Passion or addiction? Correlates of healthy versus problematic use of videogames in a sample of French-speaking regular players

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HIGHLIGHTS

• The study confirmed the distinction between engagement and addiction in video games.
• Addiction is linked to impulsive traits and depressive symptoms, but engagement is not.
• Both addiction and engagement correlate with the DSM-5 Internet gaming disorder (IGD).
• IGD criteria do not necessarily reflect problematic use and can pathologize gamers.
• The study calls for refinement of current diagnosis criteria of gaming disorder.

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ABSTRACT

A criticism of current diagnostic approaches to gaming disorder is that they fail to take into account that high and repeated engagement is not problematic per se, nor is it necessarily associated with adverse consequences. To tackle this controversy, we used Confirmatory Factor Analysis (CFA) to test, in regular gamers (N = 268), whether high (but healthy) engagement can be distinguished from problematic engagement by using the Addiction-Engagement Questionnaire (Charlton & Danforth, 2007). We then tested whether differential relationships exist between the engagement and addiction constructs, DSM-5 criteria for Internet gaming disorder (IGD), and psychological factors linked to gaming use and misuse (self-reported impulsivity, motives to play, and depression). Results indicated that a model holding engagement and addiction as two distinct, but related, constructs fits the data well. Second, we showed that although both constructs are linked to the number of IGD criteria endorsed, the relationship is more pronounced for the addiction construct. Third, a differential pattern of correlations was observed with the other study variables, further supporting the need to distinguish the two constructs. Our study emphasizes that research is needed to refine the diagnostic approach to gaming disorder to avoid conflating healthy passion with pathological behavior.

1. Introduction

A growing number of studies focused on excessive use of videogames and its associations with psychiatric, health, and interpersonal problems (e.g., Achab et al., 2011; Longman, O’Connor, & Obst, 2009; Pawlikowski & Brand, 2011; Stetina, Kohgassner, Lehenbauer, & Kryspin-Exner, 2011). Studies also included treatment-seeking cases (Müller et al., 2017; Sakuma et al., 2017; Thorens et al., 2014), indicating that problematic engagement in videogames has become a clinical reality.

Section 3 of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) integrated Internet gaming disorder (IGD) as a condition for further study, and the beta draft of the 11th revision of the International Classification of Diseases (ICD-11; World Health Organization, 2017) included gaming disorder in the section “Disorders due to substance use or addictive behaviours.” Following the release of the DSM-5, numerous epidemiological and case-control studies were conducted and
accumulating data about IGD were gathered, although the validity of the proposed IGD criteria remains debated (Deleuze et al., 2017; Griffiths et al., 2016).

Still, most studies fail to take into account that high engagement is not necessarily problematic (Colder Carras & Kardefelt-Winther, 2018; Király, Tóth, Urbán, Demetrovics, & Maraz, 2017) and that not all highly engaged gamers experience adverse consequences (Billieux et al., 2017; Charlton & Danforth, 2007; Kardefelt-Winther et al., 2017). In this regard, the seminal works of Charlton (2002) and Charlton and Danforth (2007) questioned the approach that consists of applying recycled substance use disorder criteria to the screening of computer-related addictive behaviors. Using Brown’s (1993) criteria for behavioral addictions as a rationale, Charlton and Danforth (2007) highlighted that when applied to gaming, these criteria constitute either addiction or elevated yet non-problematic engagement (i.e., cognitive salience, tolerance, and euphoria). Crucially, the IGD criteria included in the DSM-5 comprise both core and peripheral criteria, which is a concern when defining a potentially new disorder. Along the same lines, Deleuze et al. (2017) suggested that IGD criteria confute high and problematic engagements. Other studies supported the notion that high engagement must be distinguished from harmful engagement. Thus, Billieux et al. (2013) showed in a longitudinal study that fast in-game progression is not associated with symptoms of disordered gaming, implying that high engagement is not necessarily problematic. More recently, Przybylski, Weinstein, and Murray (2017) used IGD criteria in a large sample from the general population and reported that only a small proportion of the sample could be qualified as having clinically relevant problematic use of online gaming (between 0.3% and 1%). Furthermore, most participants endorsing the IGD diagnosis are highly engaged players who face minimal consequences in relation to gaming. Failing to distinguish between a dys-functional from a high but healthy engagement might have important repercussions, such as generating unreliable epidemiological studies or pathologizing normal behavior (Aarseth et al., 2017; Bean, Nielsen, van Rooij, & Ferguson, 2017; Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Markey & Ferguson, 2017).

Accordingly, further disentangling the characteristics and correlates of high versus maladaptive engagement in videogames is urgent. To this end, we tested in a sample of regular gamers whether the two constructs developed by Charlton and Danforth, “engagement” versus “addiction,” are identified by using confirmatory factor analysis (CFA), as their initial works relied only on exploratory factor analyses (Charlton, 2002; Charlton & Danforth, 2007). If successful, this first objective will provide a psychometrically sound French version of the Addiction-Engagement Questionnaire developed by Charlton and Danforth (2007). Our second objective was to explore whether differential relationships exist between Charlton and Danforth’s engagement and addiction constructs and specific factors that have been linked to gaming use and misuse, including impulsivity (Billieux, Thorens, et al., 2015; Choi et al., 2014; Ko et al., 2015), depression (Bargeron & Hormes, 2017; Gentile et al., 2011), and motivations to play online (Billieux, Thorens, et al., 2015; Kirby, Jones, & Copello, 2014; Ye, 2006). We expected to find differential associations, so that the addiction construct only would correlate with factors having been related to problematic videogame use in previous studies. Finally, we explored the relationships between the tentative DSM-5 IGD criteria and the engagement and addiction constructs. Because IGD criteria are supposed to measure pathological behavior, we expected them to correlate specifically with the addiction construct.

2. Method

2.1. Participants and procedure

Participants were recruited through an online contact survey sent to the entire student community of the Université catholique de Louvain (Belgium) by using an online platform (Qualtrics, Provo, UT), reaching a total of 1637 potential participants. Inclusion criteria were being 18 years or older, native or fluent French speaker, and playing online videogames at least once per week. Of the 645 eligible participants, 291 gamers completed the entire survey, of which 23 were removed because of incomplete data.

The final sample consisted of 268 participants (48 females) between 18 and 34 years (M = 21.52, SD = 3.00). Completing the survey guaranteed their participation in a random draw in which five respondents of the total sample received 20 euros in cash. The ethical committee of the Psychological Science Research Institute of the Université catholique de Louvain approved the study protocol.

The participants started the online survey by providing their informed consent. They filled out demographic (age, gender, language, educational level) and online gaming-related information (favorite genre, number of hours spent playing per week). They filled out questionnaires in the following order: the Addiction-Engagement Questionnaire (Charlton, 2002; Charlton & Danforth, 2007), IGD criteria (Petry et al., 2014), the short UPPS-P Impulsive Behavior Scale (s-UPPS-P; Billieux et al., 2012), the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and the Motivation to Play in Online Games Questionnaire (MPOGQ; Yee, 2006). All alpha values reported below were obtained in the current sample.

2.2. Instruments

2.2.1. Addiction-Engagement Questionnaire

The Addiction-Engagement Questionnaire (Charlton & Danforth, 2007, 2010) is a 24-item scale measuring two types of online videogame engagement. The participants first indicate which specific game they currently play the most, the name of this game then being implanted in each of the questionnaire’s items. In developing the French Addiction-Engagement Questionnaire, the 24 items were first translated into French before being back-translated into English by a bilingual English-French speaker. The back translation resulted in a solution that was acceptable for all items. The first 12 items measure dysfunctional engagement in videogames (Addiction subscale), while the last 12 items are assumed to measure healthy engagement in videogames (Engagement subscale). The French questionnaire, along with the corresponding English items, are reported in the Appendix 1.

2.2.2. Internet gaming disorder (IGD)

The nine IGD criteria were assessed with a nine-item questionnaire provided by Petry et al. (2014). The respondents have to provide a binary answer regarding whether they endorse each item as having occurred over the past 12 months. The IGD items measure preoccupation, withdrawal, tolerance, loss of control, loss of interest, excessive gaming despite problems, deception, negative mood regulation, and jeopardizing. Five or more positive answers are required to indicate IGD (American Psychiatric Association, 2013; Petry & O’Brien, 2013).

2.2.3. Short UPPS Impulsive Behavior Scale (s-UPPS-P)

Impulsivity was measured with the s-UPPS-P (Billieux et al., 2012). This 20-item questionnaire measures five distinct impulsivity facets on a 4-point Likert scale: negative and positive urgency (i.e., acting rashly under the influence of strong negative and/or positive emotions; Cronbach’s alphas of 0.81 and 0.75), lack of premeditation (i.e., difficulties taking into account the consequences of an action; Cronbach’s α = 0.84), lack of perseverance (i.e., difficulties remaining focused on a difficult or boring task; Cronbach’s α = 0.90), and sensation seeking
2.2.4. Center for Epidemiologic Studies Depression Scale (CES-D)

The 20-item version of the CES-D was used (Fuhrer & Rouillon, 1989; Morin et al., 2011) to measure depression. Items are scored on a 4-point Likert scale (Cronbach’s α = 0.90). The CES-D was used in the current study as a dimensional measure of depression.

2.2.5. Motivation to Play in Online Games Questionnaire (MPOGQ)

The MPOGQ (Yee, 2006) is a 39-item questionnaire that measures the motivations to play online videogames on a 5-point Likert scale. Ten motivations to play are assessed under three main categories: (1) Achievement, including Advancement (i.e., progression in the game; Cronbach’s α = 0.79), Mechanics (i.e., knowing how the game system works; Cronbach’s α = 0.79), and Competition (i.e., challenging other players; Cronbach’s α = 0.73); (2) Social, including Socializing (i.e., helping and chatting with others; Cronbach’s α = 0.80), Relationship (i.e., forming long-term relationships; Cronbach’s α = 0.77), and Teamwork (i.e., being part of the group effort; Cronbach’s α = 0.76); and (3) Immersion, including Discovery (i.e., discovering as many things as possible within the game; Cronbach’s α = 0.85), Role-Playing (i.e., creating a background for the avatar, interacting with others as if you were the character; Cronbach’s α = 0.84), Customization (i.e., liking to customize the appearance of the avatar; Cronbach’s α = 0.82), and Escapism (i.e., escaping from real-life problems through the game; Cronbach’s α = 0.67). The French version (Billieux et al., 2013) was used in the present study.

2.3. Data analysis

To determine the factorial structure of the Addiction-Engagement Questionnaire, we undertook CFA with maximum likelihood estimation. We compared three models that consider the relationships among the two components of problematic playing of online videogames. The first model holds that there is a single unitary construct of gaming engagement. The second model identifies two independent constructs of addiction and engagement, while the third model recognizes those two factors as being interrelated.

Regarding model evaluation, we chose to compute relative chi-square values ($\chi^2$/df) to test the goodness of fit for each model, because $\chi^2$ is known to increase with sample size, and it is unusual to obtain nonsignificant $\chi^2$ values when performing CFAs on self-reported questionnaires (Byrne, 1994). A relative $\chi^2$ of between 1 and 2 indicates a reasonable fit (Byrne, 2012; Marsh & Hocevar, 1985). Moreover, in addition to $\chi^2$, two other indices that depended on conventional cutoffs were computed, namely, the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) (Hu & Bentler, 1999). Their combination was adopted because the RMSEA is sensitive to misspecification of the factor loadings and the SRMR is sensitive to the misspecification of the factor covariances. An RMSEA of between 0 and 0.05 indicates a good fit and that between 0.05 and 0.08 represents an acceptable fit. An SRMR of between 0 and 0.05 indicates a good fit and that between 0.05 and 0.10 represents an acceptable fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003). We also reported the comparative fit index (CFI). A CFI higher than 0.90 indicates an acceptable fit (Hooper, Coughlan, & Mullen, 2008). Internal reliability of the Addiction-Engagement Questionnaire and its two postulated subscales was measured with Cronbach’s α coefficient.

Two-tailed Pearson correlations were used to explore the relationships between the Addiction-Engagement subscales and the other constructs included in the study. When both scales of the Addiction-Engagement Questionnaire significantly correlated with a specific construct, Fisher z-to-r transformations were performed to compare these correlations.

### Table 1

Descriptive statistics, internal consistency, and Pearson correlations for the Addiction–Engagement Questionnaire.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean</th>
<th>SD</th>
<th>α</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total score (24 items)</td>
<td>87.97</td>
<td>17.81</td>
<td>0.80</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2. Addiction subscale (12 items)</td>
<td>32.98</td>
<td>12.44</td>
<td>0.75</td>
<td>0.84</td>
<td>–</td>
</tr>
<tr>
<td>3. Engagement subscale (12 items)</td>
<td>54.99</td>
<td>9.96</td>
<td>0.79</td>
<td>0.74</td>
<td>0.26</td>
</tr>
</tbody>
</table>

* $p < 0.001$.

3. Results

3.1. Structural validity of the addiction and engagement constructs

To confirm the bi-factorial nature of high engagement in gaming (engagement versus addiction), we computed a series of CFAs on the 24 items of the Addiction-Engagement Questionnaire.

Means, standard deviations, internal consistency coefficients (Cronbach’s α), and correlations for the Addiction-Engagement Questionnaire are reported in Table 1. Cronbach’s α ranged from 0.75 to 0.80, suggesting good internal consistency for the 24-item scale and its two subscales.

Absolute fit indices of the three computed models are summarized in Table 2. First, the results showed that the single-factor model in which all items loaded on a unique latent factor poorly fits the data (see Table 2, Model 1).

Second, the two-factor models both had a better fit than the first model did (see Table 2, Model 2), and the two-factor model that assumes an interrelation between the engagement and addiction constructs offers the best fit to the data (see Table 2, Model 3).

From the modification indices provided for Model 3 and a subsequent content and semantic analysis of the items (see Appendix 2 for details), 11 residual pairs of errors were allowed to covary (see Fig. 1). The CFA computed for the modified third model suggested that the modifications improved the global model fit (see Table 2, Model 3b).

3.2. Correlation analyses

Table 3 reports the Pearson’s correlations measured between the two subscales of the Addiction-Engagement Questionnaire, socio-demographics, and other variables included in the study.

First, the number of IGD criteria endorsed were positively correlated with both subscales, with a significant stronger relation for the Addiction subscale ($r = 0.56$ for Addiction and $r = 0.30$ for Engagement). In contrast, the magnitude of the relationship between both subscales and self-reported time spent playing was equivalent. Regarding socio-demographic variables, no significant relationship was observed. Concerning factors that have been linked to videogame overuse, specific significant relationships were identified for the Addiction subscale (with all s-UPPS-P variables, except for lack of premeditation and with depressive symptoms). Numerous relationships were observed between the two facets of the Addiction-Engagement Questionnaire and the various motives to play online. First, all
achievement motives were correlated with both Engagement and Addiction subscales. The only quasi-significant difference in correlations’ size concerned the mechanics component, which tended to be more important for players with a high engagement score. Second, the only social motive linked to both engagement and addiction was the relationship motive. However, the latter did not have a significantly more pronounced relationship with any of the videogame engagement subscales. Third, a differential pattern of correlations appeared for immersion motives. Indeed, whereas the escapism motive was similarly linked to both engagement and addiction, the other immersion-related motives were significantly related only to the Engagement subscale.

4. Discussion

The purpose of this study was to further test the relevance of distinguishing between high engagement and problematic engagement in videogames. Indeed, current conceptualizations of problematic use tend to overlook this distinction, engendering conflation between healthy and pathological gaming patterns. The current study thus tested the structural validity of the Addiction-Engagement Questionnaire (using confirmatory analyses) and explored its relationships with DSM-5 IGD criteria, depressive symptoms, and factors that have been related to videogame use and misuse. The main findings of the study are as
follows. First, CFA analyses emphasized that a model holding engage-
ment and addiction as two distinct but related constructs fits the data,
further supporting the need to distinguish high from problematic en-
gagement. Second, both constructs are linked to the endorsement of
pathological gaming in epidemiological studies (e.g., Rehbein, Kliem,
Baier, Mörike, & Petry, 2015; Subramaniam et al., 2016) is likely to
result in an inflated prevalence rate because of the conflation between
pathological and highly engaged individuals. The diagnosis must in-
stead focus on the functionally impairing nature of gaming engagement
(Billieux, King, et al., 2017; Ferguson, Coulson, & Barnett, 2011). The
latter approach is aligned with the conceptualization of gaming dis-
order included in the beta draft of the ICD-11 (World Health
Organization, 2017) and with a recent broader definition of behavioral
addictions (Billieux, van Rooij, et al., 2017; Kardfelft-Winther et al.,
2017). Along the same lines, time spent playing weekly was also posi-
tively correlated with both subscales, which is not surprising, given that
it is systematically associated with pathological gaming, while highly
engaged gamers can also play a lot without experiencing negative outcomes
(Ferguson et al., 2011; Király et al., 2017; Kirby et al., 2014;
Lemmens, Valkenburg, & Peter, 2009).

Our findings also fit well with the dualistic model of passion (Vallerand et al., 2003), which posits that any activity in which people invest time and energy can be conceptualized as either “harmonious” or “obsessive” passion. Harmonious passions are adaptive and character-
ized by autonomous internalization (i.e., the activity becomes part of the self in an integrated and positive way; see Deci & Ryan, 2000) and free will (i.e., the activity is performed on a voluntary basis), and it is practiced in harmony with other aspects of life. In contrast, obsessive passions are maladaptive and globally imply a strong urge to engage in the activity that is beyond one’s control. The activity is internalized to such an extent that self-worth depends on the compelled commitment to the activity. Obsessive passions are the result of compensatory behav-
iors for unfulfilled needs and tend to enter into conflict with other aspects of the person’s life, engendering negative consequences (Lalande et al., 2017). We hypothesize that the engagement construct is
underlain by a harmonious passion for videogames (e.g., linked to achievement and immersion motives, but not to depressive symptoms), whereas the addiction construct is instead the consequence of an ob-
sessive passion (e.g., mainly linked to achievement motives and es-
capism, and associated with impulsivity and depressive symptoms). This assumption is consistent with previous researches showing that the harmonious use of videogames predicts life satisfaction, improved psychological adjustment, and a sense of self-realization (Laforestière, Vallerand, Donahue, & Livigne, 2009), whereas obsessive use of vi-
dogames was linked with dissatisfaction, game use to fulfill basic needs, lower game enjoyment, and more negative consequences (Laforestière et al., 2009; Przybylski, Weinstein, Ryan, & Rigby, 2009).

On the whole, our study emphasizes the crucial need to distinguish repeated healthy versus repeated maladaptive engagement in video-
games to avoid conflating passion with disorder, ultimately patholo-
gizing healthy gamers (Aarseth et al., 2017; Billieux, King, et al., 2017).
Notably, our results support a critical approach to diagnostic criteria for
gaming disorder, in particular those included in Section 3 of the DSM-5
that adopt a polythetic approach mixing core and peripheral criteria to
establish the diagnosis. In this vein, gaming disorder, as defined in the
ICD-11 approach (World Health Organization, 2017), is interesting in
the sense that it considers functional impairment as a mandatory cri-
terion, and includes core criteria as diagnostic guidelines (e.g., loss of
control, continued use despite negative consequences). In contrast, the
DSM-5 criteria define the condition as a pattern of persistent or re-
current gaming associated to clinically significant impairment or dis-
tress, even though functional impairment per se is not listed in the nine
potential inclusionary criteria. As a consequence, most of previous
studies having used the DSM-5 criteria have not considered functional
impairment as a mandatory diagnosis criterion, which might have in-
flated the prevalence rates reported (Billieux, King, et al., 2017).

An additional benefit of our study is that it provides a French and
psychometrically sound version of the Addiction-Engagement
Questionnaire. The limitations of the study must be acknowledged, how-
ever, in particular its correlational nature, the convenience sample
used, the absence of clinical participants, and the use of self-reports.
Further studies should also consider the impact of psychosocial well-being and several background variables (e.g., socio-economic status, parenting or school support, family and school environments) which have been found to importantly contribute in identifying individuals with problem video gaming (Colder Carras & Kardefelt-Winther, 2018). Despite these limitations, the present study offers important avenues for improving the conceptualization and diagnosis of gaming disorder.

Role of funding sources

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Contributors

Jory Deleuze and Joël Billieux designed the study. Jory Deleuze elaborated the online survey and collected the data. Jory Deleuze and Jiang Long did the statistical analyses. Jory Deleuze and Joël Billieux interpreted the results and wrote the article. Jory Deleuze, Jiang Long, Tie-Qiao Liu, Pierre Maurage, and Joël Billieux reviewed the manuscript. All authors approved the final version of the manuscript.

Conflict of interest

All authors have no conflicts of interests to declare.

Appendix 1. Items of the Addiction-Engagement Questionnaire in English and French versions. Examples are provided using the game “League of Legends”

<table>
<thead>
<tr>
<th>English</th>
<th>French</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I sometimes neglect important things because of an interest in League of Legends</td>
<td>Je néglige parfois des tâches importantes à cause de mon intérêt pour League of Legends</td>
</tr>
<tr>
<td>2. My social life has sometimes suffered because of me playing League of Legends</td>
<td>Ma vie sociale a parfois souffert du fait que jouais à League of Legends</td>
</tr>
<tr>
<td>3. Playing League of Legends has sometimes interfered with my work</td>
<td>Jouer à League of Legends a parfois interféré avec mon travail ou mes études</td>
</tr>
<tr>
<td>4. When I am not playing League of Legends I often feel agitated</td>
<td>Quand je ne joue pas à League of Legends, je me sens souvent agité</td>
</tr>
<tr>
<td>5. I have made unsuccessful attempts to reduce the time I spend playing League of Legends</td>
<td>J’ai tenté de réduire, sans y arriver, le temps passé à jouer à League of Legends</td>
</tr>
<tr>
<td>6. I am sometimes late for engagements because I am playing League of Legends</td>
<td>J’ai parfois du retard dans mes obligations/engagement parce que je joue à League of Legends</td>
</tr>
<tr>
<td>7. Arguments have sometimes arisen at home because of the time I spend on League of Legends</td>
<td>Des disputes ont parfois eu lieu à la maison à cause du temps que je passe sur League of Legends</td>
</tr>
<tr>
<td>8. I think that I am addicted to League of Legends</td>
<td>Je pense que je suis accro/addicte à League of Legends</td>
</tr>
<tr>
<td>9. I often fail to get enough sleep because of playing League of Legends</td>
<td>J’ai souvent manqué de sommeil parce que je jouais à League of Legends</td>
</tr>
<tr>
<td>10. I never miss meals because of playing League of Legends</td>
<td>Je n’ai jamais raté de repas parce que je jouais à League of Legends</td>
</tr>
<tr>
<td>11. I have never used League of Legends as an escape from socializing</td>
<td>Je n’ai jamais utilisé League of Legends pour échapper aux relations sociales</td>
</tr>
<tr>
<td>12. I often feel that I spend more money than I can afford on League of Legends</td>
<td>J’ai souvent l’impression que je dépense plus d’argent que ce que je peux me permettre dans League of Legends</td>
</tr>
<tr>
<td>13. It would not matter to me if I never played League of Legends again</td>
<td>Ça ne me dérangerait pas si je ne jouais plus jamais à League of Legends</td>
</tr>
<tr>
<td>14. I feel happy at the thought of playing League of Legends</td>
<td>Je me sens heureux quand je pense au fait de jouer à League of Legends</td>
</tr>
<tr>
<td>15. The less I have to do with League of Legends the better</td>
<td>Au moins je joue à League of Legends, au mieux c’est</td>
</tr>
<tr>
<td>16. League of Legends is unimportant in my life</td>
<td>League of Legends n’est pas important dans ma vie</td>
</tr>
<tr>
<td>17. I would hate to go without playing League of Legends for more than a few days</td>
<td>Je détesterai ne pas jouer à League of Legends pendant plusieurs jours</td>
</tr>
<tr>
<td>18. I rarely think about playing League of Legends when I am not using a computer</td>
<td>Je pense rarement au fait de jouer à League of Legends quand je n’utilise pas un ordinateur (ou autre support me permettant d’y jouer)</td>
</tr>
<tr>
<td>19. I pay little attention when people talk about League of Legends</td>
<td>Je ne fais pas beaucoup attention quand les gens parlent de League of Legends</td>
</tr>
<tr>
<td>20. It is important to me to be good at League of Legends</td>
<td>C’est important pour moi d’être bon à League of Legends</td>
</tr>
<tr>
<td>21. I often experience a buzz of excitement while playing League of Legends</td>
<td>Je ressens souvent un frisson d’excitation quand je joue à League of Legends</td>
</tr>
<tr>
<td>22. I like the challenge that learning to play League of Legends presents</td>
<td>J’aime le défi que représente le fait d’apprendre à jouer et de progresser dans League of Legends</td>
</tr>
<tr>
<td>23. League of Legends jargon sounds stupid to me</td>
<td>Le vocabulaire/jargon utilisé dans League of Legends me parait stupide</td>
</tr>
<tr>
<td>24. I can’t understand why people like League of Legends</td>
<td>Je ne peux pas comprendre pourquoi les gens aiment League of Legends</td>
</tr>
</tbody>
</table>
Appendix 2. Items for which error pairs were allowed to covary. Examples are provided using the game "League of Legends"

<table>
<thead>
<tr>
<th>Items of residual correlations implemented for modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I sometimes neglect important things because of an interest in League of Legends</td>
</tr>
<tr>
<td>2. I sometimes neglect important things because of an interest in League of Legends</td>
</tr>
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<td>3. My social life has sometimes suffered because of me playing League of Legends</td>
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<tr>
<td>6. It would not matter to me if I never played League of Legends again</td>
</tr>
<tr>
<td>7. I feel happy at the thought of playing League of Legends</td>
</tr>
<tr>
<td>8. I often experience a buzz of excitement while playing League of Legends</td>
</tr>
<tr>
<td>9. I pay little attention when people talk about League of Legends</td>
</tr>
<tr>
<td>10. I like the challenge that learning to play League of Legends presents</td>
</tr>
<tr>
<td>11. I think I am good at League of Legends</td>
</tr>
<tr>
<td>12. I like the challenge that learning to play League of Legends presents</td>
</tr>
<tr>
<td>13. I sometimes neglect important things because of an interest in League of Legends</td>
</tr>
</tbody>
</table>

References


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