8-27-2020

Perceived Social Norms in Relation to Internet Gaming and Problems among College Students

Qian Li

PERCEIVED SOCIAL NORMS IN RELATION TO INTERNET GAMING AND PROBLEMS

AMONG COLLEGE STUDENTS

by

Qian Li

A Thesis

Submitted in Partial Fulfillment of

the Requirements for the Degree of

Master of Science

Major: Psychology

The University of Memphis

August 2020

Abstract

To better understand college student's gaming behavior, the present study used an online survey to investigate how college students' Internet gaming and problems relate to the perceived descriptive and perceived injunctive social norms they hold. It was hypothesized that college students would report higher perceived descriptive norms for Internet gaming frequency and expenditure than their own self-reported behaviors. It was also hypothesized that both perceived descriptive norms and perceived injunctive norms would have a positive relation with Internet gaming frequency and problems. These hypotheses were partially supported. College students reported higher perceived descriptive norms for Internet gaming frequency and expenditure than their own reported behaviors. Additionally, it was found that gaming frequency was positively associated with perceived injunctive norms and Internet gaming problems. Gender differences were found. These findings provide recommendations for Internet gaming problem intervention

Table of Contents

Introduction

High levels of engagement in addiction-related behaviors such as gambling and Internet gaming are associated with increased likelihood of experiencing negative consequences. Consistent with the theory of planned behavior (Ajzen, 1991), perceived social norms have been found to predict the experience of addiction-related problems and levels of engagement in behaviors, such as substance use and gambling among college students (Perkins & Berkowitz, 1986; Cooper, et al., 2016; Larimer & Neighbors, 2003; Sherry, Lucas, Greenberg & Lachlan, 2006). An evaluation of perceived social norms should help us to better understand both the involvement and risk taking of Internet gamers. The purpose of this study was to examine perceived social norms in relation to Internet gaming participation and gaming problems among college students.

Internet gaming

High levels of Internet gaming involvement are associated with various problems for young adults including reduced sleep, attention problems and poorer school performance (Anand, 2007; Gentile, 2009; Rehbein, Psych, Kleimann, Mediasci, & Mößle, 2010; Wang, et al., 2014). The range of Internet gaming disorder prevalence rates for adolescents varies from 1.7% in Germany (Rehbein, Psych, Kleimann, Mediasci, & Mößle, 2010), 8.5% in the US (Gentile, 2009) to 15.6% in Hong Kong (Wang et al., 2014). Kuss (2013) suggested that the wide range of the prevalence rates might be due to several factors, such as diverse conceptualizations of Internet gaming disorder and different measurements to assess gaming problems.

Evidence about problems related to Internet gaming involvements has received consideration as a psychiatric disorder. The fifth edition of the Diagnostic and Statistical Manual had included Internet gaming disorder as a condition for further study (APA, 2013). While in the

11th edition of the International Classification of Diseases (ICD-11), the World Health

Organization included gaming disorder as a clinically recognizable mental health problem

(World Health Organization, 2018). In the present study, DSM-5 diagnostic criteria of Internet

gaming disorder were employed to assess Internet gaming problems.

Internet gaming has become the norm among college students (Greenberg, Sherry,

Lachlan, Lucas, & Holmstrom, 2010). Seventy percent of college students reported playing

Internet games (Jones, 2003) and 54% of US gamers are men (ESA, 2019). On average, male

college students reported spending 16 hours per week playing video games, almost twice the

weekly average of 9 hours for female students (Greenberg, Sherry, Lachlan, Lucas, &

Holmstrom, 2010). Social motives were often reported reasons for Internet gaming, along with

motives of challenge, competition, diversion, arousal and fantasy (Sherry, Lucas, Greenberg &

Lachlan, 2006). Therefore, it is important to understand how gamers perceive others' gaming

involvement and how these perceived social norms relate to their own gaming involvement and

gaming problems.

Perceived Social Norms and Health Behaviors

Perceived social norms have been studied as a way to understand what might lead to

engagement in addiction-related behaviors over time, such as substance use and gambling

(Perkins & Berkowitz, 1986; Cooper, et al., 2016; Larimer & Neighbors, 2003; Sherry, Lucas,

Greenberg & Lachlan, 2006). There are two types of perceived social norms, perceived

descriptive norms and perceived injunctive norms. Perceived descriptive norms can be

understood as how often or with what intensity individuals perceive their peers engage in a given

behavior (Cialdini, Kallgren & Reno, 1991). For example, an individual may perceive that an

average college student plays video games at a certain frequency or spends a certain amount of money on video gaming behavior.

There are several consistent findings regarding the relationship between perceived norms and individuals' own behavior. First, individuals often overestimate the behavior of their peers. For example, college students tend to believe that their peers consume alcohol at a higher rate than is the actual normative behavior of this group (Perkins, Haines, & Rice, 2005). This overestimation has been found to predict an individual's own intensity of alcohol consumption (Perkins, 2007) and is thus an important variable to consider when studying the development of an addiction-related disorder over time. If perceived norms surrounding video gaming behavior mirror relationships for other addiction-related behaviors, then we would expect that individuals will likely overestimate how often their peers play video games, and there will be a relationship between how often one perceives that others game and how often they themselves play video games.

The second type of perceived social norms is perceived injunctive norms (Cialdini, Kallgren & Reno, 1991). Perceived injunctive norms are sometimes referred to as "subjective norms," though in this paper, only the term "perceived injunctive norms" will be used. Perceived injunctive norms can be understood as the degree to which individuals perceive others' approval or disapproval of a given behavior. For example, an individual may perceive that their close friends and family strongly approve or disapprove of their video gaming behavior.

Perceived injunctive norms typically correlate with how often an individual engages in a behavior. In other words, the more that individuals perceive that their peers (e.g., friends and family) approve of a given behavior, the more likely they are to engage in that behavior. For example, college students who perceive that their family and friends approve of gambling

behavior are likely to gamble with greater intensity (Neighbors et al., 2007). If perceived injunctive norms surrounding video gaming behavior mirror relationships with other addictive behaviors, then individuals who perceive that their family and friends approve of video gaming behavior will play video games at a greater intensity than their peers who do not perceive this approval.

To date, the relation between perceived social norms and individuals' own video gaming behavior has not been widely investigated. One longitudinal study found that Dutch adolescents who perceived greater approval of video gaming behavior were more likely to report an intention to game than those who reported a lower perceived approval to game (Haagsma, King, Pieterse & Peters, 2013).

Present Study

The present study tested whether the relation between perceived social norms and individuals' own video gaming behavior is similar to the way these variables correlate with other addiction-related behaviors addiction-related behaviors such as substance use and gambling. There are four hypotheses being tested. First, it was hypothesized that individuals would perceive that the average college student plays video games at a higher rate than they themselves do, operationalized by frequency of play and amount of money spent on video games. Second, it was hypothesized that there would be a positive relationship between perceived descriptive norms, individuals' level of video game involvement and Internet gaming problem severity. Third, it was hypothesized that there would be a positive relation between perceived injunctive norms, Internet gaming problem severity and their level of video gaming involvement. Finally, gender differences were explored, and it was hypothesized that male participants would perceive

4

a higher level of descriptive norms, injunctive norms, and that they themselves would play video games at a higher rate than their female counterparts.

Method

Participants

Participants were 447 college students who consented to participate in this online research study via the psychology subject pool at a U.S. public university. They received research participation credit for volunteering. Participants had to be at least 18 years old and proficient in English. The mean age was 20.30 ($SD = 4.42$), and 70% were female. Table 1 displays participants' demographic characteristics.

Materials

Demographic questionnaire. This questionnaire assessed age, sex, ethnicity, marital status, level of education, and household income.

Video Game Dependency Scale (VGDS; Rehbein, Kliem, Baier, Mößle, & Petry, 2015). The VGDS is an 18-item measure with two items devoted to each of the nine DSM-5 criteria. Each item is scored on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). For each of the nine criteria, one of the two items devoted to assessing it must have been rated as "strongly agree." Scores ranged from 0-9, with a score of 5 indicative of an Internet gaming disorder (Rehbein, Kliem, Baier, Mößle, & Petry, 2015). In this study, the continuous total score will be used. Internal consistency in this sample ($\alpha = 0.94$) was similar to previous study ($\alpha = 0.94$).

Perceived Descriptive Norms. Two items assessed participants' perception of average college students' Internet gaming behavior. Participants were told that "An average college student refers to a college student at your university." The first item assessed for perceived

frequency of play and asked "How often do you think an average college student plays video games?" with response options being: never (1), a few times a year (2), about once a month (3), about once a week (4), a few times a week (5), or daily or almost daily (6). The second item assessed for perceived financial expenditure on gaming. This was an open-ended question that asked "How much money does an average college student spend on video games PER MONTH on average? (e.g. buying or renting games; buying in-game items; etc)." Each item was used as a continuous scale variable in all analyses.

Individual Gaming Engagement. Participants were asked to report their own frequency of gaming and expenditure on gaming. Participants responded to the same questions used to assess for their perceived descriptive norms of average college students' Internet gaming behavior, except that they were reporting on their own behavior (e.g., "How often do you play video games" and, "How much money do you spend on video games PER MONTH on average?"). The averages of all participants' responses were used.

Perceived Injunctive Norms. This 10-item measure was used to assess perceived injunctive norms to understand participants' perceptions of family and friends' approval or disapproval of online and/or offline games. Participants responded using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated higher perceived approval of Internet gaming. Total scores could range from 10-50. Internal consistency was 0.68 (95% CI: 0.63 - 0.72) in the current sample, which is lower than estimates from a previous modification of this scale for gambling ($\alpha = 0.78$; Larimer & Neighbors, 2003). Total scores were used as a continuous variable in all analyses.

This measure was adopted from a measure developed by Moore and Ohtsuka (1999) that originally contained 12 statements to assess gambling related perceived injunctive norms. In the

current study, the original measure was modified by replacing the gambling-related behavior with the phrase "playing video games." Additionally, two items were dropped because this modification process resulted in what appeared to be redundancy in the item pool. For example, two items "My friends would disapprove of me playing pokies" and "My friends would disapprove of me buying a lottery ticket" would have been modified to the same items, "My friends would disapprove of me playing video games." The other two items, "My family would disapprove of me playing pokies" and "My family would disapprove of me buying a lottery ticket" would have been modified to the item "My family would disapprove of me playing video games."

Procedure

The University's Institutional Review Board approved of all study procedures. We posted the study's description via the University's psychology subject pool. There were 475 participants enrolled in the study. After consenting to participate, eligible participants were asked to complete a questionnaire online including the questions described above and additional questions not relevant to the current study. One reading check item was included (e.g., "For this item, please choose item '2' on a 1 to 4 Likert scale) in the Video Game Dependency Scale, Perceived Descriptive Norms questionnaires and Individual Gaming Engagement to ensure data quality. Twenty-eight participants failed at least one of these reading checks and were excluded from the final database.

Data Analysis Approach

Statistical Package for the Social Sciences version 26 was used to test: 1) the differences between perceived descriptive norms and their own reported Internet gaming engagements; 2) gender differences regarding perceived descriptive norms perceived injunctive norms as well as

their own gaming behavior. Data cleaning procedures followed recommendations by Tabachnick and Fidell (2007). Univariate outliers were identified as those cases with standardized scores exceeding $z = +/- 3.29$ on any continuous study variable, which resulted in 27 cases being excluded from analyses. Multivariate outliers were checked using Mahalanobis distance (Tabachnick & Fidell, 2007), and 6 cases that include multivariate outliers were removed from analyses. Little's missing completely at random test (Little,1988) was performed, all missing data was missing completely at random and less than 5% of data was missing. Visual inspection including frequency histogram, probability-probability plot, and quantile-quantile plot were used to check normality visually ((Tabachnick & Fidell, 2007). All variables were normally distributed except perceived descriptive norms for gaming expenditure and participants' self-reported gaming expenditure. Logarithmic transformations were performed on these two, but the variables, remained non-normal. Consequently, nonparametric tests were used for analyses that involved these two variables, and parametric tests were used for the normally distributed study variables.

Path analysis was performed using Mplus 8 to test the relation between perceived descriptive norms, perceived injunctive norms, individuals' level of video game involvement and Internet gaming problems. Full information maximum likelihood robust estimator was used in order to handle non-normal data. Standard model fit indices were used to evaluate the goodness of fit of the models (Kline, 2012): Model chi-square and degrees of freedom; Steiger-Lind root mean square error of approximation (RMSEA; Steiger, 1990) with its 90% confidence interval; Bentler comparative fit index (CFI; Bentler, 1990); Standardized root mean square residual (SRMR; Bentler, 1995). Chi-square evaluates statistical significance, and when significant, rejects the null hypothesis that the model fits the data. RMSEA with 90% confidence interval

measure the discrepancy per degree of freedom in a model. As suggested by Browne and Cudeck (1993), RMSEA values below .08 indicate adequate fit and below .05 indicate good fit, with values above .1 indicating lack of fit. Considering recommendation from Hu and Bentler (1999), CFI should be above .95 for excellent model fit, but values between .90 and .95 are often considered acceptable model fit. Hu and Bentler (1999) recommended SRMR values of .08 or below as a good model fit. In addition to these four indices, Bayesian Information Criteria (BIC; Schwarz, 1978) was used to compare between models. BIC differences equal or greater than 10 gives evidence to retain or select the model with the smaller value (Kass & Raftery; 1995).

Results

Internet Gaming Behavior

The average amount of time the sample spent playing video games was about once a month ($M = 3.14$, $SD = 1.77$; Table 1). The average expenditure was \$8.76. The majority of the sample (67%) did not report spending any money on gaming behavior. Almost the entire sample (99%) scored below the clinical threshold for Internet Gaming Disorder, with the modal number of symptoms endorsed being 0 (89%) followed by 1 (7%). Table 2 presents the bivariate correlations between the primary predictor variables that were normally distributed: perceived descriptive norms for gaming frequency, individuals' self-reported gaming frequency and perceived injunctive norms. The correlation between the perceived injunctive norms variable and individual's gaming frequency was $r = .31$, $p < .001$. The correlation between perceived descriptive norms and individual gaming frequency was $r = .06$, $p > .05$.

Accuracy of Perceived Descriptive Norms

A paired samples T-test and Wilcoxon rank sum test were used to examine the differences between participants' perceived descriptive norms and their self-reported gaming

engagement. Consistent with our hypothesis, participants reported that "the average college student" (*M* = 5.09, *SD* = .77) played video games significantly more often than participants' own reported frequency (*M* = 3.14, *SD* = 1.77), *t* (413) = 21.04, *p* < .001. In addition, participants believed that "the average college student" spent more money (*Md* =$ 40) than participants' own reported expenditure on video games (*Md* =$ 0), *z* = -15.31, *p* <.001.

Norms and Internet gaming problem

Path analysis was used to examine the relation between perceived descriptive norms, perceived injunctive norms, individuals' gaming engagement and Internet gaming problems. The hypothesized path model (Figure 1) was examined, and it turned out to be a poor fit (Table 3). Considering the severity of the skewness for the individuals' self-reported gaming expenditure variable, it was determined that the expenditure-related variables may not be appropriate indicators of Internet gaming engagement compared to individuals' frequency of play. Therefore, the expenditure-related variables were removed from the path analysis (Figure 2). This final model's fit was good (Table 3). Unstandardized data were reported (Figure 2). We found that individuals' self-reported gaming frequency was positively associated with perceived injunctive norms (ß = .101) and Internet gaming problems (ß = .100). Although the direct effect between perceived injunctive norms and Internet gaming problems was not significant, the indirect effect between perceived injunctive norms and Internet gaming problems through their self-reported gaming frequency was significant (ß = .010). The rest of the paths were not significant, all *p*s > .05.

Gender differences

Independent T-tests and Mann-Whitney U test were used to examine gender differences regarding perceived injunctive norms, perceived descriptive norms, and participants' self-

reported Internet gamine engagement. Results were only partially consistent with the hypotheses. Males ($M = 33.64$, $SD = 4.24$) perceived important others (i.e. family and friend) as more approving of Internet gaming than females ($M = 31.24$, $SD = 5.71$), $t(306) = 4.72$, $p < .001$. In terms of their own gaming engagement, males' ($M = 4.54$, $SD = 1.48$) gaming frequency was between once a week and a few times a week. This was significantly higher than females who played between a few times a year and about once a month (($M = 2.54$, $SD = 1.53$), $t(412) = 12.23$, $p < .001$. Also, males ($Md = \$10$, $n = 120$) reported higher gaming expenditure than females ($Md = \$0$, $n = 287$, $U = 8496$, $Z = -9.65$, $p < 0.01$, $r = .48$). However, there was no difference in perceived descriptive norms between genders, all ps $> .05$.

Discussion

The current study was designed to understand how college students' Internet gaming and problems related to the perceived descriptive and injunctive social norms they hold. Specifically, this study sought to evaluate whether college students misperceive the descriptive norms for Internet gaming. Additionally, we assessed how perceived norms relate to Internet gaming participation and problems. Lastly, gender differences for perceived norms and their self-reported gaming engagement were explored. Based on the addiction-related behaviors literature relevant to these variables, it was hypothesized that college students would overestimate descriptive norms for Internet gaming compared with their own self-report behaviors. It was also hypothesized that both perceived descriptive norms and perceived injunctive norms would be associated with their self-reported Internet gaming engagement and problems. Finally, males were expected to report higher perceived injunctive norms, perceived descriptive norms, and a higher rate of gaming engagement than their female counterparts.

Consistent with past research on addiction-related behaviors, this study found that participants overestimated descriptive norms for Internet gaming engagement within their community. Specifically, participants believed that average college students at their University tend to play video games more often and spend more money on games than the respondents do. One caveat to this finding is that participants in the present study played video games at a remarkably lower rate than most other college students (Greenberg et al., 2010). Therefore, it is important to examine whether this finding would be replicated in a population of college students who play video games at more typical rates.

As expected, there was a significant relation between gaming participation and gaming problems. However, contrary to our hypotheses, the misperception of gaming norms was not associated with greater gaming participation and Internet gaming problems. Treatments for college students' substance use and gambling often recommend the use of personalized feedback approaches to correct students' misperceptions about these behaviors to reduce their substance use and gambling involvements (Larimer & Neighbors, 2003; Perkins & Berkowitz, 1986). However, our findings raised questions about the need to incorporate personalized feedback on descriptive norms in intervention approaches for problem gaming given the non-significant association in the present study. The present study also found that perceived injunctive norms were positively associated with gaming frequency and indirectly associated with Internet gaming problems when mediated by gaming engagement. These findings suggested that peer and family members' approval of Internet gaming were important to the participants and would affect their gaming participation. Future studies should examine if there is misperception of injunctive norms for Internet gaming.

Gender differences regarding participants' own gamine engagement and perceived injunctive norms were found, but there were no gender differences for perceived descriptive norms. Males were more likely to report their peers or family members as approving of gaming participation compared to female college students. Additionally, male students tended to play video games more often and spend more money on games than female students.

Limitations

Although this study provided evidence to support a model of Internet gaming that incorporates the role of social influence, including descriptive and injunctive norms, it is necessary to address the limitations of this research. The sample used in this study was atypical in multiple ways. All participants were voluntarily recruited via psychological subjective pool and not randomly selected. The sample used in this study also had a below average rate of video gaming behavior and gaming related problems. Thus, this study may have benefitted from the inclusion of individuals who played video games at a greater frequency and more individuals who were experiencing symptoms of Internet Gaming Disorder.

Conclusions

Despite these limitations, the present study has several implications for treatment with college student problem gamers. For example, interventions targeting college student Internet gaming behavior should consider including injunctive norms in personalized feedback reports. However, further research is needed to understand whether there is value in including information on descriptive norms of peers. Given the widespread dissemination of social norms-based interventions for other addictive behaviors, this study provided new insights into the role of social norms for Internet gaming interventions to consider normative influences.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179–211

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®).* American Psychiatric Pub.

Anand V. (2007). A study of time management: the correlation between video game usage and academic performance markers. *Cyber Psychology & Behavior, 10*, 552–559.

Asch, S.E. (1951). Effects of group pressure on the modification and distortion of judgements. In H. Guetzkow (Ed.), Groups, leadership and men (pp. 177–190). Pittsburgh: PA Carnegie Press.

Barmpagianni, E., Travlos, A., Kalokairinou, A., Sachlas, A., & Zyga, S. (2014). Predictors of Smoking and Alcohol Use Behaviour in Undergraduate Students: Application of the Theory of Planned Behaviour. *International Journal of Caring Sciences, 7*(2), 477-487.

Berkowitz, A. D. (2004). An overview of the social norms approach. In L. Lederman, L. Stewart, F. Goodhart, & L. Laitman (Eds.), Changing the culture of college drinking: A socially situated prevention campaign (pp. 187–208). Creskill, NJ: Hampton Press.

Cialdini, R. B., Kallgren, C. A., & Reno, R. R. (1991). A Focus Theory of Normative Conduct: A Theoretical Refinement and Reevaluation of the Role of Norms in Human Behavior. *Advances in Experimental Social Psychology Volume 24*, 201–234. doi: 10.1016/s0065-2601(08)60330-5

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58*(6), 1015-1026. doi:10.1037/0022-3514.58.6.1015

Cooper, M., Creamer, M. R., Ly, C., Crook, B., Harrell, M. B., & Perry, C. L. (2016). Social

norms, perceptions and dual/poly tobacco use among Texas youth. *American Journal of*

Health Behavior, 40(6), 761-770. doi:10.5993/AJHB.40.6.8

Duggan, M. (2015). Gaming and gamers. Pew Research Center. Retrieved from

http://www.pewinternet.org/2015/12/15/gaming-and-gamers/

Entertainment Software Association. (2017). Essential facts about the computer and video game

industry. Retrieved from http://www.theesa.com/wp-

content/uploads/2017/09/EF2017_Design_FinalDigital.pdf

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical

power analysis program for the social, behavioral, and biomedical sciences. Behavior

Research Methods, 39, 175-191.

Gentile, D. (2009). Pathological video-game use among youth ages 8 to 18: A national study.

Psychological Science, 20(5), 594-602. doi:10.1111/j.1467-9280.2009.02340.x

Ghasemi, A., & Zahediasl, S. (2012). Normality Tests for Statistical Analysis: A Guide for Non-

Statisticians. *International Journal of Endocrinology and Metabolism, 10*(2), 486–489.

http://doi.org/10.5812/ijem.3505

Greenberg, B. S., Sherry, J., Lachlan, K., Lucas, K., & Holmstrom, A. (2010). Orientations to

video games among gender and age groups. *Simulation & Gaming, 41*(2), 238-259.

doi:10.1177/1046878108319930

Haagsma, M., King, D., Pieterse, M., & Peters, O. (2013). Assessing Problematic Video Gaming

Using the Theory of Planned Behavior: A Longitudinal Study of Dutch Young People.

International Journal of Mental Health & Addiction, 11(2), 172-185.

doi:10.1007/s11469-012-9407-0

Halim, A., Hasking, P., & Allen, F. (2012). The role of social drinking motives in the

relationship between social norms and alcohol consumption. *Addictive Behaviors, 37*(12),

1335-1341. doi:10.1016/j.addbeh.2012.07.004

Harris, M. B., & Williams, R. (1985). Video Games and School Performance. *Education, 105*(3),

306. Retrieved from

http://search.ebscohost.com.ezproxy.memphis.edu/login.aspx?direct=true&db=a9h&AN

=4732020&site=eds-live&scope=site

Jones, S., (2003). Let the games begin: Gaming technology and college students? Retrieved

March 10, 2018, from http://www.pewinternet.org/2003/07/06/let-the-games-begin-

gaming-technology-and-college-students/

Kuss, D. J. (2013). Internet gaming addiction: Current perspectives. *Psychology Research and*

Behavior Management, 6

Kuss, D. J., Louws, J., & Wiers, R. W. (2012). Online gaming addiction? Motives predict

addictive play behavior in Massively Multiplayer Online Role-Playing Games.

Cyberpsychology, Behavior, And Social Networking, 15(9), 480-485.

doi:10.1089/cyber.2012.0034

Larimer, M. E., & Neighbors, C. (2003). Normative misperception and the impact of descriptive

and injunctive norms on college student gambling. *Psychology of Addictive Behaviors,*

17(3), 235-243. doi:10.1037/0893-164X.17.3.235

Lee, C. M., Geisner, I. M., Lewis, M. A., Neighbors, C., & Larimer, M. E. (2007). Social

motives and the interaction between descriptive and injunctive norms in college student

drinking. *Journal of Studies on Alcohol and Drugs, 68*(5), 714-721.

doi:10.15288/jsad.2007.68.714

Lenhart, A., Kahne, J., Middaugh, E., Macgill, A. R., Evans, C., & Vitak, J. (2008). Teens, video

  games, and civics: Teens' gaming experiences are diverse and include significant social

  interaction and civic engagement. Pew Research Center. Retrieved from

  http://www.pewinternet.org/2008/09/16/teens-video-games-and-civics/

Little, R. A. (1988). A Test of Missing Completely at Random for Multivariate Data with

  Missing Values. *Journal of The American Statistical Association, 83*(404), 1198.

Martin, R. J., Usdan, S., Nelson, S., Umstattd, M. R., LaPlante, D., Perko, M., & Shaffer, H.

  (2010). Using the theory of planned behavior to predict gambling behavior. *Psychology*

  of Addictive Behaviors, 24(1), 89-97. doi:10.1037/a0018452

Miller, DT & McFarland, C (1991) When Social Comparison Goes Awry: The Case of

  Pluralistic Ignorance. Chapter 11 in Suls, J & Wills, T (Eds) Social Comparison:

  Contemporary Theory and Research, Hillsdale, NJ: Erlbaum

Moore, S. M., & Ohtsuka, K. (1999). The prediction of gambling behavior and problem

  gambling from attitudes and perceived norms. *Social Behavior and Personality, 27*(5),

  455-466. doi:10.2224/sbp.1999.27.5.455

Neighbors, C., Dillard, A. J., Lewis, M. A., Bergstrom, R. L., & Neil, T. A. (2006). Normative

  Misperceptions and Temporal Precedence of Perceived Norms and Drinking. *Journal of*

  Studies on Alcohol, 67(2), 290-299. doi:10.15288/jsa.2006.67.290

Neighbors, C., Lostutter, T. W., Whiteside, U., Fossos, N., Walker, D. D., & Larimer, M. E.

  (2007). Injunctive norms and problem gambling among college students. *Journal of*

  Gambling Studies, 23(3), 259-273. doi:10.1007/s10899-007-9059-3

Perkins, H. W. (2007). Misperceptions of peer drinking norms in Canada: Another look at the "reign of error" and its consequences among college students. *Addictive Behaviors, 32*(11), 2645–2656. doi: 10.1016/j.addbeh.2007.07.007

Perkins, H. W., & Berkowitz, A. D. (1986). Perceiving the community norms of alcohol use among students: Some research implications for campus alcohol education programming. *International Journal of The Addictions, 21*(9-10), 961-976. doi:10.3109/10826088609077249

Perkins, H. W., Haines, M. P., & Rice, R. (2005). Misperceiving the College Drinking Norm and Related Problems: A Nationwide Study of Exposure to Prevention Information, Perceived Norms and Student Alcohol Misuse. *Journal of Studies on Alcohol, 66*(4), 470-478. doi:10.15288/jsa.2005.66.470

Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology, 64*(2), 243-256. doi:10.1037/0022-3514.64.2.243

Rehbein, F., Kliem, S., Baier, D., Mößle, T., & Petry, N. M. (2015). Prevalence of Internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction, 110*(5), 842-851. doi:10.1111/add.12849

Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mößle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *Cyberpsychology, Behavior, And Social Networking, 13*(3), 269-277. doi:10.1089/cyber.2009.0227

Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social

    norms. *Journal of Personality and Social Psychology, 64*(1), 104-112. doi:10.1037/0022-

    3514.64.1.104

Rivis, A., & Sheeran, P. (2003). Descriptive Norms as an Additional Predictor in the Theory of

    Planned Behaviour: A Meta-Analysis. Current Psychology, 22(3), 218-233.

Sherry, J. L., Lucas, K., Greenberg, B. S., & Lachlan, K. (2006). Video Game Uses and

    Gratifications as Predicators of Use and Game Preference. In P. Vorderer, J. Bryant, P.

    Vorderer, J. Bryant (Eds.) , Playing video games: Motives, responses, and consequences

    (pp. 213-224). Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers.

Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics. Boston: Pearson/Allyn &

    Bacon.

Tukey, J.W. (1977). Exploratory Data Analysis. Reading, MA: Addison-Wesley.

Wang, C. W., Chan, C. L. W., Mak, K. K., Ho, S. Y., Wong, P. W. C., & Ho, R. T. H. (2014).

    Prevalence and correlates of video and Internet gaming addiction among Hong Kong

    adolescents: A pilot study. *The Scientific World Journal.*

    doi:https://doi.org/10.1155/2014/874648

World Health Organization. (2018). *International Classification of Diseases for Mortality and*

    Morbidity Statitsics (11th Revision). Retrieved from https://icd.who.int/

Tables and Figures

Table 1

Sample Characteristics

Characteristic	
Age: *M (SD)*	20.30 (4.42)
Sex (%)	
Male	30
Female	70
Ethnicity (%)	
Asian or Pacific Islander	5
Black or African American	34
Hispanic or Latino	8
Native American or American Indian	1
White or Caucasian	48
Other	4
Marital Status (%)	
Single	94
Married	5
Widowed	0
Divorced	1
Separated	0
Education (%)	
Freshman	54
Sophomore	18
Junior	17
Senior	11
Household Income (%)	
Less than $20,000	31
$20,000 to $39,999	20
$40,000 to $59,000	13
$60,000 to $79,000	12
$80,000 to $99,000	10
$100,000 or greater	14
Play video games in the Past 12 months (%)	
Yes	79
No	21
Play video games in the Past 30 days (%)	
Yes	56
No	44
Watch video games livestreamings (%)	
Yes	50

No	50
Play video games with friends in person (%)	
Yes	55
No	45
Play video games with friends online (%)	
Yes	45
No	55
Play video games with parents (%)	
Yes	13
No	87
Play video games with family members other than parents (%)	
Yes	43
No	57
Platforms that play on the most (n)[1]	
PC/Computer game	106
Console game	253
Handheld gaming console	57
Arcade	11
Web browser	39
Smartphone/Tablet	220
Virtual reality Headset	8
Other	36
numbers of IGD criteria endorsed based on VGDS (%)	
0	88.5
1	6.7
2	2.8
3	.9
4	.7
5	0
6	.2
7	.2
8	0
9	0
Participants' reported own gaming frequency: $M (SD)$[2]	3.14 (1.77)
Participants' reported own gaming expenditure: $M (SD)$	8.76 (17.21)

Note. 1: Platforms that play on the most: participants could pick more than one option; 2: anchors were never (1), a few times a year (2), about once a month (3), about once a week (4), a few times a week (5), daily or almost daily (6).

Table 2

Intercorrelations between the primary predictor variables that were normally distributed

	1	2	3
1. Perceived Descriptive Norms for Gaming Frequency	-		
2. Participants' self-reported Gaming Frequency	.06	-	
3. Perceived Injunctive Norms	.12*	.31*	-

Note. * $p < .05$

Table 3 *Fit Indices*

Model	Chi-square	RMSEA (90% CI)	CFI	SRMR	BIC
Hypothesized model	70.68, $p < .05$	.418 (.339 -.503)	.567	.082	5761.396
Final model	0, $p < .05$	0	1	0	2454.144

Note. χ^2 = chi square goodness of fit statistic; RMSEA = Root-Mean-Square Error of Approximation; CFI= Comparative Fit Index; SRMR= Standardized Square Root Mean Residual; BIC = Bayesian Information Criteria.

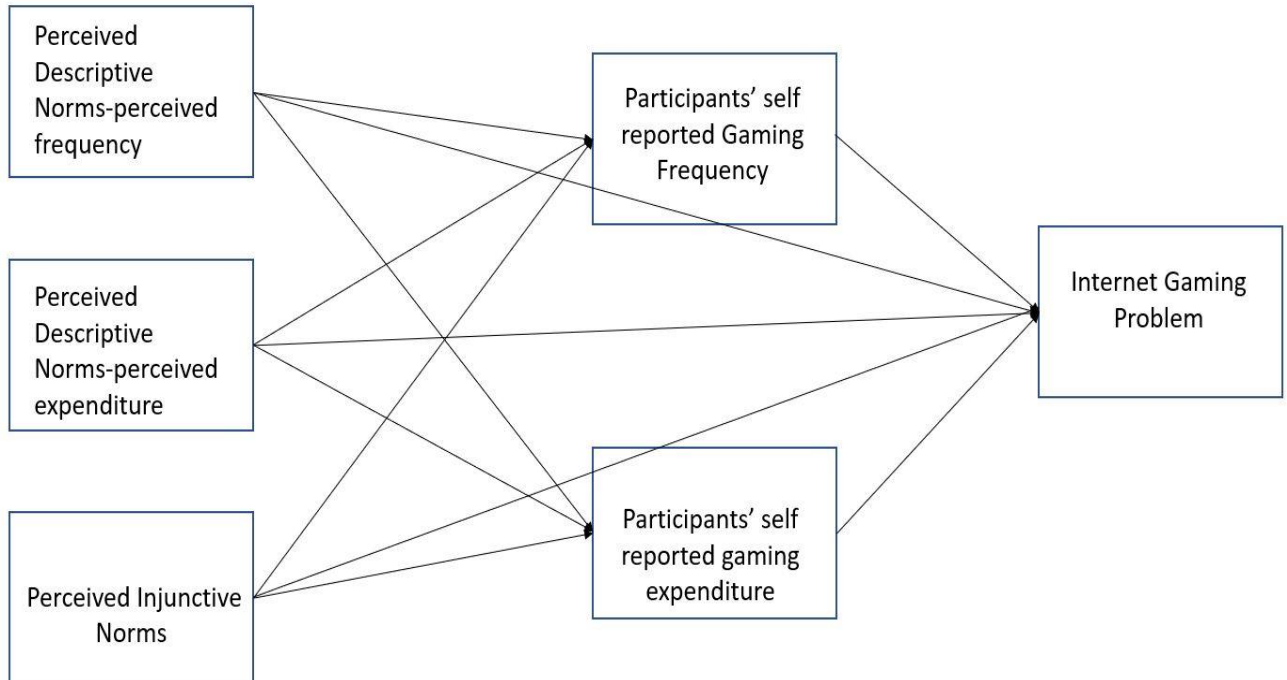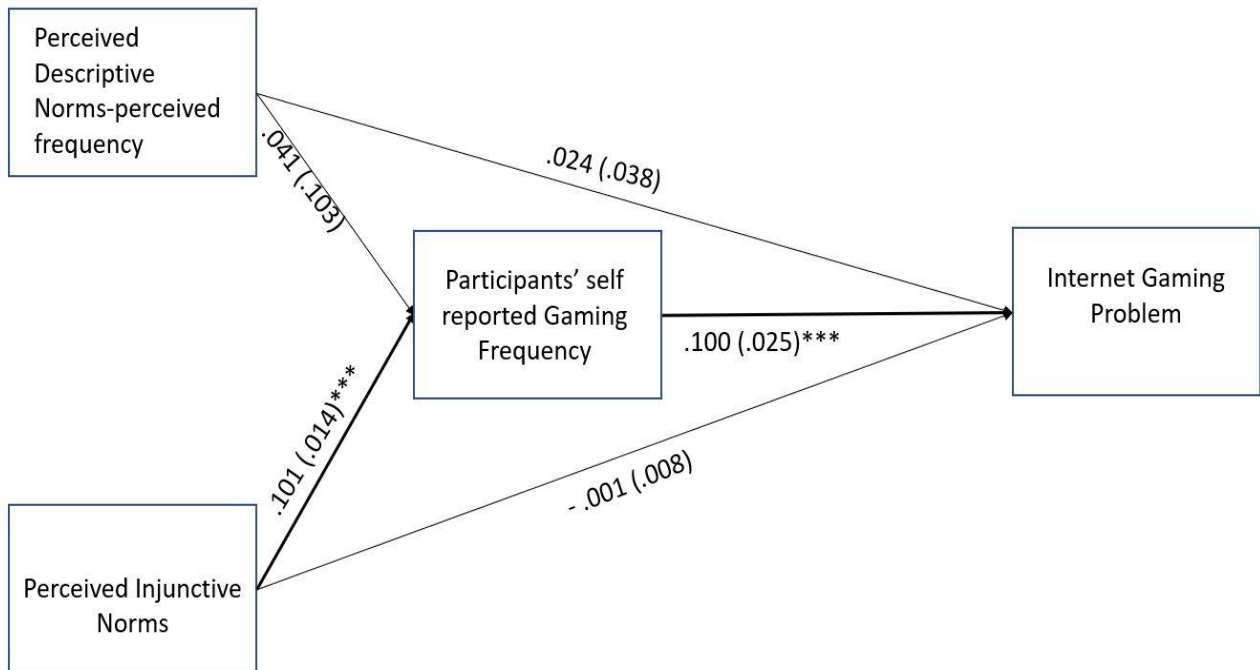Figure 1. Hypothesized Path Model.

Figure 2. Final Path Model.

Note. The unstandardized coefficients are presented. Significant relations are presented as bold lines. ***p < 0.001