects these differences have on fantasy game participation.

Although federal law declares that fantasy games do not comprise "an illegal bet or wager as a matter of law" (Moorman 2008, p. 233), previous research has suggested that fantasy games contain major characteristics of gambling. This is primarily because of the characteristics discussed below. Fantasy games often result in potential monetary loss or gain (Stein 2009). The vast majority of fantasy game providers or social leagues require participants to pay entry fees or fees for trades, acquisitions, etc. In exchange for these fees, participants gain entry into the league and are often awarded prize money based on overall performance and final standings (Bernhard and Eade 2005). For example, some higher-stake fantasy game providers distribute winnings of anywhere from a few thousand dollars to sometimes even up to $300,000 (e.g., World Championship of Fantasy Football, Ultimate Fantasy Football League, National Fantasy Baseball Championship). For these high-payout services, participant entry fees range from $20 to $5,000 which are collected up front and a portion of which is eventually distributed to the winners. According to the Fantasy Sports Trade Association (2009), the average fantasy participant spends over $460 annually on fantasy game related purchases and uses the Internet 3 h a week just to manage her/his virtual team. Given the excessive amount of time and money spent online and the inherent natures of outcome uncertainty, fantasy games can be considered addictive (Davidson 2002). Additionally, some reports (e.g., Liberman 2001) have suggested that online fantasy games are comparable to various types of point spread gambling. Therefore, an implication of this research is that the frameworks employed to study gambling behavior may be applicable to study the determinants of participation in fantasy games.

There is research support (e.g., Zuckerman 1994) for the significant relationship between gambling behavior and certain types of personality traits such as sensation seeking (SS), locus of control (LOC), and need for cognition (NFC). Such research is reinforced by studies finding that gambling serves the function of psychological arousal reinforcement (Coventry and Constable 1999). Some experimental studies, however, have reported contradictory results. For example, Anderson and Brown (1984) discovered a positive relationship between SS and bet size. Likewise, other studies found a significant relationship between SS and involvement in gambling (Dickerson et al. 1987), future intention to participate in gambling (Wolfgang 1988), and involvement in a variety (e.g., slot machines, sports betting, cards) of gambling forms (Coventry and Brown 1993).

Conversely, a few studies (e.g., Dickerson et al. 1990) have failed to find SS as a significant influence on gambling behaviors.

Aasved (2002) provided a reasonable explanation for the two conflicting empirical directions in the gambling research literature. Aasved argued that one of the problems in gambling research studies is the failure to take into account the heterogeneity of gambling forms. This is important as there are numerous forms of gambling such as sports betting and card games. While Petry (2003) suggested that certain gambling forms (e.g., horse racing) are high SS activities and other gambling forms (e.g., slot machines) are low SS activities, no studies have been found examining the relationship between SS and fantasy sports game participation. Therefore, this study fills this void in the SS literature and addresses the issue of heterogeneity by examining one specific form of gambling: fantasy sports games.

In addition, in personality literature, Kassarjian and Sheffet (1991) identified several potential drawbacks of directly linking personality traits to a domain-specific consumption behavior. They noted that low explanatory power and non-significant findings are the results of such a shotgun approach—where a convenient, available, and easily scored personality instrument is administered without any a priori hypotheses or solid theoretical justification (i.e., problematic conceptualizations on the single relationship between personality and certain behavior). Kassarjian and Sheffet suggested that examining the interaction effects of relevant variables and personality may be fruitful for understanding certain behaviors. Thus, in order to address the potential drawbacks noted above, the current study includes a domain-relevant construct as a moderator variable to explain fantasy game participation. More specifically, the study incorporates perceived sports knowledge (PK), considered a major motivating factor in choosing to participate in a fantasy game (Davis and Duncan 2006), as a moderating variable. Therefore, the purpose of this study was to gauge the moderating role of PK in the relationship between personality traits (i.e., SS, LOC, and NFC) and fantasy sports game participation. In order to understand the theoretical principles and empirical evidence regarding the research questions, the review of literature below first details how certain personality traits are related to fantasy games and gambling activities. This is followed by an examination of the literature related to the critical role of perceived background knowledge in fantasy games participation, considering the uniquely inherent nature of fantasy games (e.g., winning probability based on players' statistics, drafting players, submitting lineups). Finally, the review of related literature concludes with an overview of studies focused on gender effects on fantasy games.

Literature Review

SS and Fantasy Games

Zuckerman (1994) noted a positive relationship between SS and risk-taking behaviors, indicating that high-sensation seekers (HSS) underestimate risk and anticipate arousal as more positive than low-sensation seekers (LSS). Other studies (e.g., Coventry and Norman 1998) supported this by showing that gambling serves the function of arousal reinforcement. However, empirical findings linking SS and gambling behavior are mixed (Dickerson and Baron 2000). For instance, some studies (e.g., Breen and Zuckerman 1999) found SS significantly associated with gambling behaviors (e.g., betting size, behavioral intentions to gamble, gambling frequency) while the results of other studies (e.g., Coventry and Constable 1999) failed to link SS with gambling behaviors.

Different gambling activities offer participants experiences with varying degrees of arousal potential (McDaniel and Zuckerman 2003). In fantasy sports games, participants experience the excitement of managing their own teams and players. As Davis and Duncan (2006) noted, participants act as "front office members of multi-million dollar sports teams, wheeling and dealing commoditized players and allowing owners to experience the thrill of competition and victory" (p. 247). Furthermore, Farquhar and Meeds (2007) found that arousal is a major motivation for participating in fantasy games. While participation in fantasy games involves both unique arousal experiences and risk-taking decision making processes, no study has examined the relationship between participants' needs for stimulation and participation in fantasy games.

NFC and Fantasy Games

The NFC personality variable developed by Cacioppo and Petty (1982) is a commonly used measure of the motivation needed to exert a cognitive effort. As most of the work on NFC involved other areas of research (e.g., communication studies), little is known about the role of NFC in fantasy sports game participation. Previous studies (e.g., Haugtvedt et al. 1992) suggested that NFC is significantly related to various cognitive activities. Furthermore, Walker (1992) suggested that each form of gambling can be located on a luck-skill continuum. The outcome of skill-based gambling (e.g., fantasy games) is determined by strategic play controlled by gamblers, while luck-based gambling (e.g., slot machines) is largely based on pure chance. Thus, it can be hypothesized that an individual's NFC level is positively related to fantasy game participation, because participation demands certain levels of cognitive load and information processing in terms of the calculation of odds, the drafting and trading of players, and familiarity with using the fantasy game and sport-related websites as noted by Davis and Duncan (2006).

LOC and Fantasy Games

As noted earlier, an individual's cognitive style is a factor that characterizes a gambler's behaviors. Among other cognitive mechanisms, numerous studies have suggested that gambling is associated with cognitive biases (Coventry and Norman 1998; Ladouceur 2004). Gamblers often operate under several cognitive mechanisms that involve erroneous perceptions, including illusions of control (Dixon 2000), belief in control (Moore and Ohtsuka 1999), irrational thinking (Delfabbro and Winefield 2000), superstitious thinking (King 1990), and belief in "hot" and "cold" numbers (Webley et al. 1997).

The biased perceptions noted above are generally associated with Rotter's (1966) locus of control. A study put forth by Lester (1980) suggested that internals (i.e., people who believe the end-results are the consequences of their own behavior) are more likely to engage in skill-based gambling (e.g., poker and blackjack), whereas externals (i.e., individuals who attribute consequences to luck or fate) are positively related to luck-based gambling (e.g., slots, craps, and roulette). Further, Ladouceur (2004) and Moore and Ohtsuka (1999) noted that some people believe that players' concentration or thinking positively could facilitate winning the game of chance. Because of these beliefs or perceptions, individuals with an internal LOC may have more favorable attitudes and intentions toward fantasy game participation than individuals with an internal LOC.

PK and Fantasy Games

Perceived sports (e.g., football) knowledge (PK) is a major motivating factor for fantasy game participants. This is because a main characteristic of fantasy game participation is an emphasis on possessing, securing, and using sports knowledge, as a large amount of time is spent gathering statistical sports information (Davis and Duncan 2006). Given that participants are involved in almost every phase of the fantasy game sports team's development (e.g., drafting players, trading players, submitting lineups), participants use their sports knowledge as a component of their overall empowerment within the game. The possession and use of this knowledge could play a critical role in motivating them to continue their participation.

Some psychologists have argued that the inclusion of domain-specific variables (Kassarjian and Sheffet 1991) can address potential problems of asymmetry, which attenuates interrelationships between personality trait measures and the behavior of interests (Bosnjak et al. 2007). Including more domain-specific constructs and using theoretically relevant personality measures can provide further information contributing to a greater understanding of fantasy game participants. Therefore, based on the previous literature (e.g., Davis and Duncan 2006) regarding fantasy sports game participation, the current study incorporated the fantasy sports game participants' PK as a domain-specific construct in linking personality variables and fantasy sport game participation behavior.

Gender and Fantasy Sports Games

Gambling preferences, according to the literature, involve unique gender differences. For example, Kassinove (1998) noted that male participants show significantly greater preference for games of skill (e.g., horse racing). Delfabbro and Winefield (2000) added that males are more likely to participate in games of skill (e.g., cards), while females prefer games of chance (e.g., slot machines) and more variety in gaming activities. Furthermore, Potenza et al. (2001) found that males preferred the strategic and social gambling activities while females preferred the non-strategic and less social gambling forms. Given that fantasy sports games can be categorized as a gambling form considered more strategic (e.g., analyzing player statistics) and social (e.g., interaction with other participants) and that fantasy sports games share many characteristics with games of skill, it can be hypothesized that males would show a higher preference for participation. While this is a reasonable hypothesis as it reflects Davis and Duncan's (2006) finding that fantasy games are a male-dominated phenomenon, Fisher (2007a) added that the number of female participants involved continues to grow.

Methods

Subjects and Design

Data collection utilized a convenience sampling approach of college students attending a large eastern university in the United States. A college student sample was used because Fisher (2007a) noted the majority of active fantasy game participants were of a younger generation. The current study employed an online survey method. Data collection began 2 weeks prior to the commencement of the National Football League (NFL) season and continued for 3 weeks, because this is the period of time that most fantasy football sites recruit fantasy sports participants and begin their operations. In all, 244 individuals

(18 years of age and older) agreed to participate and provided completed questionnaires. The sample was comprised of 51% males ($n = 123$) and 49% females ($n = 121$). Ages ranged from 19 to 37, with a mean age of 22.03 years. The majority of the respondents were Caucasian ($n = 160$, 66%), followed by Asian-American ($n = 42$, 17%) and African-American ($n = 25$, 10%). Among the various types of fantasy games (e.g., celebrity, golf, baseball), fantasy football leagues were selected for the study because they constitute the most popular fantasy games (Kelly 2008).

Measures

Demographic Measures

Demographic questions included gender, age, race/ethnicity, and education level.

Impulsive Sensation Seeking

Zuckerman's (1994) 19-item ImpSS scale was employed to measure individual differences in SS tendencies. The Impulsive Sensation Seeking (ImpSS) is part of the larger Zuckerman–Kuhlman Personality Questionnaire (ZKPQ) and is comprised of eight items gauging impulsivity (Imp) and 11 items measuring SS (Zuckerman et al. 1993). It has been suggested that the ImpSS scale is a valid and reliable alternative to the 40-item Sensation Seeking Scale Form V (SSS-V), given its greater simplicity and its generality in content (Haynes et al. 2000; Zuckerman 1996). It does not, for example, describe specific activities, such as drinking or sexual behaviors (McDaniel and Mahan 2009).

Need for Cognition

Respondents' tendencies to enjoy cognitive activities were measured by the 18-item NFC scale (Cacioppo et al. 1984). The NFC scale has been extensively used and tested as a reliable and valid instrument; reported coefficient alpha for the scale was .90.

Locus of Control

Participants' LOC was measured using the locus of control scale developed by Rotter (1966). It is composed of a 23-item, forced-choice questionnaire in which each statement or item is followed by a set of two responses or a pair of alternatives lettered A or B. Respondents were required to select only one statement from each pair which they "more strongly believe to be the case." One point was given for each 'external' statement selected, while zero point was given for each 'internal' statement selected (Rotter 1966).

Perceived Football Knowledge

Participants' perceived football knowledge questionnaire was adapted from Brucks' (1985) three-item perceived knowledge (PK) scale. The measure asked the subjects to use a seven-point semantic differential scale to respond to the following statement: "Rate your knowledge of fantasy football games compared to the average user," "Rate your confidence in using fantasy football games compared to the average user," and "I feel confident about my ability to comprehend fantasy football games."

Table 1 Descriptive statistics and intercorrelations ($N = 244$)

	Mean	SD	α	1	2	3	4	5	6
Predictor									
1. ImpSS	8.70	4.57	.82	1					
2. LOC	14.21	2.44	.70	−.23*	1				
3. NFC	57.52	9.19	.86	.03	.18*	1			
4. PK	12.05	5.63	.97	.08	−.09	.10	1		
Criteria									
5. Attitude	15.33	5.56	.98	.04	−.15*	.03	.63*	1	
6. Intention	7.95	4.81	.98	.13*	−.16*	.11	.69*	.65*	1

ImpSS Impulsive Sensation Seeking, *LOC* locus of control, *NFC* need for cognition, *PK* perceived football knowledge

* $p < .05$

Attitudes/Intentions

Respondents' attitudes toward fantasy football game were measured by a five-item hedonic attitude scale developed by Voss et al. (2003). Participants were asked to rate their overall attitude toward fantasy football games on the following dimensions: fun, exciting, delightful, thrilling, and enjoyable, on a five-point Likert type scale.

Respondents were also queried about their behavioral intentions to participate in fantasy football games. The questionnaire used in the study was adapted from Mackenzie et al. (1986), and responses were measured by a five-point semantic differential scale (i.e., improbable/probable, likely/unlikely, and impossible/possible). Overall, as measured by Cronbach's α, all measures used in this study had an acceptable reliability, indicating that the measures had good internal consistency (see Table 1).

Results

Descriptive Statistics and Correlations

In addition to the coefficient alpha reliabilities numbers noted above, descriptive statistics including Cronbach's α and variable intercorrelations are also shown in Table 1. As measured by coefficient α, reliability exceeded .95 for both attitudes and intentions. Reliabilities for all three personality traits and PK were over .70, indicating that all measures had good consistency. Significant, positive correlations were found between PK and the two dependent variables as well as ImpSS and intentions. On the other hand, significant, negative associations were found between LOC and the two criteria. ANOVA results showed that ImpSS [F (1,242) = 3.89], LOC [F (1,242) = 7.89], NFC [F (1,242) = 4.24], PK [F (1,242) = 84.51], attitudes [F (1,242) = 68.82], and intentions [F (1,242) = 210.88] were significant ($p < .05$) functions of gender.

Tests of Validity of Assumptions

Before conducting the main analyses [i.e., moderated multiple regression (MMR)], three principle assumptions (i.e., normality, linearity, and homoscedasticity) which justify the

operation of linear regression models were tested. In order to gauge normality, kurtosis and skewness scores from all variables were measured. All scores were within the acceptable level (i.e., ±2) except for one item from LOC, indicating that the distribution approximates a normal distribution (Hair et al. 2009). Plots of the residuals against 10 items from independent and dependent variables were observed in order to test linearity of the regression. Following Hair et al.'s (2009) procedure, 10 items were randomly selected (i.e., eight items from independent variables and two from dependent variables) to cut cross the process. All residual plots revealed no departures from the assumption of linearity. Similar to testing linearity, plots of the residuals against 10 randomly selected items were monitored to identify homoscedasticity (i.e., constant variance). The results showed residuals plotted against predicted values, with no clear departure from the homoscedastic assumption.

Moderated Multiple Regression Analyses

A series of MMR analyses (West et al. 1996), similar to the procedure used by Siu (2003), was conducted to test the moderating effects of perceived football knowledge (PK) on the personality–attitude/intention relationships. MMR increases statistical power, especially when the model has categorical moderators between continuous predictors and dependent variables (West et al. 1996). Thus, following Cohen and Cohen (1983), a dummy variable based on total PK scores was created by using a median split—high and low PK groups. Before entering the continuous variables (i.e., ImpSS, LOC, and NFC) into the analyses, deviation scores were used in order to perform "centering" (an action involving the converting of the predictor by deducting its original mean value from all observed values and thus the new predictor has an identical distribution with a mean of zero). This procedure, although it has no impact on the slope of the interaction term, minimizes problems associated with predictor multicollinearity and eases the interpretation of the non-product terms in the final regression model (Cohen and Cohen 1983; West et al. 1996). In regressing participants' adaptation to fantasy sports games on the personality variables, two steps were conducted on each of the two dependent variables in the study (i.e., attitudes and intentions) by entering first order effects (i.e., ImpSS, LOC, NFC, and PK) followed by the addition of the hypothesized lower-order interactions on the second steps of each model. Finally, when data for the entire sample were examined, gender was found to moderate many of the relationships among the major predictors and outcome variables (see "Descriptive Statistics and Correlations"). Furthermore, the sample size is large enough not to consider the reduction of statistical power (i.e., over 120 samples in each regression equation) or the distortion of results (Jusko and Shively 2005). As a consequence, all regression analyses were conducted separately by gender.

Influences of Personality and PK on Attitudes

Data analyses revealed that the significant first order effects involving the independent variables on male participants' fantasy football game attitudes were LOC ($\beta = -.26$, $p < .05$) and PK ($\beta = .46$, $p < .05$). Furthermore, the lower-order interaction between LOC and PK was also significant ($\beta = .20$, $p < .05$) with the change in adjusted $R^2 = 4\%$ (see Fig. 1). The overall model demonstrated 24% of the variance in the participants' intentions to participate in fantasy football games with a significant model fit [F (7, 116) = 5.69, $p < .05$]. However, the only significant first order effect on female participants' attitudes toward fantasy sports games was PK ($\beta = .29$, $p < .05$). None of the

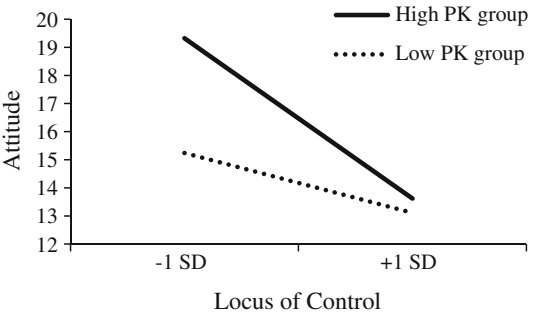

Fig. 1 Regression lines for relationship between LOC and attitudes as moderated by PK in males. Low score = 1 SD below the mean; high score = 1 SD above the mean. Only scores ± 1 SD from the mean of LOC are plotted

Table 2 Influences of personality, PK, interactions on attitude ($N = 244$)

Variable	Men ($n = 123$)		Women ($n = 121$)	
	$\beta 1$	$\beta 2$	$\beta 1$	$\beta 2$
Step 1				
ImpSS	−.07	−.07	.08	.04
LOC	−.26*	−.24*	.07	.02
NFC	.02	.10	−.08	−.13
PK	.46*	.51*	.28*	.29*
Step 2				
ImpSS × PK		−.05		−.04
LOC × PK		.20*		−.09
NFC × PK		−.13		−.09
ΔR^2	.25	.14	.09	.01
ΔF	8.18*	3.10*	3.03*	.55
Adjusted R^2	.20	.24	.06	.05
F	8.18*	5.69*	3.03*	1.95

ImpSS Impulsive Sensation Seeking, *LOC* locus of control, *NFC* need for cognition, *PK* perceived football knowledge

* $p < .05$

interaction effects put into the second step was significant in increasing additional variance explained in the final model (Table 2).

Influences of Personality and PK on Intentions

Similar to the steps mentioned above, the effects of first order variables and lower-order interactions were entered hierarchically into regression analysis to examine their potential effects on behavioral intentions. The significant relationships found between male subjects' intentions and the independent variables were ImpSS ($\beta = .23$, $p < .05$), LOC ($\beta = -.18$, $p < .05$) and PK ($\beta = .58$, $p < .05$). The second step of the model indicated that the addition of the LOC × PK interaction terms significantly improved the variance explained in the model by an additional 4% [F (7, 116) = 5.69, $p < .01$] (see Fig. 2). The directionality of the β coefficient revealed that those who scored low in LOC (internals) and high in ImpSS (high sensation seekers) were more likely to have positive attitudes toward fantasy games and thus had more intentions to participate in the games than participants who had higher LOC scores (externals) and lower ImpSS scores (low sensation seekers). However, for females, the only significant relationship found between intentions and the

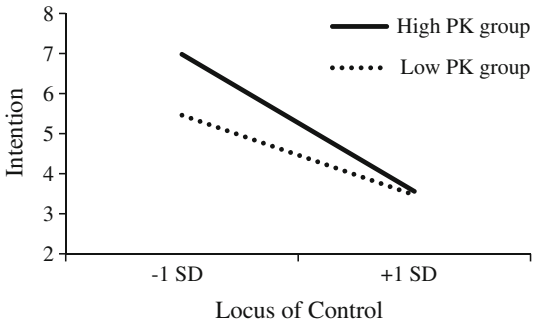

Fig. 2 Regression lines for relationship between LOC and intentions as moderated by PK in males. Low score = 1 SD below the mean; high score = 1 SD above the mean. Only scores ± 1 SD from the mean of LOC are plotted

Table 3 Influences of personality, PK, interactions on intention ($N = 244$)

Variable	Men ($n = 123$)		Women ($n = 121$)	
	$\beta 1$	$\beta 2$	$\beta 1$	$\beta 2$
Step 1				
ImpSS	.22*	.23*	.12	.13
LOC	−.18*	−.18*	−.03	−.05
NFC	.01	.09	.05	.11
PK	.58	.65	.24	.26
Step 2				
ImpSS × PK		−.09		−.02
LOC × PK		.29*		−.05
NFC × PK		−.09		.12
ΔR^2	.35	.84	.08	.01
ΔF	15.15*	5.43*	2.56*	.49
Adjusted R^2	.33	.40	.05	.04
F	15.15*	12.00*	2.56*	1.62

ImpSS Impulsive Sensation Seeking, *LOC* locus of control, *NFC* need for cognition, *PK* perceived football knowledge

* $p < .05$

independent variable was for PK ($\beta = .28$, $p < .05$). The addition of the three interactions on the second step of the model did not have the hypothesized effect [F (7, 114) = 1.95, $p > .05$] (Table 3).

Discussion

This study focused on examining the moderating effect of perceived football knowledge (PK) on the relationship between personality and participants' attitudes toward and intentions to participate in fantasy sports games. Specifically, this study contributes to the gambling literature by comparing male and female respondents' influences of personality traits on fantasy sports game participation.

The results of this study partially supported the proposed hypotheses. For each gender, the results highlighted that both attitudes and intentions were significant functions of PK. The influence of PK was stronger for males than for females. This finding—which provides initial support to Lyons and Henderson's (2005) hypotheses—illustrates that the respondents who reported a higher PK also reported significantly greater attitudes and intentions

to participate in fantasy games than did the respondents who reported a lower PK. The significance of PK also supports the previous finding by Davis and Duncan (2006) that participants use their sports knowledge as a tool to outperform other participants.

In terms of the personality effects, the results showed that certain personality traits (e.g., LOC, ImpSS) were significant predictors of attitudes and intentions among male respondents. For female respondents, however, personality characteristics had no significant effects on attitudes and intentions toward fantasy games. It is interesting that individual personality characteristics did not play an influential role in explaining fantasy game participation for females. However, researchers (e.g., Browne and Brown 1994; Coventry and Constable 1999; Delfabbro and Winefield 2000) have noted gender differences in gambling preferences as females prefer games of chance, males prefer games of skill, and that males are significantly more involved than are females in betting on sports. Given that certain skill-relevant decision-making processes (e.g., player drafts, trades) and sports knowledge play critical roles in fantasy game participation, it could be argued that males in general would have higher attitudes and intentions toward fantasy sport games than do females. Furthermore, Davis and Duncan (2006) argued that fantasy sports games are a male-dominated activity emphasizing sports knowledge, competition, male bonding, and traditional gender roles. Therefore, it could be hypothesized that for the females in this study, gender-role socialization was more influential than individual differences in influencing them to participate in fantasy games.

With respect to attitudes toward fantasy game participation, LOC was a significant predictor in males. In particular, internal LOC was significantly associated with favorable attitudes toward fantasy sports game participation. This result is similar to previous studies (e.g., Browne and Brown 1994; Lester 1980), indicating that people who believe in 'luck' are more likely to engage in chance-based games, whereas those who believe in 'self-agency' are more likely to engage in skill-based games. Browne and Brown also found that internal beliefs were significantly related to sports betting, which males have been reported to be more involved with than are females. Furthermore, the moderating role of PK in the associations between personality and fantasy game attitudes and intentions was assessed by using interaction terms in the regression analyses. The results showed that PK moderated the relationship between LOC and attitudes/intentions such that the relationship between LOC and the dependent variables (i.e., attitudes and intentions) is stronger (i.e., steeper slope) for the high PK group as compared to low PK group (see Figs. 1 and 2). This finding suggests that internals are more likely to engage in fantasy sport games if they possess a greater knowledge of football. However, the effect of football knowledge on externals' attitudes and intentions to participate in fantasy football league is not as significant as the effect on internals' attitudes and intentions. As previous research (Lester 1980) has suggested that internal LOC is associated with skill-based gambling activities, it does seem plausible that people who feel more knowledgeable about the context of the game and have a sense of control in their life events would have higher attitudes and intentions toward fantasy sports games. Additionally, PK may reflect the motivation to learn about the sport. For instance, individuals with high PK about sport would be motivated to search for more information about their teams and players, which is linked to the fantasy sport participation (Davis and Duncan 2006; Kwak et al. 2010). Another possible explanation of the moderating effect is that such a relation between thought-related motivations (i.e., LOC) and desire for strategic gambling could logically depend on the richness of one's PK, which is supported by Ranyard and Charlton's study (2006). They compared four cognitive processes (i.e., odds-based, money-based, knowledge-based, and other processes) underlying two distinct types of gambling (lottery versus sports betting). From two series of

experimental studies, they found that participants were dependent more on background information and knowledge (i.e., football), rather than assessed odds and probabilities in the decision processing of sports gambling and vice versa. Given that fantasy sports games are considered a form of skill-based gambling activity and they are different from traditional gambling activities, the results revealed the importance of perceived background knowledge in fantasy sports games. Rather than thinking risk dimensions (e.g., odds, winnings, outcome probabilities), fantasy game participants seriously consider sports knowledge to judge their decisions. Such a phenomenon is more salient when participants have internal LOC.

Compulsive gambling and gambling addiction are essential issues in gambling studies (Dickerson and Baron 2000). Griffiths (1999) argued that 'hard gambling' with an instant outcome (e.g., slot machine) is more addictive in nature than is 'soft gambling' with its delayed outcome (e.g., sports betting, lottery). However, previous studies showed that fantasy games, even if they are considered a form of soft gambling, is very addictive (Fantasy Sports Trade Association 2009). One possible explanation for the addictive nature of fantasy games is their uniqueness in terms of participants' motivation. Various motivational factors of fantasy league participation were found, including economy (e.g., betting), escape, social interaction, knowledge, fantasy, achievement, and pass time, while those factors often serve as constraining factors as well (Suh et al. 2010). Among the motive factors, the fantasy factor is especially important in the current study as fantasizing about winning should be related to impulsivity, LOC, and PK. For example, It was found that fantasy proneness and impulsivity are positive related (McDaniel et al. 2000) and thus the fantasy factor (i.e., fantasizing about buying a luxury car, making a lot of money, winning a major prize) may lead to the compulsive participation in fantasy games. Moreover, the fantasy motive may be enhanced when a participant is over-confident in her/his knowledge and has a higher LOC level. Overconfidence certainly plays a huge role in fantasy sports (as well as other forms of gambling). Kwak et al. (2010) found that PK has a significant direct effect on inflated winning confidence in the fantasy sports context. In addition, some individual differences such as trait impulsivity could be responsible for such biased judgments about a chance-based event. However, the relationship between trait impulsivity and fantasy sport participation needs to be examined further in follow up studies. Perhaps impulsive individuals would be overly confident in their sports knowledge while participating in fantasy sports games.

Returning to factors that influenced behavioral intentions, ImpSS was a significant predictor in male respondents. Although previous research (Zuckerman 1994) has shown mixed results linking SS and gambling behaviors, this study's finding empirically supports the arousal theory which postulates that individuals in high need for arousal seek out certain activities (e.g., fantasy sports games) to maintain or increase their arousal to an optimum level. Actively engaging in fantasy sports games could function as boredom alleviation and as a way to increase arousal. Farquhar and Meeds (2007) found that arousal is one of the primary motivations for fantasy game participants. For high SS males, participation in fantasy sports games can be an arousing experience because it satisfies their optimum stimulation levels. While the current study found the significant influence of personality on attitude and intention, in order to better understand the addictive nature of fantasy games it is recommended that follow up studies examine how personality and certain types of motives (e.g., fantasy) interact to affect certain behaviors (e.g., compulsive participation).

Overall, this research connects underlying theories in emerging online user psychology. Specifically, the findings indicate that individuals who believe in self-agency and personal

control (i.e., internal LOC) and are willing to seek out novel and complex experiences (i.e., high SS) are more likely to engage in fantasy sports games than are their counterparts. The study implies that certain psychological factors related to gambling behavior can also be applied to predict fantasy sports game participation.

Although this study is the first known attempt to utilize the implications of individual differences and PK as useful constructs in studying fantasy sports game participants, the results of this study leave more to be investigated. First, other domain relevant factors (e.g., past experience, perceived ease of internet use) that might have affected the results were not accounted for in the model. Therefore, it is recommended that further studies use a pretest procedure to identify significant variables and incorporate them into the model. Second, because of the nature of data sampling, the subject pool used for this study was relatively homogeneous (i.e., 95% of participants were younger than 25 years). Although homogeneous subjects improve power for theory testing, they can negatively impact the study's relevance to other populations (Kempf 1999). To increase the generalizability of the results, future research needs to include broader subject populations. Another limitation of this study is that it is cross-sectional and based solely on self-reported data. While some studies have addressed different personality–gambling behavior relations (e.g., Dickerson and Baron 2000), experimentation and longitudinal studies are needed in the future to determine the direction of causality. Finally, due to a single study nature of the present study, replications and extensions to other types of fantasy sport games (i.e., baseball and basketball) are needed. Further, other types of applicable measures to gauge individual differences (e.g., extroversion/neuroticism) and emotional response are needed to validate the relationship. It would be also interesting to investigate the relationship between individual differences and specific consumption patterns in fantasy league sports (e.g., excessive financial involvement, multiple league participation).

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