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For the Love of a Game: The Effects of Pathological Video
Game Use on Romantic Relationship Satisfaction

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A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of
Master of Science

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ABSTRACT

For the Love of a Game: The Effects of Pathological Video Game Use on Romantic Relationship Satisfaction

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Media use may have the potential to influence romantic relationships, depending on the context of media use. For example, pathological media use, which includes symptoms of addiction such as relapse, withdrawal, and conflict with family and friends over media use, may be particularly damaging to romantic relationships. Additionally, research shows that pathological video game use can negatively influence factors of mental health, including depression. The current study includes 183 heterosexual couples from the Eastern United States. Both members of each couple completed online surveys answering questions regarding pathological media use, depression, and relationship satisfaction. Results showed that male pathological video game use was not associated with female romantic relationship satisfaction. Additionally, male pathological video game use was associated with increased levels of male depression, and male depression was associated with increased levels of female relationship satisfaction. However, male depression did not mediate the relation between male pathological video game use and female relationship satisfaction. Discussion focuses on the implications of pathological video game use on mental health, as well as problems within the sample, measurement, and short-term longitudinal study design.

Keywords: pathological video game use, romantic relationship satisfaction, depression

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For the Love of a Game: The Effects of Pathological Video Game Use on Romantic Relationship Satisfaction

Media use among adults is nearly ubiquitous with 85% of American adults using the Internet, and about 72% regularly using social networking sites such as Facebook (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). Indeed, 67% of American adults own smartphones (Anderson, 2015), and nearly 50% of adults play video games, with 10% considering themselves “gamers” (Duggan, 2015). Though most media research focuses on children, adolescents, or emerging adults, the effect of media on adults cannot be ignored given the widespread use of media within this age group. Media may have the potential to influence romantic relationships in adulthood: the effect may be positive or negative depending on the context of media use. For example, some research shows that cell phone communication with one’s romantic partner is positive as it is linked with more love, commitment, and less relationship uncertainty (Jin & Peña, 2010). Other research shows that perceived differences in time spent using social media between romantic partners was associated with less caring, and more loneliness and jealousy (Nongpong & Charoensukmongkol, 2016). Additionally, anecdotal evidence from online support groups for spouses of “video game addicts” and media addiction treatment centers note the relational and psychological harm pathological media use can have on both men and women in romantic relationships. Thus, the purpose of this paper is to empirically examine any short-term longitudinal associations between male pathological video game use and romantic relationship satisfaction in female partners, and to determine whether depression mediates or explains the association between these variables. This study will focus specifically on pathological video game use, as there is a large body of existing research examining the effects of pathological video game use on individuals (e.g. Gentile, 2009), and as pathological video game use has been

linked with some negative relationship outcomes for both partners in romantic relationships (Northrup & Shumway, 2014).

Pathological Media Use

Research shows that there are many positive effects of media use. For example, some video game users show enhanced cognitive performance, increased creativity, improved problem solving skills, and greater social skills associated with playing video games (Granic, Lobel, & Engels, 2014). However, a great deal of research demonstrates the negative effects of media use including harm to school, social, and psychological functioning, especially as use becomes pathological in nature (Gentile, 2009). For the purpose of this paper, pathological media use is defined by using a number of general addiction criteria including: *salience* or the potential for media to dominate all aspects of life and *euphoria*, or media use producing a “high.”

Pathological media use also includes *tolerance* where increasing amounts of media use is needed to achieve euphoria. Pathological users may also experience *conflict* with family and friends over time spent using media, and finally *relapse* as pathological users may try multiple times to quit or decrease use without success. Additionally, criteria specific to pathological media use have been created, and include *mood modification* or using media to forget about real life, *withdrawal* or feeling negative symptoms when unable to use, and *problems* from neglecting other important activities (Lemmens, Valkenberg, & Peter, 2009). Multiple types of media have been examined in a pathological context, including social media (DeJong, 2014), video games (Gentile, 2009), cell phones (Jenaro, Flores, Gomez-Vela, Gonzalez-Gil, & Caballo, 2007), and general Internet use (e.g. gambling, shopping, surfing; Petry & O’Brian, 2013). In this paper, I will focus specifically on pathological video game use, as a number of studies have examined the effects of general video gaming on romantic relationships. However, none have focused specifically on the

short-term longitudinal associations of pathological video gaming on romantic relationship satisfaction. In terms of numbers, research shows that 50% of American adults play video games (Duggan, 2015), and that approximately 10% of video game players are pathological users (Gentile, 2009). This means that pathological video game use affects a startling 12.25 million people. The results of this study could potentially help pathological video game users and their romantic partners by providing a research base to create therapeutic techniques, as well as intervention programs for both individuals in the relationship.

Pathological Video Game Use

As was stated previously, pathological media use is generally associated with negative outcomes in the literature among adolescents (Gentile, 2009). Pathological video game use in particular is becoming increasingly problematic as approximately 10% of adolescent video game players show signs of pathological video game use (e.g. Choo, Gentile, Sim, Li, Khoo, & Liau, 2010; Gentile, 2009), and as this type of video game use has been linked with negative outcomes including trouble building and maintaining social relationships (Gentile, 2009), problems with impulse control, social competence, academic performance, and hostility (Choo et al., 2010). Although pathological video game use is not yet considered an addiction, the DSM-V categorizes “Internet Gaming Disorder” as an area worthy of future study (American Psychiatric Association, 2013).

Most researchers studying pathological video game use employ Brown (1991) and Lemmens et al. (2009), as detailed above, for their pathological use criteria. For example, a pathological video game user may suffer symptoms of withdrawal when attempting to cut down or quit video game play, or may argue with family and friends about the amount of time they spend playing video games. Additionally, a pathological video game user might need to play

increasingly more often to achieve euphoria, and may try multiple times to cut down on video game play without success. It is important to note that much of the pathological video game literature, as detailed above (e.g. Gentile, 2009; Choo et al., 2010), focuses on children and adolescents. Little research focuses specifically on pathological video game use among adults, where this type of video game use has been linked with insomnia and poor work performance among US marines (Eickhoff, Yung, Davis, Bishop, & Klam, 2015), and lower sociability and life satisfaction in older adults (Festl, Scharkow, & Quandt, 2013). As many individuals in adulthood are involved in romantic relationships, it is important to understand the longitudinal impact that pathological video game use has on romantic relationship outcomes. The current study will focus on the effects of male pathological video game use on female romantic relationship satisfaction, as pathological video game use may negatively influence satisfaction among partners in a romantic relationship.

Theoretically, there are a number of reasons why pathological video game use may be especially problematic in a romantic relationship context, because of the potential it has to influence social exchanges between partners (Emerson, 1976), and to displace time spent with one's partner (Kraut, Patterson, Lundmark, Kiesler, Mukopadhyay, & Scherlis, 1998). For example, a pathological video game user may spend increasing amounts of time playing games, and establishing relationships with online friends, at the expense helping their partner receive the benefits of a romantic relationship (e.g. help with children or with chores around the house, enjoying intimacy and communication). This concept is well supported by the social exchange theory (Emerson, 1976), which posits that relationships are formed and maintained as both individuals in the exchange receive optimal rewards relative to costs. This theory has been applied to romantic relationships, where when both partners are satisfied by the relationship

(receiving more rewards than costs), they come to depend upon the relationship to satisfy their needs in anticipation of those rewards (Laursen & Jensen-Campbell, 1999). Additionally, the theory proposes that when individuals are not satisfied in their relationship (e.g. experiencing more costs than benefits), they are more likely to look toward attractive alternatives in order to maximize rewards.

There are a number of ways in which the social exchange theory may apply directly to the associations in the current study. First, pathological video game players may feel that they are receiving more costs than rewards from their romantic relationship, and may seek out video game use as their alternative reward system. Second, partners of pathological video game users may feel that they are receiving more costs than rewards in the relationship because of the increased responsibilities they take on while their partner plays video games. In sum, it is likely that pathological video game use will interfere with social exchanges between partners, and that partners will feel that they are experiencing more costs than rewards in their romantic relationship.

Additionally, the displacement theory (Kraut et al., 1998) applies to the current study as it suggests that time spent playing video games may displace time spent doing other important activities; specifically, media use might displace time spent helping and interacting with one's romantic partner. This may be especially problematic for pathological video game users as they report more conflict, more problems from playing, and more time spent using media than nonpathological players (Gentile, 2009). As media displaces time spent with one's partner, or helping one's partner around the house, relationship satisfaction may decrease, as partners are unhappy with the way their partner is spending their free time. This displacement of time may help us understand why pathological media use could lead to lower levels of romantic

relationship satisfaction. In sum, it is possible that pathological video game use will influence romantic relationship satisfaction, which may lead to problems in a romantic relationship. As little research has specifically examined these associations, we will examine the existing literature to understand the associations between other forms of media use and romantic relationship satisfaction.

Media Use and Romantic Relationship Satisfaction

Across the existing literature, high levels of romantic relationship satisfaction has predicted positive outcomes in relationships including life satisfaction, happiness, and positive affect (Love & Holder, 2016), whereas low levels of romantic relationship satisfaction has predicted loneliness (Pereira, Taysi, Orcan, & Fincham, 2014) and is linked with infidelity (Previti & Amato, 2004). This section will focus on the general effects of media use on romantic relationships in order to show how media can influence attitudes and behaviors in this context.

In this paper, romantic relationship satisfaction will be defined as how well each partner reports the relationship meeting their individual needs (Peleg, 2008), and how happy each feels overall in the romantic relationship (Byers, 2005). This construct is important as high levels of relationship satisfaction have been associated with positive outcomes, including higher levels of intimacy and commitment (Rusbult & Buunk, 1993) and lower levels of infidelity (McDaniel, Drouin, & Cravens, 2017). Accordingly, research suggests that media use among romantic partners can increase relationship satisfaction when used positively (Coyne, Stockdale, Busby, Iverson, & Grant, 2011), where texting and calling for the purpose of “expressing affection” were the most common reasons for communication via media among romantic partners. Additionally, research indicates that relationship satisfaction may increase when partners include each other in their Facebook posts, and that disagreements over relationship status updates on

Facebook can lead to lower levels of relationship satisfaction (Papp, Danielewicz, & Cavemberg, 2012). Further, research regarding media use among married couples suggests that husbands' television and social networking use were negatively associated with wives' marital quality, though wives' media use was not associated with husbands' marital quality (Dew & Tulane, 2015). The authors suggest that these differential effects on gender may be due to gender norms, where women are more commonly engaged in electronic communication with others (Baym, Zhang, Kunkel, Ledbetter, & Lin, 2007). When husbands' violate gender norms by connecting frequently with others online, wives' may become frustrated and report lower marital quality. In sum, existing research shows that media use has the potential to influence romantic relationship satisfaction positively or negatively, where pathological media use in particular may negatively influence relationship outcomes as it can involve conflict with family, and other problems that interfere with daily life (Lemmens et al., 2009).

Pathological Video Game Use and Romantic Relationships

Though little research focuses specifically on pathological video game use and its association with romantic relationship satisfaction, this is an important area of study as research links some types of media use with negative relationship outcomes as shown above (e.g. Dew & Tulane, 2015), and as various other addictions and pathologies have been shown to negatively influence satisfaction in romantic relationships. For example, research shows that problematic alcohol use is associated with lower relationship satisfaction and commitment (Rodriguez, Øverup, & Neighbors, 2013), pathological gamblers are more likely to have been divorced (Black, Shaw, McCormick, & Allen, 2012), and partners of pathological gamblers report greater dissatisfaction in their marriages (Mazzoleni, Gorenstein, Fuentes, & Tavares, 2009). Research shows that various pathological behaviors are associated with negative romantic relationship

outcomes, and it is important to understand the impact of pathological video game use on these associations.

Almost no research specifically examines pathological video game in a romantic context. However, one rare exception involving a qualitative study found that spouses of video game addicts reported changes in three areas of their lives due to their partners' pathological video game use (Northrup & Shumway, 2014). First, spouses reported changes in their partner due to video game use including isolating themselves from the real world, defensiveness when questioned about video game use, and personal consequences such as poor health from neglecting exercise and healthy eating. Additionally, spouses reported changes in themselves, including anger and resentment toward their spouse, stress, sadness, and frustration. Finally, spouses of pathological video gamers reported changes in the relationship including changes in roles and responsibilities as pathological gamers helped less around the house, talked to their children less often, were less likely to engage in physical and emotional intimacy with their partner, and financial losses due to money spent on video games and problems at work. Overall, this study shows some evidence that pathological video gaming may be damaging to romantic relationships.

Depression as a Mediator

Some research points to the importance of studying depression among individuals in romantic relationships, as depression could be an important factor in determining relationship outcomes. Existing research indicates a longitudinal bidirectional association between poor marital quality and depression, where individuals with depression report lower levels of marital quality, and individuals with lower levels of marital quality report higher levels of depression over time (Najman et al., 2014). Research suggests that pathological video game use is

associated with various factors of mental health, such as depression, anxiety, and social phobias (e.g. Gentile, Choo, Liau, Sim, Li, & Fung, 2011; Mentzoni et al., 2011), however it is important to determine the direction of these effects (e.g. depression increasing the risk of becoming a pathological gamer, or whether pathological gaming leads to higher levels of depression).

Gentile and colleagues (2011) sought to understand these relations and found that pathological video game use was associated with increased depression three years later, and that depressive symptoms improved when individuals stopped gaming at pathological levels. The authors note that their findings suggest that pathological video game use is not merely comorbid with, or a symptom of, other problems (e.g. depression) but that pathological video game use is problematic in and of itself (Gentile et al., 2011).

Though this is the only study, to our knowledge (Gentile et al., 2011), that has examined the direction of the association between pathological video game use and depression, research on other pathological behaviors has investigated these associations. For example, multiple studies have found that pathological gambling was associated with increased depression longitudinally (Afifi, Nicholson, Martins, & Sareen, 2016; Jauregui, Urbiola, & Estevez, 2016). Thus, the current study proposes that depression will mediate the association between pathological video game use and romantic relationship satisfaction. Further, it is possible that partners of pathological video game users will experience increased depression due to their partner's media use. For example, research shows that spouses of pathological video gamers report frequent sadness and anger toward their partner (Northrup & Shumway, 2014). Additionally, partners of individuals addicted to substances report higher levels of depression and anxiety (Noori et al., 2015), and spouses of pathological gamblers report increased emotional disturbances including depression (Lorenz & Yaffee, 1988). As such, it is possible that spouses of pathological video

gamers will also experience higher levels of depression as they may not feel like they are receiving enough connection, communication, or desired social support because of their partner's focus on video games. Given that higher levels of depression have been associated with lower reports of relationship satisfaction (Najman et al., 2014), it is possible that depression will mediate the association between a partner's pathological media use and relationship satisfaction.

Study Aims and Hypotheses

The aim of the current study is to determine whether pathological video game use is associated with romantic relationship satisfaction. This is the first study, to our knowledge, to examine these associations longitudinally, which is important in determining the direction effects and in understanding whether pathological video gaming matters over a short period of time. Additionally, the current study will examine whether depression mediates the link between pathological video game use and romantic relationship satisfaction. First, I hypothesize that pathological video game use will be associated with lower levels of relationship satisfaction. Second, I hypothesize that pathological video game use will be associated with increased levels of depression, and third, that depression will be associated with lower levels of relationship satisfaction. Finally, I hypothesize that the relation between pathological video game use and romantic relationship satisfaction will be mediated by depression, with pathological video game use being associated with more depression, and less relationship satisfaction. Control variables include initial levels of depression and relationship satisfaction, length of romantic relationship, relationship status, and number of children, as it is possible that these variables will influence the hypothesized associations (e.g. Pollmann-Schult, 2014; Willoughby, Carroll, & Busby, 2012).

Method

Participants and Procedure

The current study included 183 heterosexual couples from the *Daily Family Life Project* (DFLP), an ongoing longitudinal study of family life. All couples included in the sample were living together in the United States, with a child age 5 or younger ($M = 2.33$ years, $SD = 1.33$, 55% female). Participants were from the following regions in the United States: 52% Northeast, 17% West, 16% South, and 15% Midwest. Participants ranged in relationship length from 2 to 23 years and 92% had been in a relationship for 5 years or longer ($M = 9.99$, $SD = 4.07$). Participants were educated on the whole, where most had a bachelors' degree or higher (76% of females, 68% of males), were not currently attending school (80%), and were European American (93% females, 89% males). Females were 33.31 years old on average ($SD = 4.41$), and males were 33.31 ($SD = 5.04$). Additionally, yearly household income was approximately \$74,000 ($SD = \$39,000$), but ranged from no income to \$250,000, and 21% of families reported they were on federal aid (e.g. medical assistance, food stamps, etc.).

Participants were recruited by one of three sources, (1) a database of families in Pennsylvania who indicated they were willing to participate in research, (2) flyers in community buildings and doctors' offices, (3) announcements on listserves and parenting websites. Both the male and female partner were included in the study, and both completed online surveys at the initial time point (Time 1), one month later (Time 2), and again at three months after the initial time point (Time 3).

Measures

Pathological video game use. Pathological video game use was measured at Time 1 using a revised video game addiction questionnaire (Gentile, 2009), where participants answered

(1) *yes*, (2) *no*, or (3) *sometimes* to 15 questions measuring pathological video game use. This measure looks at symptoms of pathological video game use, and does not include a clinical cut off. Sample questions include “In the past year...have you ever felt restless or irritable when attempting to cut down or stop playing video games,” “have you ever skipped sleeping, eating, or bathing so that you could spend more time playing video games,” and “have you become more preoccupied with playing video games, studying video game playing, or planning the next opportunity to play?” Scores were calculated according to past use of this measure (Gentile, 2009), using a sum score (yes = 1, sometimes = .5, and no = 0), where higher scores reflect more symptoms of pathological video game use ($a = .88$).

Relationship satisfaction. Relationship satisfaction was measured at Time 1 and Time 3 using a modified version of Norton’s Quality of Marriage Index (QMI; Norton, 1983). This measure included six items which assessed relationship satisfaction on a scale from 1 (*very strongly disagree*) to 7 (*very strongly agree*). Sample questions include “My relationship with my partner is very stable,” and “My relationship with my partner makes me happy.” The scale was modified by changing the wording from “spouse” to “partner” and “marriage” to “relationship.” All items were standardized, higher scores reflect greater relationship satisfaction ($a = .96$).

Depression. The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) was utilized to measure depression at Time 1 and Time 2. Depression was assessed with 20 items on a 4-point Likert scale ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). Sample questions include, “I thought my life had been a failure,” and “I was bothered by things that don’t usually bother me.” Scores were summed, where higher scores indicate higher reported levels of depression (male: $a = .89$)

Length of relationship. Length of relationship was measured by asking participants “how long have you been in a relationship with your partner? Participants entered a numerical response for the length of their relationship in years.

Relationship status. Relationship status was measured by asking participants “what is your relationship status?” Answer options included married, married but separated, cohabiting, single never married, single divorced, and other.

Number of children. Number of children was measured by asking participants, “How many children do you have?” Participants entered a numerical response for the number of children they have.

Analytic Strategy

In order to determine the association between male pathological video game use and female romantic relationship satisfaction, I will utilize ordinary least squares multivariate regression analysis in STATA. In answer to the first hypothesis, multivariate regression analyses will be utilized to determine whether pathological video game use at Time 1 is associated with relationship satisfaction at Time 3. Second, multivariate regression analyses will be used to determine whether pathological video game use is associated with male depression at Time 2, and third, whether depression at Time 2 is associated with romantic relationship satisfaction at Time 3. Finally, mediation analyses in STATA will be conducted to determine whether depression at Time 2 mediates the association between pathological video game use at Time 1 and relationship satisfaction at Time 3. Control variables include romantic relationship satisfaction and depression at the initial time point, length of romantic relationship, relationship status, and number of children.

Results

Descriptive Statistics

Means and standard deviations for each study variable are reported in Table 1. Specifically, few men report symptoms of pathological video game use ($M = 1.26$, $SD = 1.90$). Almost no women in the sample reported symptoms of pathological video game use, so the current study will focus on male pathological video game use and depression, and female romantic relationship satisfaction from this point forward. Male participants reported moderately low levels of depression ($M = 9.93$, $SD = 9.09$), and females reported very high levels of relationship satisfaction ($M = 38.40$, $SD = 7.06$). Finally, most participants have been in their relationship between 7-12 years ($M = 1.58$, $SD = 1.09$), and have 1-2 children on average ($M = 1.10$, $SD = .44$).

Bivariate correlations were conducted on all study variables, and are reported in Table 2. Specifically, male pathological video game use at Time 1 was positively associated with male depression at Time 2 ($r = .32$, $p < .01$), and male depression at Time 2 was negatively associated with female relationship satisfaction at Time 3 ($r = -.31$, $p < .001$). Finally, male pathological video game use was not associated with female relationship satisfaction at Time 1 ($r = -.04$, $p = .575$), or at Time 3 ($r = -.07$, $p = .393$).

Multiple Regression Analysis

Multiple regression analyses were conducted in STATA to determine the associations between male pathological video game use at Time 1 and female relationship satisfaction at Time 3, as mediated by male depression at Time 2. In the first model, the independent variables were male pathological video game use, male depression, female romantic relationship satisfaction, length of romantic relationship, relationship status, and number of children all

measured at Time 1, the dependent variable was female romantic relationship satisfaction at Time 3. Inconsistent with our first hypothesis, which was that male pathological video game use would be associated with lower levels of female relationship satisfaction, the multivariate regression between male pathological video game use at Time 1 and female relationship satisfaction at Time 3 was not significant. The results suggest that male pathological video game use and female relationship satisfaction are not associated, while accounting for all other variables in the model, ($b = -.15$, $t = -.58$ $p = .562$).

A second multivariate regression was conducted to examine the second hypothesis. Specifically, independent variables included male pathological video game use, female relationship satisfaction, male depression, length of relationship, relationship status, and number of children all measured at Time 1, and the dependent variable was male depression measured at Time 2. The results supported our second hypothesis, in that male pathological video game use at Time 1 was positively associated with male depression at Time 2. For every one-unit increase in male pathological video game use at Time 1, there was a .89 increase in levels of male depression at Time 2, given that other variables in the model are held constant ($b = .89$, $t = 2.54$ $p = .012$).

To answer our third hypothesis, that male depression at Time 2 would be associated with lower levels of female romantic relationship satisfaction at Time 3, a multivariate regression was conducted with male depression at Time 2, male depression, female relationship satisfaction, length of relationship, relationship status, and number of children at Time 1 as independent variables, and female relationship satisfaction at Time 3 as the dependent variable. The third hypothesis was confirmed as male depression at Time 2 was negatively associated with female relationship satisfaction at Time 3. For every one unit increase in depression at Time 2,

relationship satisfaction at Time 3 decreased by .12, given that all other variables in the model are held constant ($b = -.12, t = -2.70, p = .007$). See Table 3 for a full regression table.

To test the fourth hypothesis, that depression would mediate the association between male pathological video game use and female relationship satisfaction, the Sobel-Goodman mediation test was conducted in STATA to test for mediation effects. Results of this analysis revealed that male depression at Time 2 was not a significant mediator of the association between male pathological video game use at Time 1 and female report of romantic relationship satisfaction at Time 3 ($b = -.05, p = .581$).

Discussion

The purpose of this study was to examine the relation between pathological video game use and relationship satisfaction, as mediated by depression. As there was little evidence of female pathological video game use, the results reported focus on the effects of male pathological video game use and female relationship satisfaction. The results of the current study revealed that male pathological video game use was not associated with female romantic relationship satisfaction concurrently or three months later. Additionally, male pathological video game use was linked with increased levels of his own depression one month later, and male depression was related to lower levels of his female partner's relationship satisfaction one month later. Finally, results showed that depression did not mediate the association between pathological video game use and romantic relationship satisfaction.

The first finding in the current study did not support our hypothesis, that male pathological video game use would be associated with lower levels of relationship satisfaction in his female partner. This hypothesis was based upon the social exchange and displacement theories (Emerson, 1976; Kraut et al., 1998, respectively). According to the social exchange theory (Emerson, 1976), relationships flourish when both partners receive optimal rewards

relative to costs. There are a number of theoretical reasons why pathological video game use should influence social exchanges between partners. First, some of the symptoms of pathological use are *saliency*, or video game use becoming an important part of daily life, *conflict* with friends and family over video game use, and other criteria that influence the workings of daily family life (Lemmens et al., 2009). These criteria suggest that pathological video game use might hinder social exchanges between partners (e.g. taking care of children, making dinner, chores around the house, time and attention toward one's partner), so that the non-playing partner feels that they are receiving more costs than rewards from the relationship. Additionally, these criteria would suggest that time spent with one's partner may be displaced by pathological video game use, as pathological game use has been associated with less physical and emotional intimacy, and more frustration toward one's partner (Northrop & Shumway, 2014). In this way, pathological game use may displace time spent engaging in physical and emotional intimacy with their romantic partner with video game use. Though the results of the current study do not support the initial hypothesis, it was rooted in theory, and thus remains a valid explanation for the associations between these variables. There are a number of reasons as to why our findings did not match the theories, which will be discussed below.

First, the current sample included participants who reported very few symptoms of pathological video game use. Thus, it is possible that the lack of significant results in the current study is due to an absence of pathological video game players in the sample, and not because pathological video game use does not matter for romantic relationships. Indeed, it is likely that pathological video game use in one partner would be associated with lower levels of relationship satisfaction in the other, due to an imbalance in rewards versus costs (e.g. social exchange theory; Emerson, 1976) and in displacement of time away from one's partner due to video game

use (e.g. displacement theory; Kraut et al., 1998). It is likely that a different result would be found in a sample with more pathological video game players, and that the result of this test shows some evidence of a Type II error. More sample limitations will be discussed in the limitations section.

Additionally, the pathological video game use measure, though it is the norm for research in this field, may contribute to the lack of findings in the current study. In the current measure, individuals rate themselves on a number of factors regarding video game play, including conflict with family and friends about video games, trying but failing to quit, using games to increase mood, etc. Though pathological video game users likely experience these symptoms, it is possible that these global measurement questions do not capture the problems pathological video game use presents for romantic relationship satisfaction. It would be helpful for the field to develop more specific measures of pathological video game use for various contexts (e.g. romantic relationships, mental health). Additionally, the self-report nature of this measure may create problems as it is unlikely pathological video game players themselves will report all of their symptoms, either because pathological users do not realize how big of a problem it is, or because they do not want to admit to their problem. Instead, the field should consider using a comprehensive approach by asking the pathological video game user and other important people they associate with (e.g. coworkers, spouse or romantic partner, children, friends, and other family members). This way, not only will we receive a report of how the pathological user believes him or herself to be influenced by games, but how those they associate with feel about their video game use as well. A comprehensive measure of pathological video game use may help identify more pathological players, and would allow research to hone in on how pathological video game use is really influencing the everyday lives of users and their associates.

The second hypothesis was supported, as male pathological video game use was associated with increased levels of his own depression one month later. This finding is validated by previous research, as studies have shown this and similar associations (e.g. Gentile et al., 2011). It is important to note that to our knowledge, Gentile and colleagues (2011) have published the only other longitudinal study on this topic, suggesting that pathological video game use may lead to increased levels of depression (rather than depression leading to pathological video game use). This finding indicates directionality, in that pathological video game use is not merely a symptom of other mental health issues (e.g. depression), but that pathological video game use is problematic in and of itself. While the previous literature highlights these associations only among adolescents (Gentile et al., 2011), the current study deepens understanding of this connection by extending the findings into adulthood. This suggests that not only is pathological video game use problematic during adolescence, but also remains problematic into adulthood, at least in terms of mental health. There are therapeutic implications for this finding as counselors and therapists can help individuals overcome pathological video game use, and in effect decrease symptoms of depression in both adolescence and adulthood.

The third hypothesis was confirmed, as depression was significantly associated with lower levels of relationship satisfaction one month later, after controlling for initial levels of depression. This finding is supported by a multitude of previous research showing that depression can negatively impact romantic relationship outcomes (e.g. Najman et al., 2014). Indeed, research shows that depression is considered a source of impairment (Coyne & Benazon, 2001), and that relationship quality can fluctuate weekly depending on depressive symptoms (Whitton & Whisman, 2010). Additionally, depressive symptoms in one partner can increase spousal burden and depression in the other partner (Benazon & Coyne, 2000). These findings are

well supported by the social exchange theory (Emerson, 1976), as depressive symptoms in one partner may elicit the other to experience more costs than benefits in the relationship.

Finally, the fourth hypothesis was not confirmed as depression does not significantly mediate the association, or lack of association, between male pathological video game use and female romantic relationship satisfaction three months later. In other words, male pathological video game use is associated with increased male depression, and male depression is associated with lower levels of female relationship satisfaction, but depression cannot mediate the relation between male pathological video game use and female romantic relationship satisfaction because there is no significant association.

Limitations and Conclusion

There were many limitations associated with the current study, the first being that most participants reported very few symptoms of pathological video game use. This was likely due to the educated nature of the sample, as more than half had received a bachelors degree or higher. Additionally, the sample was mainly white, and very wealthy. It is likely that the well-educated, high-income nature of the sample was an influential factor for how little the individuals played video games. Indeed, if this study were replicated using a more diverse sample, the results would likely show a significant association between pathological video game use and romantic relationship satisfaction.

Further, this longitudinal study was only conducted over the span of three months. It is possible that pathological video game use is not something that influences romantic relationships immediately, but may begin to take effect over a longer period of time. Research should examine these associations over a longer period of time to understand how pathological video game use influences relationships long-term.

To conclude, the results of the current study suggest that male pathological video game use is not associated with female romantic relationship satisfaction, in this sample of individuals. However, as was discussed previously, there are a number of major limitations and according to the social exchange and displacement theories (Emerson, 1976; Kraut et al., 1998), there is evidence that findings would be different using an improved sample. Additionally, results showed that male pathological video game use was associated with increased levels of male depression, and that male depression was associated with lower levels of female romantic relationship satisfaction, which has been found in past literature. Overall, researchers should examine these associations again with a higher quality sample, to truly understand the relations between these variables. Additionally, research should continue studying pathological video game use and mental health outcomes, as these associations are clearly established in the literature.

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Table 1: Mean, Standard Deviation, and Range of all study variables

	Mean	Standard Deviation	Range
Male Pathological VG T1	1.26	1.90	(0,7)
Female Relationship Satisfaction T1	38.10	7.00	(12,45)
Depression T1	10.78	8.60	(0,42)
Depression T2	9.93	9.09	(0,49)
Relationship Satisfaction T3	38.41	7.07	(6,45)
Relationship Length	1.57	1.09	(1, 4)
Number of Children	1.85	.91	(1, 5)
Relationship Status	1.10	.44	(1, 3)

Table 2: Correlations between study variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Male Pathological VG T1	-							
2. Female Relationship Satisfaction T1	-.04	-						
3. Male Depression T1	.25*	.36***	-					
4. Male Depression T2	.32**	-.31***	.63***	-				
5. Female Relationship Satisfaction T3	-.07	.69***	-.19*	-.31***	-			
6. Relationship Length	-.17*	-.04	.01	.05	-.08	-		
7. Number of Children	-.05	.13*	.03	-.07	.03	.09	-	
8. Relationship Status	-.30**	-.29***	.17**	.23**	-.16*	-.17*	-.07	-

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 3: Full Regression Table

Variable	Model 1		Model 2		Model 3	
	<u>b</u>	<u>SE</u>	<u>b</u>	<u>SE</u>	<u>b</u>	<u>SE</u>
Male Pathological Video Game T1	-.15	.26	.89	.35	-	-
Male Depression T1	.07	.07	.58***	.10	.17**	.10
Male Depression T2	-	-	-	-	-.18***	.04
Female Relationship Satisfaction T1	.68	.09	-.36**	.12	.76***	.12
Length of Relationship	-1.45**	.44	.77	.59	-.48	.28
Number of Children	-.09	.50	.89	.70	-.32	.34
Relationship Status	-2.26	1.15	2.27	1.59	.16	.87

Dependent Variable for Model 1 and Model 3: Time 3 Female Relationship Satisfaction;

Dependent Variable for Model 2: Time 2 Male Depression;

* $p < .05$, ** $p < .01$, *** $p < .001$