Title

Unsatisfied needs as a predictor of obsessive passion for videogame play

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Abstract

While research shows that videogames have a positive impact for the majority of players, concerns remain about the situations in which videogame play becomes disordered and harmful. Drawing on Self- Determination Theory and the Dualistic Model of Passion and based on previous research in non-videogame domains, we sought to explore the extent to which need satisfaction outside of videogames (in general life) as well as need satisfaction from videogames predicted passion orientation. We also aimed to explore the extent to which passion for videogames predicted wellbeing outcomes. We undertook structural equation modelling with survey data from a sample of 170 participants. We found need satisfaction from videogames predicted both obsessive and harmonious passion, but importantly, that obsessive passion for videogames was predicted by low need satisfaction in general life. In turn, qualified support was found for obsessive passion predicting psychological distress and addiction. Overall, our findings highlight that when problematic gaming occurs it may be useful to focus outside of videogames as the cause of the problem.

Keywords: videogames; wellbeing; self-determination theory; passion; addiction

Public Significance Statement: We assess the extent to which need satisfaction from videogames and from general life is associated with healthy (harmonious) and unhealthy (obsessive) passion for videogame play. In turn, we assess the association between harmonious and obsessive passion a range of wellbeing related outcomes. Obsessive passion is more likely in the context of a lack of satisfaction from sources other than videogames (general life) and increases the likelihood of addiction, psychological distress and lower levels of vitality.

Introduction

Videogames continue to be an exceptionally popular activity with recent evidence suggesting interest in videogames is becoming more ubiquitous across countries (WEPC, 2020), gender and age (Brand et al., 2020). Encouragingly, a growing body of research (Connolly et al., 2012; Ferguson, 2007; Jones et al., 2014) suggests that videogame play has a positive impact on wellbeing for the majority of players. These positive impacts are varied, including positive emotions (Ryan et al., 2006; Wang et al., 2008), greater relaxation and recovery from stress (Russoniello et al., 2009; Wack & Tantleff-Dunn, 2009) and increased social connections (Depping & Mandryk, 2017; Perry et al., 2018). However, alongside work demonstrating the positive effects of videogame play, there has also been an increase in concerns around the possibility of disordered engagement with videogames (Allen & Anderson, 2018; Pontes et al., 2019), problematic gaming (Billieux et al., 2011; Deleuze et al., 2018; Desai et al., 2010), and potential addiction (Lemmens & Hendriks, 2016). Specifically, the Diagnostic and Statistical Manual of Mental Disorders has recently been extended to include Internet Gaming Disorder (American Psychiatric Association, 2013) and the World Health Organisation's International Classification of Diseases (ICD-11) now describes Gaming Disorder (World Health Organisation, 2018). Although helpful for developing and validating treatments aimed at problematic gaming (Higuchi et al., 2017), a number of scholars have argued that such classifications are premature (Van Rooij et al., 2018), citing concerns including the potential for formal classification to cause diagnostic inflation, the possibility that gaming disorder/addiction may more often be a symptom of other causes and not the underlying problem, i.e., it is a coping behaviour (Billieux et al., 2017), and that classification puts at risk the benefits of gaming for healthy, highly engaged players (Charlton & Danforth, 2010; Kardefelt-Winther et al., 2017).

Irrespective of questions of whether it is timely or premature to formally classify videogame-related disorders, there is general agreement that there are people for whom videogame

play is problematic (Kuss et al., 2017; Van Rooij et al., 2018) and others for whom videogame play is simply an enjoyable leisure activity that provides relief and recovery. To better understand why this single activity (videogame play) results in benefit or harm to players, the current study sought to explore the conditions under which videogames are more likely to have a positive or negative influence through the lenses of Self-Determination Theory and the Dualistic Model of Passion.

Self-determination Theory

Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) proposes that individuals need specific psychological nutriments from the activities they engage in, and from their life in general in order to thrive. The theory stipulates three such basic psychological needs: autonomy, competence, and relatedness. The need for autonomy implies we desire to feel free to make our own decisions about performing an activity, and to be able to express ourselves in that activity. The need for competence represents a desire to act effectively on the world around us and develop our skills through performing satisfying activities. Finally, the need for relatedness refers to a desire for supportive interpersonal connections with others through our shared activities. Across a wide range of situations and contexts (as well as in life in general), individuals who meet their basic psychological needs for autonomy, competence, and relatedness report higher levels of performance and wellbeing (Ryan & Deci, 2000). In contrast, those whose needs are unmet, thwarted or undermined report poor performance, less well-being and even show signs of ill-being such as anxiety and depression (Deci et al., 1994; Ryan, 1995; Ryan & Deci, 2000). A cornerstone of SDT is thus that psychological health is conferred as a function of the extent to which our psychological needs are satisfied. Since need satisfaction is experienced as pleasurable, activities that fulfill those needs become intrinsically motivating. SDT, along with earlier theories of motivation, distinguishes between intrinsic and extrinsic motivation as sources of goal-directed behavior (Deci & Ryan, 1985). Intrinsic motivation leads to engagement because such an activity is enjoyable or interesting in and of itself. Extrinsic

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motivation, in contrast, describes a process of engagement driven by expected outcomes that are external to the focal activity (Ryan & Deci, 2000).

Hierarchical motivation

According to the Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM; Vallerand, 1997), need satisfaction may occur at three distinct levels of engagement in an activity. The first and most specific level is situational and refers to the here and now. For example, someone who is engaged in a session of videogaming may or may not feel competent, autonomous and related to others during that particular session. Repeated occurrences of game playing eventually become a context of gaming (Turkay & Adinolf, 2015). This reflects the second level in the HMIEM model—the contextual level. As in the situational level, all three needs can be more or less satisfied at the contextual level. For example, a person may have a sense of usually feeling competent, autonomous and related to others when playing videogames. Finally, the most encompassing level in the model is the global level. This refers to one's life in general. Here, people may have a sense that their psychological needs are met in life, generally speaking. A video gamer may feel more or less autonomous, competent and related to others in his or her daily life, including but not limited to gaming.

Vallerand (1997) describes bottom-up and top-down effects in his model whereby (a) need satisfaction at a lower level (e.g., situational) influences need satisfaction at a higher level (e.g., contextual) and (b) need satisfaction at a higher level (e.g., global) influences need satisfaction at a lower level (e.g., situational). At all levels, need satisfaction is provided by need-supportive environments. Also at each level, satisfaction is depicted as a determinant of self-determined motivation which then leads to cognitive, affective and behavioral outcomes.

Need satisfaction in the context of video games

In the earliest demonstration of this process in a videogame context, self-reported autonomy and competence need satisfaction during a 40-minute game session was positively associated with a range of intrinsic motivation indicators including subjective game enjoyment, as well as preferences to continue playing and the desire to play the game again in the future (Ryan et al., 2006). A growing number of studies suggest that gaming represents an ideal activity for satisfying all three psychological needs, consequently improving well-being and game enjoyment (e.g., Johnson et al., 2016; Przybylski et al., 2010; Ryan et al., 2006; Tamborini et al., 2010). In their historical review of the videogame industry, Przybylski et al. (2010) found that video games have been increasingly designed to satisfy the basic psychological needs specified by SDT. Specifically, they note, early games focused on mastery of in-game challenges and goals, allowing players to satisfy their need for competence through game play. Developers increasingly introduced flexibility and increased options in game design, allowing players to exercise more choice and control in novel environments, which likely drove the success of such games given the appeal of pursuing autonomy needs. Modern developments in gaming also increasingly provide opportunities to engage and bond with other people in online and multiplayer settings, thereby satisfying relatedness needs (Przybylski et al., 2010). Most recently, Przybylski and Weinstein (2019b) found that need frustration, but not the absence of need satisfaction, predicted dysregulated gaming.

Passion and need satisfaction

Consistent with the development of intrinsic motivation, need satisfaction through an activity has been shown to lead to passion for that activity (Vallerand et al., 2003). In 2003, Vallerand and colleagues developed their Dualistic Model of Passion (DMP). In it, they propose that individuals can become passionate for just about any activity – from playing basketball or guitar, to collecting stamps. The DMP specifies a process by which activities

are internalized and become part of our identity. In a three-stage process, we first select an activity from the available options, we then come to value that activity, and finally we internalize the valued activity by adopting it as part of our self-identity (Mageau et al., 2009; Vallerand, 2015).

Vallerand et al. (2003) identified that intrinsic motivation as described in SDT is closely related to their concept of passion in that both imply that individuals pursue an activity or engage with a desire for pleasure and enjoyment. According to the DMP, to the extent our needs are satisfied when engaging in an activity, we are increasingly likely to value that activity as a passion. Vallerand et al. (2003) argued, however, that intrinsic motivation as described in SDT is a short-term process emerging from the interaction between an individual and their current activity. Passion, they suggested, is distinct in describing activities that are internalized to the extent they become an enduring part of an individual's identity. For example, one who develops a passion for playing guitar is a "guitarist", and a passionate videogame player becomes a self-identified "gamer".

The dualistic model suggests that the developing passion can variously emerge as more harmonious or more obsessive (Mageau et al., 2009; Vallerand et al., 2003). When people are harmoniously passionate about an activity, they describe it in positive terms and engage in it freely without suffering negative consequences, such as in conflicts with other activities or goals in their life. In other words, the passionate activity and other activities coexist in harmony in the person's life. Obsessive passion also describes activities that we have a strong desire to engage in, but here the desire is characterized more as an uncontrollable urge that is in conflict with other activities and goals and leads to the neglect of those other pursuits. Although this rigid persistence can be associated with performance gains (Vallerand et al., 2007) and increased time spent engaged in the activity (e.g., Perry et al., 2018), obsessive passion is also associated with negative outcomes such as ruminating

over missed opportunities to engage in the passionate activity or engaging in the activity despite being injured (Vallerand, 2011; Vallerand et al., 2006).

The passion literature has developed around both antecedents and consequences of this process by which we internalise our loved activities (Curran et al., 2015; Vallerand, 2015). Prominent among these is observations, consistent with SDT, that autonomy-supportive contexts promote the development of harmonious passion, whereas controlling social contexts in which a passion is developed tend more toward obsessive passion. Mageau et al. (2009), for example, found that participants were more likely to develop harmonious passion relative to obsessive passion in their activity when relevant authority figures— coaches, teachers, or parents—provided more supportive environments.

Compensatory obsessive passion

Lalande et al. (2017) specifically showed that a tendency toward harmonious passion versus obsessive passion with regards to activity engagement in different contexts is determined in part by the degree that psychological needs are unmet in one's life in general. Across a variety of populations and passionate activities (e.g., music, basketball, self-selected passion) they showed that obsessive passion was negatively related to autonomy, relatedness and competence satisfaction at the global level (e.g., in work or general life), and the authors concluded that becoming obsessively engaged in an activity may serve a compensatory function to fulfill those thwarted needs. In other words, when need satisfaction is lacking in a broader context, people may turn to passionate activities to compensate. While passionate activities may provide compensatory need satisfaction in such situations, passion is likely to become obsessive and the overall impact on wellbeing is often negative.

Passion for Videogames

Przybylski, Weinstein, Ryan, & Rigby (2009) reported that trait-level (global level in terms of the HMIEM) need satisfaction (i.e., need satisfaction in general life) was associated with

greater harmonious passion and lower obsessive passion for video games, suggesting a process in which global need satisfaction would "dispose one to fuller internalization of play and thus relate to increased harmonious passion for video game play" (p. 486). Looking specifically at social modes of play, Perry and colleagues (2018) found that harmonious (but not obsessive) passion mediated the positive association between playing with others and social capital (a measure of the connections or links that a person has with others including those close to us such as close friends and family as well as more distant friends, colleagues and associates (Putnam, 2000). Moving beyond need satisfaction to consider need frustration, Toth-Kiraly and colleagues (2019) found that while need satisfaction predicted harmonious passion, need frustration predicted obsessive passion in the context of videogame play (however they focussed on needs in general life and did not consider need satisfaction specific to videogame play). These authors found that harmonious passion was, in turn, associated with adaptive outcomes and obsessive passion with maladaptive ones. With a focus on negative physical symptoms associated with excessive videogame play (e.g., carpal tunnel syndrome, dry eyes) Schellenberg and colleagues (2019) applied a "quadripartite" model of passion which distinguished pure harmonious, pure obsessive, mixed and no passion. The least number of negative physical symptoms were found for those players with pure harmonious passion and the most issues for those with pure obsessive passion.

The Present Study

To help further clarify how gaming affects wellbeing, we sought to investigate how need satisfaction in general (i.e., global need satisfaction) relates to need satisfaction through videogame play (i.e., contextual need satisfaction), as well as passion for videogame play, and wellbeing related outcomes. This research extends previous work in the domain by simultaneously considering both global and contextual need satisfaction (cf. Perry et al., 2018; Przybylski et al., 2009; Schellenberg et al., 2019; Tóth-Király et al., 2019) and specifically considering this relationships in the context of videogame play (cf. Lalande,

Vallerand, Lafreniere, et al., 2017). Based on Lalande and colleagues' findings across multiple (non-gaming) domains, we expected levels of global need satisfaction outside of videogame play to determine whether contextual need satisfaction from videogames is associated with obsessive or harmonious passion for videogames. In other words, we expected to provide additional support for the hypothesis that obsessive passion for videogames is a compensatory response to unsatisfied needs outside the context of videogame play. In turn, we expected that harmonious passion for videogaming would predict higher levels of wellbeing and conversely, that obsessive passion would predict lower wellbeing. More specifically, we hypothesised that:

H1: High need satisfaction from videogames would predict both harmonious and obsessive passion for videogame play

H2: Low need satisfaction from general life would predict obsessive passion for videogames

H3: High harmonious passion would predict greater positive wellbeing and lesser negative wellbeing outcomes

H4: High obsessive passion would predict lesser positive wellbeing greater negative wellbeing outcomes

Method

Participants were 170 (72 female, 96 male, 2 other; mean age = 24.7 years, SD = 8.44) people who reported playing videogames. The sample was drawn from multiple sources and snowball sampling was employed. An open-ended question was used to ask participants how they heard about the research study. Unfortunately, the responses provided were ambiguous in many cases. Specifically, while 70 participants (40%) indicated they were drawn from an undergraduate psychology course and 21 (12%) indicated they were drawn from gaming or technology forums, the remaining 80 people (47%) provided responses that indicated they heard about the survey via snowball sampling or that were ambiguous (e.g., "email" which may indicate they were recruited via an existing mailing list of people who

have indicated an interest in videogame or that they received an email from a friend). Regardless, given the common interest in videogame play we consider that all participants are drawn from the population of videogame players and thus should be analysed collectively. Participants completed two online surveys approximately one month apart. Given the attrition between Time 1 and Time 2 (only 82 participants provided data at Time 2), the present study focuses on data from Time 1. Participants were given a choice between receiving a half-credit (if they were students) or the chance to win a $100USD amazon voucher for each of the two surveys they completed. The sample was self-identified as highly experienced with video games, with a mean of 5.63 on a scale ranging from 1 (not at all experienced) to 7 (very experienced), and estimated that they played video games for around 20.6 hours per week on average (SD = 17.6) in the past year. Almost all (94.4%) had played video games in the past year.

Measures

Seven-point Likert response scales were used (unless specified otherwise), with higher scores indicating higher levels of the construct.

Need Satisfaction from Videogames (contextual level). Twelve items were adapted from The Basic Psychological Needs Scale (Deci & Ryan, 2000; Gagné, 2003) to measure the extent to which participants' psychological needs were met by playing video games. Four items measured each of three needs for autonomy, competence, and relatedness. Example items (with adaptations to the domain of video games italicized) include: "I feel that the way I play *video games* is definitely an expression of myself" (autonomy); "I have been able to develop interesting new skills *in gaming* recently" (competence); and "I consider the *video game players* I regularly interact with to be my friends" (relatedness). All 12 items were combined to form an overall measure of need satisfaction with a Chronbach's alpha reliability coefficient of .733.

Need Satisfaction in General (global level). Twelve items, again from the Basic Psychological Needs Scale (Deci & Ryan, 2000; Gagné, 2003), were used to measure need satisfaction in life in general. Example items include "I feel free to express myself in my life" (autonomy), "I have been able to develop interesting new skills recently" (competence), and "I consider the people I regularly interact with to be my friends" (relatedness). An overall index of general need satisfaction combining all 12 items had acceptable reliability (α = .832).

Passion for Videogames (contextual level). The Passion Scale (Vallerand et al., 2003) comprises two six-item subscales assessing harmonious and obsessive passion. Due to a coding error, one item ("If I could, I would only play videogames") was unintentionally excluded from the obsessive passion scale (leaving 5 items). Consistent with the original intention of the scale, the generic term "passionate activity" was replaced with "playing video games". Example items include "Playing videogames is in harmony with the other activities in my life" (harmonious passion) and "I have difficulties controlling my urge to play videogames" (obsessive passion). Both subscales were found to have acceptable reliability (α = .883 for harmonious; α = .842 for obsessive).

Satisfaction with Life (global level). The commonly used Satisfaction With Life Scale (Diener et al., 1985) was used as a measure of wellbeing. The scale includes five items such as, "In most ways my life is close to my ideal.". The scale had acceptable reliability (α =.878)

Vitality (global level). The Subjective Vitality Scale (Ryan & Frederick, 1997) was used as an additional measure of wellbeing. The scale includes seven items such as, "I feel alive and vital" and "I look forward to each new day.". The scale had adequate reliability (α = .902)

Psychological Distress. The Kessler K6 scale (Kessler et al., 2003) was used as a measure of psychological distress. The scale consists of 6 items with an associated 5-point

likert-type response scale (in the same form with changing descriptors) such as "During the past 30 days, about how often did you feel hopeless / worthless / that everything was an effort?". The scale was found to have acceptable reliability (α =.874).

Addiction. To measure addiction, we used the 13 item addiction sub-scale from the Charlton-Dansforth Addiction and Engagement questionnaire (Charlton & Danforth, 2010). Example items include "I often feel that I spend more money than I can afford on videogames" and "When I am not playing videogames I often feel agitated", with higher ratings indicating more negative outcomes (greater addiction). The scale was found to have acceptable reliability (α =.798).

Results

Approach to Analysis

To assess hypotheses 1 through 4, we conducted a path analysis in which wellbeing outcomes (addiction, psychological distress, satisfaction with life and vitality) were regressed on both harmonious passion (H3) and obsessive passion (H4) consistent with models reported in Lalande and colleagues (2017). In turn, obsessive and harmonious passion were both regressed on need satisfaction from games (H1), while obsessive passion was also regressed on need satisfaction in general life (H2), again consistent with Lalande and colleagues (2017). Finally, while no direct hypothesis was generated (previous research has found inconsistent support for the relationship Lalande, Vallerand, Lafrenière, et al., 2017; cf. Tóth-Király et al., 2019), harmonious passion was also regressed on need satisfaction in general life. We also included direct pathways from need satisfaction in general to each of the wellbeing outcomes. Although no specific hypothesis was made, we allowed for the possibility of association as both general need satisfaction and our wellbeing constructs appear to operate at the global level of Vallerand's (1997) HMIEM.

When evaluating model fit, Hu and Bentler (1999) suggested models should generally have a standardized root mean square residual (sRMR) below 0.080 and a root mean square error of approximation (RMSEA) below 0.060. Additionally, Kline (2016) suggests models should have CFI and TLI values above 0.95.

Findings

The means, standard deviations, and minimum and maximum values for all measures are presented below in Table 1. Other than the K6 measure of psychological distress, all scales were calculated as the mean of their individual items. As proposed by the scale authors (Kessler et al., 2003), the K6 was calculated as a sum of the individual items. To facilitate ease of comparison, we followed the US approach of scoring individual items between 0 and 4 resulting in a possible range of 0 to 24.

Table 1.

Descriptive Statistics for Scales

Variable	Mean	SD	Min.	Max.
Need Satisfaction Games	4.90	.82	2.42	6.42
Need Satisfaction General	4.97	.88	2.14	6.67
Harmonious Passion	4.78	1.30	1	7
Obsessive Passion	2.55	1.27	1	6
Satisfaction with Life	4.45	1.42	1	7
Vitality	4.14	1.26	1.14	7
Psychological Distress	5.91	4.10	0	24
Addiction	3.07	.99	1	6

The path analysis was estimated in Mplus 7 using a robust maximum likelihood estimator. The model provided good fit to the observed data according to the cutoff criteria described above: $\chi^2(27)=471.817$, $p<.0001$; sRMR = 0.016, RMSEA = 0.065, CFI=0.994, TLI=0.956.
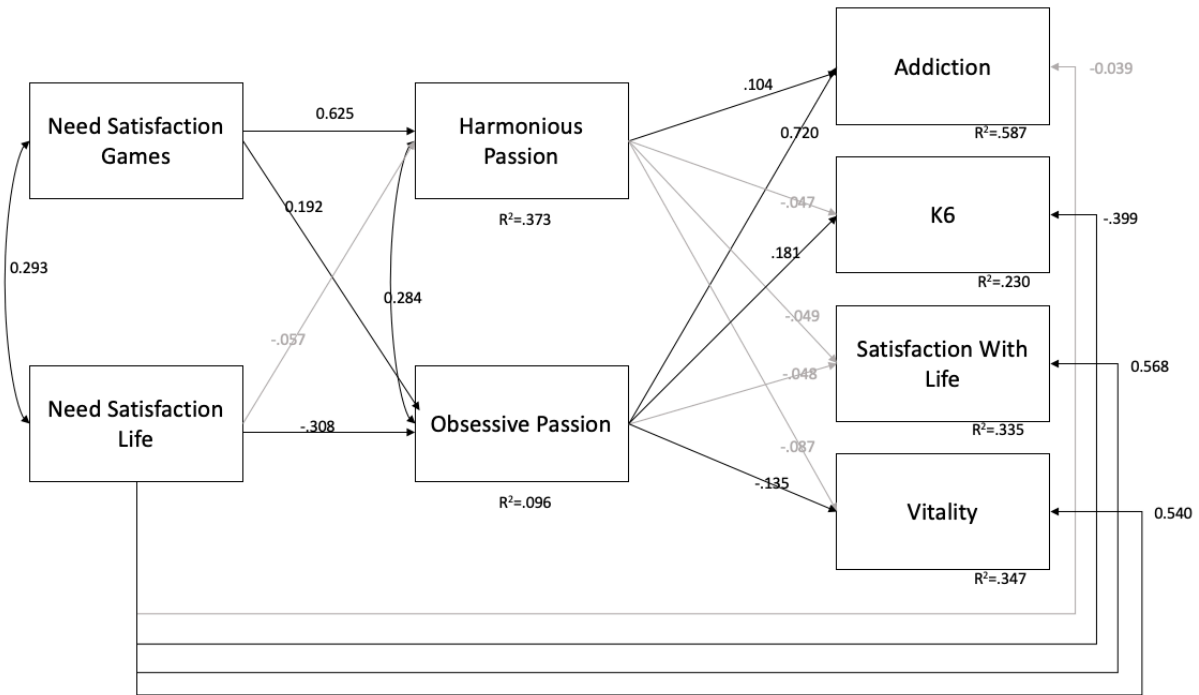
Figure 1. Path Analysis showing relationship between need satisfaction, passion and wellbeing outcomes. Significant pathways (at *p* < .01) are represented as black lines, non-significant pathways are represented as grey lines.

In the model, need satisfaction from games was positively associated with both higher harmonious and obsessive passion for videogame play (supporting H1) while need satisfaction in general life was negatively associated with obsessive passion (supporting H2) and not associated with harmonious passion. Harmonious passion was unexpectedly positively associated with addiction[1] and no associations were found between harmonious passion and other wellbeing outcomes (failing to support H3). Obsessive passion was positively associated with addiction and psychological distress and negatively associated with vitality (partially supporting H4). Additionally, need satisfaction in general life was

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[1] Given the unexpected nature of this result, we undertook some additional analysis of the specific items involved. In terms of the relationship between harmonious passion and the addiction items, one item shows a particularly strong correlation (approximately double the next most strongly related item). The addiction scale item most strongly correlated with harmonious passion was "I feel a sense of power when I am playing videogames" which arguably is more strongly related to a sense of competence during play than to problematic play or addiction per se.

positively associated with vitality and satisfaction with life and negatively associated with psychological distress.

Discussion

Overall, our results are consistent with the previous work of Lalande and colleagues (Lalande, Vallerand, Lafreniere, et al., 2017), in non-videogame domains. Specifically, we found support for Hypothesis 1 showing that need satisfaction from videogame play positively predicted harmonious and obsessive passion. Notably, need satisfaction from videogames more strongly predicted harmonious passion than obsessive passion. Furthermore, consistent with previous work, we also found support for Hypothesis 2, in that a lack of need satisfaction in general life predicted obsessive passion (Lalande, Vallerand, Lafreniere, et al., 2017; Mageau et al., 2009; Przybylski et al., 2009; Tóth-Király et al., 2019). Importantly, a lack of need satisfaction in everyday life was a stronger predictor of obsessive passion than need satisfaction from videogame play. In contrast to the findings of Lalande and colleagues (2017), Hypothesis 3 was not supported. Firstly, harmonious passion failed to predict satisfaction with life, vitality or psychological distress. However, it emerged that satisfaction with life, vitality and psychological distress were predicted by general need satisfaction. Secondly, harmoniously passion was found to predict addiction in an unexpected direction (greater harmonious passion associated with an increased likelihood of addiction). Finally, Hypothesis 4 was largely supported such that obsessive passion predicted higher levels of psychological distress and addiction and lower levels of vitality (though it did not relate to satisfaction with life).

In the case of positive wellbeing outcomes we found that need satisfaction in life was a better predictor than harmonious passion for videogames. While the Hierarchical Model of Intrinsic and Extrinsic Motivation (Vallerand, 1997) notes that need satisfaction at one level (e.g., global) can influence need satisfaction at another level (e.g., contextual), it also

predicts that a global measure of need satisfaction (need satisfaction in general life) should be a stronger predictor of a global wellbeing measure (e.g., vitality) than a more contextual variable such as passion for videogames. In other words, videogames are one part of a person's life and it makes intuitive sense that in many cases they are not the most influential factor for positive wellbeing. This is in keeping with the predictions and findings of Przybylski and colleagues (2009) who found that while passion related to overall wellbeing outcomes the variance accounted for was significantly less than that between trait need satisfaction and wellbeing outcomes. However, this pattern of results may not extend to a sample with a more pronounced interest in videogames. A component of our sample was drawn from a population of undergraduate psychology students, it may be that a sample with a specific focus on videogames (for example students in a videogame degree, or drawn more exclusively from videogame related forums) might show stronger links between passion and wellbeing outcomes. Future research should assess these relationships with a more gaming focussed sample. In contrast, obsessive passion was confirmed as predicting negative wellbeing outcomes and reduced positive wellbeing. Notwithstanding the importance of keeping in mind that obsessive passion can represent a compensatory response (Lalande, Vallerand, Lafrenière, et al., 2017; Tóth-Király et al., 2019), this suggests that obsessive passion for videogame play has implications for player wellbeing with a greater likelihood of psychological distress and addiction and reduced likelihood of feelings of vitality.

The unexpected findings with respect to H3 (harmonious passion failing to predict the majority of wellbeing outcomes and predicting addiction in an unexpected direction), sit within the context of a larger literature presenting inconsistent findings related to passion and wellbeing outcomes (Perry et al., 2018; Przybylski et al., 2009; Schellenberg et al., 2019; Tóth-Király et al., 2019). The relationship between harmonious passion and addiction is somewhat surprising but potentially indicates that high levels of passion, in general, are associated with an increased likelihood of addiction. Importantly, the relationship between obsessive passion and addiction is markedly stronger than that between harmonious

passion and addiction, suggesting that obsessive passion is the much larger risk factor. As described in the results the unexpected nature of this finding prompted us to undertake some additional analyses which can be cautiously interpreted as suggesting that it may not be addiction so much as a strong feeling of competence that is driving the positive association between these measures. This highlights challenges with defining and measuring behavioural addiction. However, it should also be acknowledged that the unexpected results with respect to harmonious passion may be specific to the sample in the current study and further research should seek to explore and replicate this finding.

Turning to the lack of relationship between harmonious passion and the wellbeing outcomes other than addiction, three possible explanations seem pertinent. Firstly, as noted above, the connection between harmonious passion and wellbeing may prove stronger with a sample more strongly interested in videogames. Secondly, it may be that our use of a global measure of non-videogame related need satisfaction (general life) effectively overpowered the relationship between passion and wellbeing in the model. To this end, future research could usefully explore the use of more specific sources of non-videogame need satisfaction (e.g., satisfaction at work or in university).

With respect to H4, obsessive passion showed the expected relationship with the majority of wellbeing outcomes confirming this type of passion as problematic. As noted above, obsessive passion strongly predicted addiction, but importantly also related to psychological distress and reduced vitality showing that this type of passion can be a useful indicator of potential issues in a person's broader life.

Our study provides further support that need satisfaction during videogame play fuels passion for play—both harmonious and obsessive (H1). This is not particularly surprising and reflects the process wherein the satisfaction of needs fuels passion for an activity. More important, given current concerns about problematic videogame play is the evidence that

satisfaction of needs during videogame play contributes more to the optimal form of passion (harmonious) than to the more problematic form of passion (obsessive). Furthermore, poor need satisfaction in general life is a stronger predictor of obsessive passion than need satisfaction within games. Overall, the negative relationship between general need satisfaction and obsessive passion and positive relationship between need satisfaction from games and obsessive passion is consistent with existing evidence of obsessive passion for videogames being a compensatory response, shown in other domains, such as passion for sports (Lalande, Vallerand, Lafrenière, et al., 2017; Mageau et al., 2009) and music (Lalande, Vallerand, Lafrenière, et al., 2017). However, our data is cross-sectional and multi-timepoint data is needed to confirm that videogame players who become obsessed are seeking need satisfaction from videogames to make up for a lack of need satisfaction from other sources (that is, the lack of need satisfaction from other domains causes the obsessive passion). With the data from the current study it is also possible that those who become obsessed with videogames begin to experience less need satisfaction from other activities (that is the obsessive passion causes the lack of need satisfaction from other domains).

Regardless, for those concerned with problematic gaming (on either a personal level or as a professional e.g., a mental health practitioner), our findings highlight the importance of looking beyond videogames themselves for explanations. Where disordered or problematic gaming is being observed, it is likely more useful to ask why a person is receiving relatively poor need satisfaction in other areas of life. This lends support to the concerns raised regarding formal classification of problematic gaming as a disorder (Van Rooij et al., 2018). If obsessive passion for videogame play is influenced by poor need satisfaction in general life, then focussing on videogames as a cause of the problem (rather than as a symptom of a different underlying problem) may ultimately be harmful.

Furthermore, it may be that in some cases, videogame play is serving a protective role for players experiencing low need satisfaction in their wider life. For example, a person feeling

isolated at work may experience rich and valuable connections through online videogame play (Cole & Griffiths, 2007; Depping & Mandryk, 2017; Trepte et al., 2012). While their passion for videogames may have become obsessive (with associated negative impacts on wellbeing), removing videogames as their primary source of social capital may cause further harm. Rather, it seems likely that the more productive approach would be to supplement the connections they are experiencing through videogame play with the building of connections in other settings. As the need satisfaction they experience in other settings increases, their passion for videogame play should become less obsessive and more harmonious. Obviously, while this process aligns with existing theory, future research is needed to confirm this process.

Limitations

The primary limitation of the current work relates to the method of data collection. Our data is drawn from a self-report survey and is cross-sectional and correlational. As a result, no firm conclusions can be made regarding causality and regardless, our findings would be further strengthened by the collection of longitudinal data. Additionally, since conducting this work, as described in the introduction, research has been published which highlights the relevance of need frustration (in addition to need satisfaction) to the domain (Przybylski & Weinstein, 2019a; Tóth-Király et al., 2019). These findings highlight the value of extending our current work to include consideration of need frustration, both within videogame play and general life. Separately, in the current study we do not attempt to assess whether different games or genres of games have a different impact. Given the significant ways in which games vary it would be useful to allow for this in future research. Finally, while our results speak to the issues of obsessive passion and associated negative outcomes, it should be noted that the levels of psychological distress and addiction were relatively low in our sample. With respect to the K6, only 4.2% of our sample met the criteria for severe distress (scores greater than or equal to 13).. Relatedly, the mean score for obsessive passion in the sample was also relatively low. Future research might usefully explore the relationships between need

satisfaction, passion and wellbeing among samples experiencing greater distress and/or exhibiting higher levels of obsessive passion and addiction.

Conclusions

Our findings show that need satisfaction from videogames is the stronger predictor for harmonious passion for videogames, whereas a lack of need satisfaction in general life is the stronger predictor for obsessive passion. In turn, obsessive passion predicted increased addiction and distress and reduced vitality, while harmonious passion did not predict wellbeing outcomes other than a relatively small relationship with addiction. Need satisfaction in general life was found to be a stronger predictor of positive wellbeing outcomes than passion for videogames. While our findings do not directly speak to overall rates of problematic gaming, they highlight that when problematic gaming is observed, it may be useful to focus outside of videogames themselves as a cause of the problem. For instance, when confronted with obsessive passion for videogames, players, parents, friends or mental health practitioners might usefully first look to the broader context surrounding videogame play. Specifically, encouraging the person to diversify their interests, with associated increased opportunities to derive need satisfaction from other sources might be the most impactful path to deal with problematic gaming.

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