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Video Game Addiction, Engagement and Symptoms of Stress, Depression and Anxiety: The Mediating Role of Coping

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Abstract

A number of studies have reported a co-occurrence between video game addiction and poorer mental health, but few have contextualised this relationship by identifying mediating variables. Further, there remains uncertainty in how to differentiate high engagement from what may be termed addiction in the context of video gaming. This study examined the mediating role of coping between one measure of video game addiction and engagement, and mental health. An international sample of 552 adult participants (*M* age 24.9 years, 52.3% Australian) completed an online survey including the Computer Addiction-Engagement Scale (CAES), Depression, Anxiety Stress Scale (DASS-21) and Approach/Avoidance Coping Questionnaire (BACQ). Multiple mediation analysis showed that coping explained a significant portion of the relationship between video game addiction and symptoms of depression, anxiety and stress. However, even after accounting for coping, a direct relationship remained. Video game engagement, on the other hand, indicated full mediation with no direct connection to declined mental health, except in the case of anxiety. Less use of approach coping strategies and particularly more use of resignation and withdrawal coping strategies were related to poorer mental health. Gaming for distraction was unrelated to mental health. This study identified maladaptive coping as a partial explanation of the relationship between video game addiction and poorer mental health. Also, the findings provide validity for making a distinction between video gaming engagement and addiction. Highly engaged gamers with maladaptive coping styles may be more vulnerable to developing video game addiction.

Keywords: video game addiction, video game engagement, coping, mental health

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Preliminary empirical and anecdotal evidence suggests excessive video gaming, commonly called video game addiction, may have some similar characteristics to other more well-established addictive conditions (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013). The preliminary 'internet gaming disorder' (IGD) has been included in the Diagnostic and Statistical Manual of Mental Disorders to prompt further topical research (5th ed.; *DSM-5*; American Psychiatric Association, 2013). An important issue in accurately defining IGD, however, is to distinguish it from an intense but ultimately benign or even healthy interest and prioritisation of gaming, sometimes referred to as 'engagement' (Charlton & Danforth, 2007). One key feature that should denote addiction is negative consequences. Where video game addiction would be expected to be associated with a range of negative consequences including mental, physical and social decline, high levels of engagement would not (Seok & DaCosta, 2014). In particular, video game addiction has been associated with increased symptoms of stress, anxiety and depression (e.g., Mentzoni et al., 2011). While several studies have established a cross-sectional relationship between video game addiction and poorer mental health in terms of increased symptoms of stress, anxiety and depression, few studies have yet tested for the importance of mediating or moderating variables. Testing for these may identify the conditions under which video game addiction is most associated with harm (Preacher & Hayes, 2008). Coping is one possible mediator, with video game addiction often being described as a form of maladaptive and primarily escape-based coping (Beranuy, Carbonell, & Griffiths, 2013; Tejeiro, Gómez-Vallecillo, Pelegrina, Wallace, & Emberley, 2012; Wan & Chiou, 2006; Yee, 2006). The present study, therefore, examined relationships between video game addiction, engagement and mental health (in terms of symptoms of

stress, anxiety and depression), and tested whether coping is a potential mediator in these relationships.

Whether a time-consuming and intense psychological and behavioural prioritisation of video gaming can be considered a new mental illness is a vexed issue. Agreement is limited on the precise defining characteristics of what can be termed video game addiction, whether it should be considered an officially diagnosable mental illness and the requisite supporting evidence (King & Delfabbro, 2014; King et al., 2013; Petry, 2013; Petry et al., 2014; Starcevic, 2013). Most research has applied some form of 'general' addiction theory, which facilitates the application of addiction to any activity, when defining and measuring video game addiction (Brown, 1997; Griffiths, 2005). Closely reflected in the recently proposed diagnostic criteria for IGD, such models have some variations (King et al., 2013), but broadly suggest video game addiction is characterised by six factors: Salience (video gaming dominates a person's cognitions and behaviour), Euphoria/Mood Modification (receiving a 'buzz' from gaming), Tolerance (spending increasing amounts of time playing video games to achieve 'buzz'), Withdrawal (unpleasant emotions or physical effects when video gaming is stopped), Conflict (with others, self or major responsibilities) and Relapse/Reinstatement (inability to cut back or stop play). Many studies have applied these factors to video game playing in the form of short scales and found varying levels of self-reported prevalence (King et al., 2013; Mentzoni et al., 2011).

The validity of using these factors as the main determinants for video game addiction is equivocal. Some of these components may not be inherently deleterious and likely to be present in the intense interest and prioritisation of any pursuit (Charlton & Danforth, 2007). These researchers have termed this intense interest 'engagement', in what may also be described as a lifestyle choice, hobby, or enthusiasm. Based on a theoretical review Charlton and Danforth concluded that behavioural salience, withdrawal, internal

and external conflict, and relapse/reinstatement were part of video game addiction as they are inherently negative whereas cognitive salience, euphoria/mood modification, and tolerance were part of engagement. This possible distinction between addiction and engagement was investigated in relation to general computer use (Charlton, 2002), and playing a specific online video game (Charlton & Danforth, 2007). In both cases factor analyses supported the distinction, and some preliminary external validity has also emerged with differences apparent in personality (Charlton & Danforth, 2010), academic performance (Skoric, Teo, & Neo, 2009) and attentional profiles (Metcalf & Pammer, 2011) for those being classified as addicted versus highly engaged. Although, Seok and DaCosta (2014) recently did not find significant differences in the social life of engaged and addicted online adolescent gamers in Korea. These researchers, however, argued that the age of their sample might have influenced their results and that future studies should consider older adult gamers.

Some researchers argue that the key differentiating feature of video game addiction is that it causes negative consequences (Griffiths, 2008). Poorer mental health in terms of higher prevalence of symptoms of stress, depression and anxiety has been repeatedly associated with measures of video game addiction in studies across countries. A large Norwegian study (N=2500) of 15-40 years olds showed a significant relationship between severity of video game addiction and symptoms of depression and anxiety (Mentzoni et al., 2011). A Dutch study of 13-16 year olds also found that video game addiction was associated with higher levels of depressed mood (Van Rooij, Schoenmakers, Vermulst, Van Den Eijnden, & Van De Mheen, 2011). Similarly, in a sample of 412 adult Australian video game players, there was a small but significant relationship between severity of video game addiction and symptoms of depression, anxiety and stress (King, Delfabbro, & Zajac, 2011). Another Australian-led study with an international sample of 1945 participants, most

between 14-30 years of age, reported the 156 (or 8%) participants diagnosed as addicted showed significantly higher scores on all dimensions of the Symptom Checklist 90 (SCL-90) than non-addicts; particularly obsessive-compulsive, interpersonal sensitivity and depression (Starcevic, Berle, Porter, & Fenech, 2011). Finally, a rare longitudinal study tracked Singaporean youth for three years and identified depression, anxiety, social phobia and school grades as negative consequences, as they worsened after development of the condition (Gentile et al., 2011). Whereas video game addiction has been associated with poorer mental health the distinction put forward by Charlton and Danforth (2007) would suggest that engagement would not result in reduced mental health. Yet there is currently limited empirical evidence to support this.

Beyond testing for differential relationships between addiction and engagement, few studies have identified variables which might contextualize reported relationships between video game addiction and poorer mental health in terms of increased symptoms of stress, depression and anxiety. A potential mediator could be coping. Coping refers to ‘constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person’ (Lazarus & Folkman, 1984, p. 141). Although there are many different coping strategies, they are often conceptualised under the higher order dimensions ‘approach’ (i.e., concentrated efforts to manage a stressful event, such as planning) and ‘avoidance’ coping (Krohne, 1993). The latter includes activities or cognitive changes to avoid situations via diversion (cognitive distancing) or withdrawal (Finset, Steine, Haugli, Steen, & Laerum, 2002). Health psychology literature indicates that a systematic lack of coping, or over-reliance on avoidance coping, predicts numerous negative health consequences, even without the presence of other conditions. Specifically, high avoidance coping combined with less approach coping has been associated with poorer mental health outcomes (Clark

& Hovanitz, 1989; Folkman, Lazarus, Gruen, & DeLongis, 1986).

In a number of qualitative studies video game addiction has been associated with a lack of coping skills, or described, by both researchers and gamers, as an escape-based coping strategy (Allison, von Wahlde, Shockley, & Gabbard, 2006; Beranuy et al., 2013; Wan & Chiou, 2006; Wood & Griffiths, 2007). Several studies have also reported associations between video game addiction and a desire to escape (Gentile et al., 2011; Tejeiro et al., 2012; Yee, 2006). Earlier studies have indicated that the use of avoidance coping strategies (withdrawal or wishful thinking) are associated with increased problematic internet use in Chinese college students (Li, Wang, & Wang, 2009) and American undergraduate students (Hetzel-Riggin & Pritchard, 2011). A more recent study showed that a sample of clinically diagnosed internet addicts from Turkey used significantly less problem focused coping (e.g., active coping, planning) and emotion focused (e.g., positive reinterpretation, emotional social support) strategies but more avoidance coping strategies (e.g. behavioral disengagement, denial) compared to a control group (Şenormancı, Konkan, Güçlü, & Şenormancı, 2014). However, a limitation of generalized internet addiction studies is that they do not distinguish between different internet-based activities. Accessing pornography and even gambling, for which there is already a distinct diagnosable condition, may be among these internet activities. While there may be some shared components, it is also highly likely that such activities qualitatively differ from online video game playing. Further, these studies did not include a theorized negative consequence of internet addiction, such as reduced mental health, and test whether coping altered that relationship. As such it is unclear whether such findings can be generalized to the domain of coping, video game addiction and mental health.

To date no study has explicitly examined the relationship between video game addiction or engagement, coping and mental health. In particular, the possible mediating

role of coping warrants testing because coping skill training is already a common empirically supported component of interventions for addictive disorders (Witkiewitz, Marlatt, & Walker, 2005) and in improving mental health more generally (Taylor & Stanton, 2007). Video game addiction researchers have called for more studies with adults (Seok & DaCosta, 2014).

In this study we have investigated whether coping mediates relationships between video game addiction, or engagement, and mental health in terms of symptoms of stress, depression and anxiety in adult problem video gamers. Based on prior studies of coping and mental health (Folkman et al., 1986), and the distinction put forward by Charlton and Danforth (2007), we predicted that higher levels of video game addiction would be associated with increased symptoms of stress, depression and anxiety, particularly when paired with lower approach and higher avoidance coping. The effect of addiction on symptoms of stress, depression and anxiety will be direct (i.e., partial mediation). On the other hand engagement would have no direct effect on symptoms of stress, depression and anxiety, except via lower approach and higher avoidance coping.

Method

Participants

In total 576 participants fully completed the survey. Responses that indicated lack of fluency in English ($n = 5$) or were deemed to be spurious ($n = 4$) were discarded. A number of participants only completed some of the survey. Although excluded from the final analysis, one-way t -tests were conducted to compare the partially completed surveys for which subscales could be computed ($n = 31$) with the completed surveys. No significant differences (all $p > .05$) were observed. IP addresses were checked to identify duplicate responses, but none were found. An additional 15 cases were removed as outliers (detailed below), leaving a final sample of 552.

The mean age of the final sample was 24.90 years ($SD = 7.28$) and ranged from 18

to 59 years (28.1% \leq 20 years of age, 58.20% between 21-30 years, 10.80% between 31-40 years, 2.59% aged between 41-54). The majority resided in Australia (52.3%), with the rest divided among several European countries (33%), the USA (4.2%), Brazil (4.2%) and smaller cohorts from a number of other countries.

Instruments

The computer engagement/addiction scale (CEAS) (Charlton & Danforth, 2007) was used to measure levels of video game engagement and addiction. In this study, the term 'Asheron's Call' was replaced with the generic 'video games'. Inclusive of Brown's components model of addiction, the CEAS has been found to have a good factorial structure and reliability as well as some convergent validity across a number of studies (Charlton, 2002; Charlton & Danforth, 2007, 2010; Metcalf & Pammer, 2011; Skoric et al., 2009). The present study obtained good reliability (Chronbach's $\alpha = .85$ for engagement and $.86$ for addiction) including an absence of inverse inter-correlations among items.

Mental health symptoms were assessed using the 21-item Depression Anxiety Stress Scale (DASS-21), which has been found to have very good validity and reliability in past studies (Lovibond & Lovibond, 1995). In the present study the subscales demonstrated good reliability ($\alpha = .92$ for Depression, $.78$ for Anxiety and $.84$ for Stress). Although the DASS-21 does not provide a clinical diagnosis, it describes severity ratings (normal, mild, moderate, severe and extremely severe), with higher scores indicating more severity of symptoms.

Coping was measured using the 12-item Brief Approach-Avoidance Questionnaire (BACQ). The BACQ measures Approach coping and Avoidance (Resignation, Withdrawal and Diversion) coping and has shown good predictive validity and reliability (Finset et al., 2002). In the present study the BACQ had acceptable reliability with Chronbach's α of $.69$

for Approach, .71 for Resignation and Withdrawal and .62 for Diversion scale. Although some of the factors of the BACQ had low levels of internal consistency it was decided to include these in the statistical analysis. As previously stated by Billings and Moos (1981), one coping strategy might be adequate to relieve stress and as such would not require additional responses from either the same category or other categories of coping. Therefore, “psychometric estimates of internal consistency may have limited applicability in assessing the psychometric adequacy of measures of coping” (Billings & Moos, p. 145). In addition, it is worth considering that calculation of Chronbach Alpha coefficient is influenced by the number of items, and when the avoidance coping scales are separated into two sub-scales (resignation and diversion), as they were in this study, each sub-scale is only 3 items, and as such this likely influenced the Chronbach Alpha values.

Procedure

Adult video game players were recruited via online video gaming forums and a communications campaign, which included media coverage and exposure of the study to a global public audience. After being directed to a website hosting the study, participants were asked whether they either feel that they may play video games too much, or that they have some sort of problem with their video game playing. This open-ended description was designed to capture the most problematic self-identified gamers without being overly prescriptive. These descriptions align with “I think I play video games too much” and “I think I have some type of problem associated with my video game playing”, which have been shown to be endorsed significantly more by people who met polythetic criteria for video game addiction (Tejeiro & Morán, 2002). As such, this sample is intentionally biased towards the more severe self-identified problematic gamers. All participants who completed the online survey at every time point were placed into a draw to win AU\$500.

Analysis

To investigate the prediction that the relationship between video game addiction and mental health would be mediated by coping, a multiple mediation method was used. A bootstrap (5000) resample procedure calculated the direct and indirect effects of video game addiction or engagement (independent factors) on mental health (dependent factors: stress, anxiety and depression). Six models in total were generated, examining whether approach, withdrawal and distraction coping fully or partially mediated the relationships between addiction or engagement and depression, anxiety and stress. All statistical analyses were conducted using SPSS V. 20 and a macro for SPSS, which facilitates multiple mediation analysis. This provided the direct, indirect, and total effects, and bias corrected and accelerated (BCa) confidence intervals (CI) (Preacher & Hayes, 2004, 2008).

Outliers. Univariate outliers were identified on the basis of $z > 3.29$ ($p < .001$). Only four cases of very high anxiety and two cases of very low engagement were identified on this basis. These six cases were removed. Multivariate outliers were then screened by calculating Mahalanobis' distance for each case based on all eight measures employed, and nine cases were identified based on a probability of less than $p < .001$ on a Chi-Square distribution (Tabachnick & Fidell, 2013). All eight measures were then regressed onto a dummy variable denoting these nine outliers, with results indicating this group had significantly lower addiction (standardized beta coefficient (β) = $-.12$, $p = .04$). In addition, these nine participants had either zero or only one hour or video game play time in the past month. The researchers believe these cases are explained by only very occasional video gamers taking part in the study out of interest. As the study advertisements were explicit in inviting gamers to take part who feel that they may play video games too much, and the very low scores on engagement and little or no gaming time for these nine participants suggest they hold very little to no interest in video games (at least at the time of the study), they were excluded from the present analysis (final

sample $N = 552$).

Results

Table 1 provides an overview of the mean and standard deviations of the scales used in the present study. Table 2 provides the details of the mediation analysis for video game addiction and mental health. The mediation analysis identified that coping was a partial mediator between addiction and stress, anxiety and depression (See Figures 1a, 1b & 1c). There was a significant total effect of addiction on stress, anxiety and depression (path c ; $p < .01$), and a significant but smaller direct effect of coping on stress, anxiety and depression adjusted for the mediators (path c' ; $p < .01$) indicating partial mediation. The total indirect effects had a BCa CI which was different from zero. Approach and resignation and withdrawal coping were significant partial mediators between addiction and anxiety and depression whereas resignation and withdrawal coping was a partial mediator between addiction and stress. Diversion coping did not contribute to the indirect effects above and beyond approach and withdrawal and resignation coping. Lower levels of addiction were associated with greater use of approach coping, which in turn was associated with lower levels of anxiety and depression. Higher levels of addiction on the other hand were associated with greater use of resignation and withdrawal coping and higher levels of stress, anxiety and depression.

Coping was found to be a full mediator between engagement and stress and depression and partial mediator for anxiety (see Table 3 and Figures 2a, 2b, & 2c). There was a significant total effect of engagement on stress and depression adjusted for the mediators (path c ; $p < .01$), but no direct effect (path c' ; $p > .05$). The total indirect effects for stress and depression were different from zero. The mediation analysis showed that coping was a partial mediator between engagement and anxiety with a significant total effect of engagement on anxiety (path c ; $p < .01$), and a significant but smaller direct effect

of coping on anxiety adjusted for the mediators (path c' ; $p < .01$). The significant effect of video game engagement on anxiety, adjusted for by the mediators, was smaller than the effect of engagement on anxiety, indicating partial mediation. Approach and resignation and withdrawal coping were significant mediators between engagement and stress, anxiety and depression symptoms, but diversion coping was not. Lower levels of engagement were associated with more approach coping, which in turn was associated with lower levels of stress, anxiety and depression. Increased levels of engagement were associated with greater use of resignation and withdrawal coping, which was in turn associated with higher levels of stress, anxiety and depression.

Discussion

This is the first study, to our knowledge, which tested the potential mediating role of coping in the relationship between video game addiction, or engagement, and symptoms of stress, anxiety and depression in adults. Consistent with our predictions, coping was found to be a mediator between video game addiction and symptoms of all three conditions, as well as between engagement and these conditions.

The three mental health conditions measured in the present study have been validated as distinct constructs. In the context of the DASS, the authors indicate depression as characterized by low positive affect, loss of self-esteem and incentive, and a sense of hopelessness; anxiety by autonomic arousal and fearfulness; and stress by persistent tension, irritability, and a low threshold for becoming upset or frustrated (Lovibond & Lovibond, 1995, p. 80). It must be noted however that these conditions, while psychometrically and theoretically distinct, do have a high rate of co-occurrence (Lovibond & Lovibond, 1995). Our analysis found a direct effect between video game addiction and symptoms of each condition measured, with anxiety showing the largest relationship followed by stress and depression. This is in line with several other studies which have found associations between

video game addiction and poorer mental health (Gentile et al., 2011; King et al., 2011; Mentzoni et al., 2011; Starcevic et al., 2011). Coping partially mediated the relationship between video game addiction and symptoms of the mental health conditions measured, but a substantial direct connection remained even after accounting for coping. As coping was not a full mediator in the case of addiction and these symptoms, future studies should explore additional underlying mechanisms in addition to coping. Also studies attempting to predict mental health outcomes in cases involving video game addiction, or similar conditions such as internet addiction, should also consider including coping behaviours in quantitative models.

Individuals with higher levels of video game addiction reported greater use of the avoidance oriented coping dimension resignation and withdrawal, and less use of approach coping. Higher levels of stress, anxiety and depression, in turn, were strongly associated with higher resignation and withdrawal coping. Higher anxiety and depression were also associated with less approach coping. Resignation and withdrawal coping strategies are considered maladaptive and passive, comprising of acquiescence, withdrawal and disengagement (Finset et al., 2002). Uses of such strategies have been associated with increased levels of distress, thwarted goal attainment, symptoms of burnout and negative emotions (Clark & Hovanitz, 1989; Nicholls, Polman, & Levy, 2012; Polman, Borkoles, & Nicholls, 2010). As such clinicians working with individuals who exhibit positive signs of possible video game addiction should consider coping strategies as part of their intervention strategies.

Interestingly, diversion coping was not found to be a partial mediator between video game addiction and symptoms of stress, anxiety or depression. This suggests that addictive video gamers using gaming as a distractive activity to escape from problems are less likely to experience increased symptoms of stress, anxiety and depression. It may be

that using gaming as a diversion can be adaptive. Studies have reported similar relationships with distraction-based electronic media use, including video gaming, to regulate negative emotions and reduce stress (Grüsser & Rosemeier, 2004; Reinecke, 2009). Rather, in the case of video game addiction, the results of this study highlight the distinction between diversion and resignation coping. In the case of depression and both engagement and addiction, the correlation with this coping dimension was almost complete. As this dimension involves withdrawing from friends and a sense of having given up trying to deal with stressors, it suggests the mental decline occurring with video game addiction or engagement has a more serious basis than escape-based diversion coping. The mediating effect of lower approach coping also suggests fewer attempts to communicate with others about stressors and make active efforts to solve problems contributes to increased symptoms of stress, anxiety and depression.

In contrast to addiction, engagement was directly related to anxiety but not stress and depression when accounting for coping, and the pathway to anxiety was smaller than in the case of addiction (.06 compared with .15). The lack of a direct path for stress and depression, and smaller path to anxiety, partially supports the distinction put forward between the two constructs of video game engagement and addiction (Charlton & Danforth, 2007). Increased levels of engagement were associated with less use of approach and increased use of resignation and withdrawal coping strategies. Although avoidance coping strategies might provide temporary relief and be adaptive in the right context, they often involve deferring problem solving to the future, which, if used in excess, can result in poorer health and well-being (Folkman et al., 1986; Polman et al., 2010). Our results suggest that both video game addiction and high levels of engagement are associated with less use of approach coping strategies and more use of resignation and withdrawal coping. Increased engagement paired with maladaptive coping may identify individuals at risk of

transitioning into video game addiction. With increasing endorsement of video game addiction criteria, coping strategies may change to reflect an increasing reliance on withdrawal and resignation rather than approach coping strategies. This in turn is likely to result in an inability to make a difference in one's situation.

Our research identified that addiction had a direct effect on symptoms of stress, anxiety and depression, whereas engagement had only a direct effect on anxiety but not stress or depression, after accounting for coping. This finding contributes to previous discussions on when intense gaming may or may not become problematic (Charlton & Danforth, 2007; Gentile et al., 2011; Mentzoni et al., 2011; Petry, 2013). The current study also confirms the co-occurrence of increased symptoms of stress, anxiety and depression with video game addiction and maladaptive coping. Similarly, coping skills training may also provide a portal to intervention. Future studies should examine whether coping interventions, which increases the use of approach and decreases avoidance coping strategies among excessive video gamers are able to improve mental health outcomes. Future studies should also explore the role of coping in the relationships between other intense hobbies (including various media consumption) and mental health.

A limitation of the present study is that it is cross-sectional. Longitudinal studies are required to confirm the directionality of relationships in the present analysis, particularly between video game addiction and symptoms related to mental health. The generalizability of the results is limited given the targeting of self-identified problem gamers. The use of self-report measures is a further limitation; clinical interviews would have been an ideal means of triangulating findings.

In conclusion, this is one of the first studies providing partial support for the distinction between video game addiction and engagement in terms of its relationship to symptoms of stress, anxiety and depression and the influence of coping. Findings

demonstrated that coping is an important partial mediator in the relationship between video game addiction and mental health, but does not explain the entire relationship.

Alternatively, video game engagement was only directly connected to anxiety, and to a lesser extent than addiction. The use of maladaptive coping strategies provides some additional context for the many cross-sectional relationships reported between video game addiction and poorer mental health, but also a portal for intervention. Researchers may benefit from the inclusion of coping as a variable in models predicting mental health outcomes in relation to conditions such as video game addiction. Clinicians may also consider interventions that are shown to broaden and foster adaptive coping, and be mindful of the relative unimportance of diversion coping, with results instead indicating that a lack of approach and increase in withdrawal and resignation coping are both strongly related to symptoms of stress, anxiety and depression.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000 (5). Informed consent was obtained from all patients for being included in the study.

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Table 1: Descriptive statistics for the measures.

Scale	M	SD	Skew	Kurt	α	Range
DASS-21						
Depression	6.76	5.77	.72	-.57	.92	0-21
Anxiety	4.07	3.88	1.08	.55	.78	0-21
Stress	6.55	4.62	.58	-.37	.84	0-21
CEAS						
Addiction	29.58	7.08	.15	-.11	.86	13-50
Engagement	46.00	6.97	.20	-.22	.85	16-64
BACQ						
Approach	20.31	4.23	-.29	-.20	.69	6-30
Diversion	9.44	2.58	-.21	-.21	.62	3-15
Resignation / withdrawal	8.50	3.07	.11	-.79	.71	3-15

Note. Skewness standard error .10 and kurtosis .22

Table 2: Multiple mediation analysis of video game addiction and DASS subscales (stress, anxiety, depression) mediated by approach, diversion, and resignation and withdrawal coping.

Multiple mediation model	Point estimate	Product of coefficient		BCa 95% CI	
		<i>SE</i>	<i>Z</i>	Lower	Upper
Indirect effects – addiction and stress					
Approach	.02	.01	1.69	.00	.03
Diversion	.00	.00	.31	-.01	.01
Resignation / withdrawal	.12***	.02	6.75	.08	.15
Total	.13***	.02	8.11	.10	.17
Indirect effects – addiction and anxiety					
Approach	.02*	.01	2.26	.00	.03
Diversion	.00	.00	.20	-.01	.01
Resignation / withdrawal	.09***	.01	6.14	.06	.12
Total	.11***	.01	7.77	.08	.14
Indirect effects – addiction and depression					
Approach	.08***	.01	6.03	.06	.11
Diversion	.00	.00	.32	.00	.00
Resignation / withdrawal	.19***	.02	9.21	.16	.24
Total	.28***	.02	11.14	.23	.33

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3: Multiple mediation analysis of video game engagement and DASS subscales (stress, anxiety, depression) mediated by approach, diversion and resignation and withdrawal coping.

Multiple mediation model	Point estimate	Product of coefficient		BCa 95% CI	
		SE	Z	Lower	Upper
Indirect effects – engagement and stress					
Approach	.01	.01	1.90	.00	.03
Diversion	.00	.00	.47	-.01	.01
Resignation / withdrawal	.08***	.01	5.66	.06	.12
Total	.10***	.02	6.23	.07	.13
Indirect effects – engagement and anxiety					
Approach	.01*	.01	2.26	.00	.03
Diversion	.00	.00	.17	-.01	.01
Resignation / withdrawal	.06***	.01	5.47	.04	.09
Total	.08***	.01	6.12	.06	.11
Indirect effects – engagement and depression					
Approach	.06***	.01	4.98	.04	.09
Diversion	.00	.00	.51	-.01	.01
Resignation / withdrawal	.12***	.02	6.11	.08	.16
Total	.18***	.03	7.05	.13	.23

Note: * $p < .05$; ** $p < .01$; *** $p < .001$

List of Figures

Figure 1a: Multiple mediation analysis of video game addiction and stress symptoms mediated by approach, diversion, and resignation and withdrawal coping.

Figure 1b: Multiple mediation analysis of video game addiction and anxiety symptoms mediated by approach, diversion, and resignation and withdrawal coping.

Figure 1c: Multiple mediation analysis of video game addiction and depression symptoms mediated by approach, diversion, and resignation and withdrawal coping.

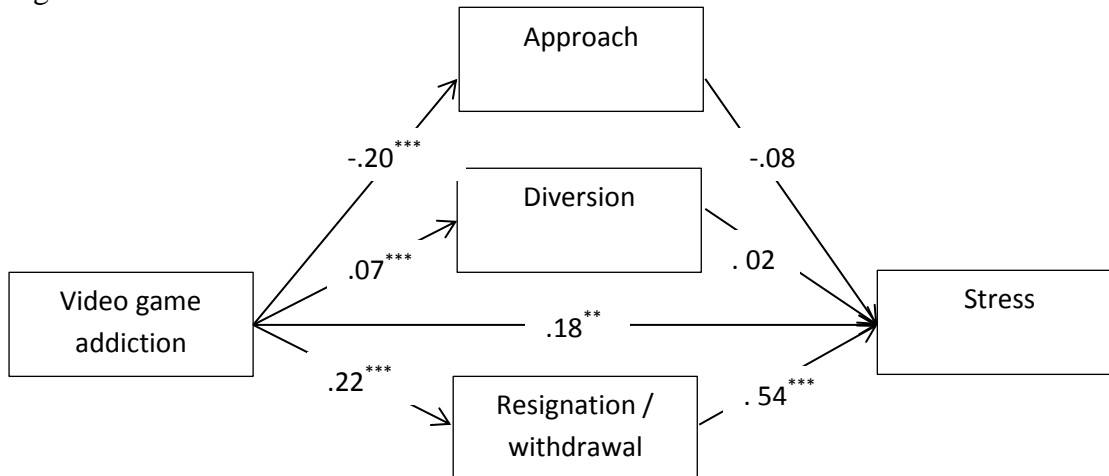
Figure 2a: Multiple mediation analysis of video game engagement and stress symptoms mediated by approach, diversion, and resignation and withdrawal coping.

Figure 2b: Multiple mediation analysis of video game engagement and anxiety symptoms mediated by approach, diversion, and resignation and withdrawal coping.

Figure 2c: Multiple mediation analysis of video game engagement and depression symptoms mediated by approach, diversion and resignation and withdrawal coping.

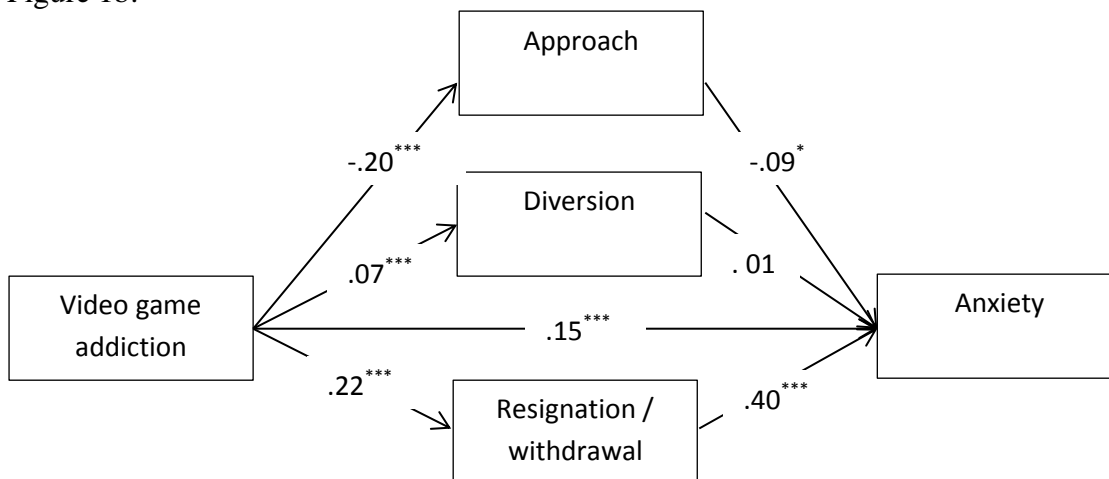
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Figure 1a:



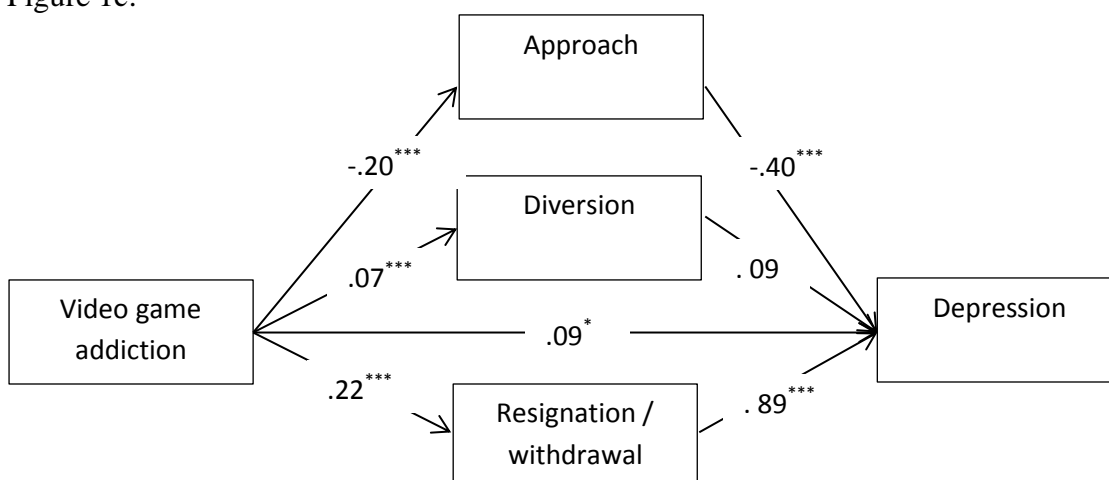
Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .35$ Adjusted $R^2 = .34$

Figure 1b:



Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .33$ Adjusted $R^2 = .32$

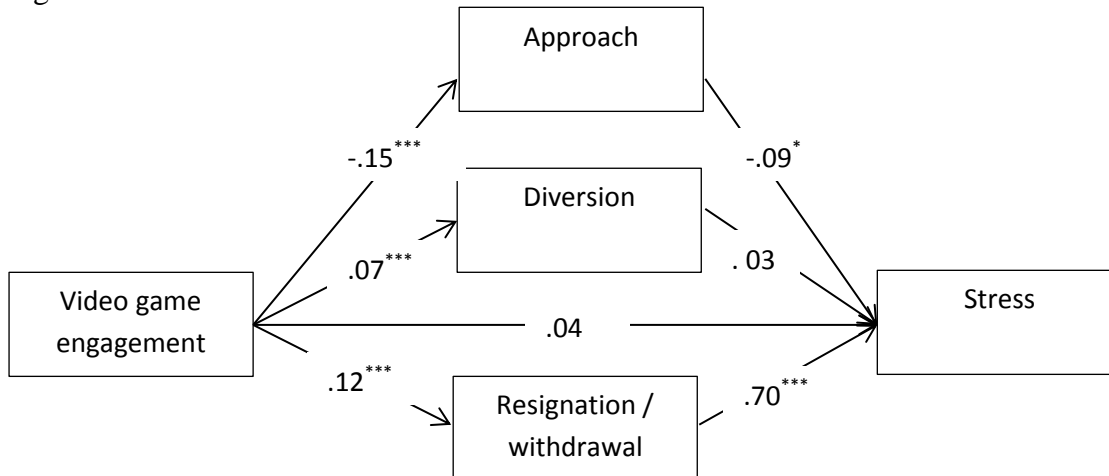
Figure 1c:



Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .55$; Adjusted $R^2 = .55$.

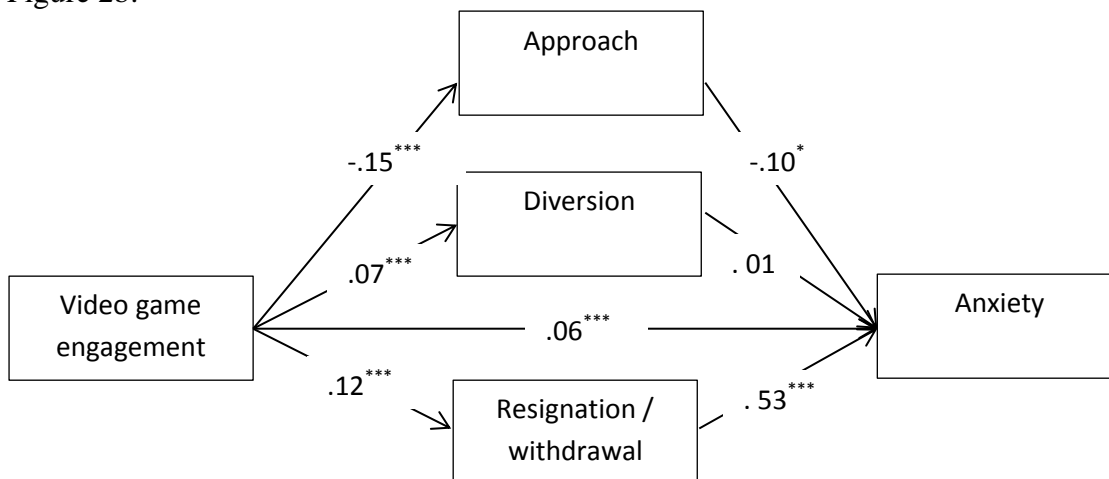
VIDEO GAME ADDICTION, ENGAGEMENT AND COPING

Figure 2a:



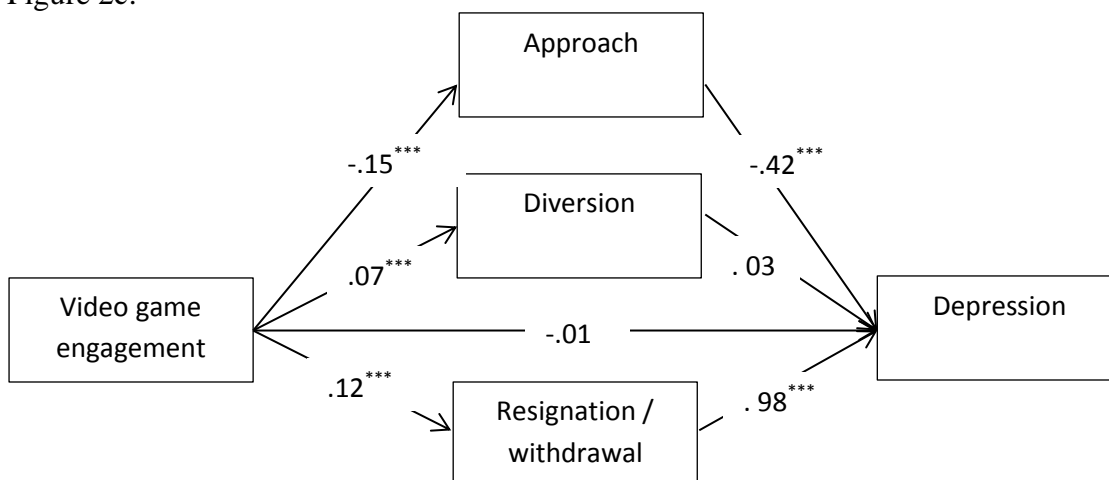
Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .29$. Adjusted $R^2 = .29$

Figure 2b:



Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .28$. Adjusted $R^2 = .28$

Figure 2c:



Note. *** = $p < .001$; ** $p < .01$; * $p < .05$. $R^2 = .54$; Adjusted $R^2 = .54$.