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THE ASSOCIATION BETWEEN PSYCHOLOGICAL MALTREATMENT AND VIDEO GAME ENGAGEMENT: THE ROLE OF DISTRESS TOLERANCE

Mason Lee Hatwan

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Chairperson, Elizabeth Boyd, Ph.D.

Committee Member, Jeffrey S. Simons, Ph.D.

Committee Member, Travis Loof, Ph.D.

ABSTRACT

Problematic video gaming is a growing concern worldwide, with negative consequences on mental health and social functioning. This study examines the mediating role of distress tolerance in the relationship between childhood psychological maltreatment and problematic video game engagement. Childhood psychological maltreatment is a form of abuse that can lead to long-term consequences such as emotion regulation difficulties, which have been linked to problematic gaming. Distress tolerance, the perceived ability to endure negative emotional states, may influence how individuals cope with stress and engage in regulatory behaviors like problematic gaming. Using a sample of 474 college-aged individuals (56% male, aged 18-25) who endorsed playing video games for at least one-two hours on an average weekday or weekend day, this study tests three hypotheses: (1) childhood psychological maltreatment will be negatively associated with distress tolerance, (2) distress tolerance will be negatively associated with problematic gaming engagement, and (3) childhood psychological maltreatment will exhibit positive associations with problematic gaming engagement and a positive indirect association through distress tolerance, controlling for biological sex. The results support all three hypotheses, demonstrating that psychological maltreatment is weakly positively related to problematic gaming, moderately inversely related to distress tolerance, and has a weak positive indirect association with problematic gaming through distress tolerance. Female sex is moderately inversely associated with distress tolerance and weakly inversely associated with problematic gaming. These findings highlight the importance of addressing the role of distress tolerance and emotion regulation in clinical interventions for individuals with a history of childhood psychological maltreatment who report engaging problematically with video games. By focusing on developing healthy alternative regulation strategies and considering individual demographic characteristics, clinicians can optimize treatment outcomes and foster more adaptive coping mechanisms. Further research is needed to explore the specific motives and factors that may buffer against the development of psychopathology in individuals with problematic gaming behaviors.

Thesis Advisor: Elizabeth Boyd, Ph.D.

Signature: Beth Boyd

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Introduction

Video game use is a growing phenomenon in industrialized parts of the world. Over the years, researchers have debated various terms to describe problems associated with video game use. The terms video game addiction (Griffiths, 2005; King et al., 2011; Skoric et al., 2009), pathological video gaming (Gentile et al., 2009; Laura M. Maruschak & Minton, 2020), internet gaming disorder (American Psychiatric Association, 2013), and internet gaming addiction (Kuss & Griffiths, 2012) have all been used to define a phenomenon associated with increased time spent playing video games. The phrase "Problematic gaming" has been used as an umbrella term to describe problematic levels of video game engagement. Problematic gaming is defined as "excessive use of one or more video games (regardless of gaming platform, e.g., console, personal computers [PC], mobile, Etc.) resulting in a preoccupation with and loss of control over playing video games, along with various negative psychosocial and/or physical consequences" (Porter et al., 2010, p.121). Problematic gaming can occur both online (i.e., playing with others through the internet) and offline (i.e., playing alone or playing on a local access network LAN; (Griffith et al., 2015).

Problematic gaming has been associated with adverse outcomes such as depression (Huang et al., 2017; Ni et al., 2009; Whang et al., 2003), anxiety (Bakken et al., 2009; Ni et al., 2009), harmful alcohol use (Yen et al., 2009), compulsivity (Whang et al., 2003), sleeping disorders (Bakken et al., 2009), Attention Deficit Hyperactivity Disorders (Ju-Yu et al., 2009), and other forms of general psychopathology (Bakken et al., 2009; Durkota et al., 2019). Poor academic performance has been found to be both an adverse outcome and risk factor associated with problematic video game engagement (Colder Carras & Kardefelt-Winther, 2018; Stevens et al., 2020). Additional risk factors include insecure attachment styles (Benarous et al., 2019), low social support (Hickerson & Mowen, 2012; Scharkow et al., 2014; Wong & Lam, 2016) and

exposure to childhood maltreatment (Bőthe et al., 2015; Schneider et al., 2017; Wartberg et al., 2017). Childhood maltreatment is the primary risk factor investigated in the present study.

Child maltreatment is defined as emotional abuse, physical abuse, sexual abuse, and/or neglect of children below 18-years-old by parents or guardians even when harm is unintended (Arias et al., 2008). Childhood psychological maltreatment is defined as a pattern of parental or caregiver behavior that expresses to the child that they are unwanted, unloved, or their needs are unimportant (Kairys & Johnson, 2002). Child psychological maltreatment encompasses both emotional abuse and neglect and is the focus of this study (Norman et al., 2012).

Years of research, expert opinion, and clinical findings recognize serious consequences associated with childhood psychological maltreatment (Gilbert et al., 2012; Hart et al., 1997; Norman et al., 2012). Maltreated children also experience greater levels of perceived stress throughout the lifespan compared to non-maltreated individuals (Bell & Belicki, 1998; Hager & Runtz, 2012; Hyman et al., 2008). Furthermore, childhood psychological maltreatment can have prolonged effects extending past childhood (Gilbert et al., 2012; Hart et al., 1997; Hart & Brassard, 1987; Norman et al., 2012). Such effects include drug use, suicide attempts, impulsivity, and a range of mental disorders (Norman et al., 2012). Additionally, another long-term consequence of childhood psychological maltreatment manifests in the form of emotion regulation difficulties (Berzenski, 2019; Berzenski & Yates, 2010; Burns et al., 2010; Egeland et al., 1983; Erickson & Egeland, 2002).

Distress tolerance refers to an individuals' perceived capacity to endure negative emotional and/or other adverse states (Leyro et al., 2010). It has been implicated as a factor influencing responses to stressful life experiences (Banducci et al., 2016; Leyro et al., 2010). Research posits that individuals with a low tolerance for distress (e.g., perceived) may be prone

to maladaptive, avoidance-oriented coping (e.g., escapism; Leyro et al., 2010). Moreover, low levels of distress tolerance may disrupt, disorganize, or overwhelm regulatory processes (Skinner & Zimmer-Gembeck, 2006). Numerous studies have also elucidated the strong link between child maltreatment and a low tolerance for distress (Banducci et al., 2017; Berenz et al., 2018b; Robinson et al., 2019; Yang et al., 2020). For example, the negative reinforcement model of substance use posits that individuals low in distress tolerance and high in negative affect or stressful situations are more likely to resort to alcohol use as a means of regulating emotions than those with high distress tolerance (Simons & Gaher, 2005). Although no study has examined the role of distress tolerance in problematic gaming, this study postulates that problematic gamers engage in gaming as a means to regulate emotions or deal with negative affect.

Literature examining both childhood maltreatment and problematic gaming propose a tertiary connection worth investigating (Darden & Maroney, 2018; Hollett & Harris, 2020). This study will assess child psychological maltreatment, distress tolerance, and problematic gaming in college-aged individuals while controlling for gender. We hypothesize that distress tolerance will mediate the association between childhood psychological maltreatment and problematic video game engagement. In other words, individuals who report experiencing more significant levels of childhood psychological maltreatment, and are low in distress tolerance, will endorse greater problematic gaming.

The following literature review will discuss the history, definition, genres, platforms, and prevalence of problematic video game engagement. Second, childhood psychological maltreatment will be discussed. Third, emotion regulation and dysregulation will be outlined, and the role of distress tolerance will be discussed. Further, the associations between distress tolerance and problematic video game engagement will be outlined. Finally, the mediating role

of distress tolerance to problematic video game engagement via childhood psychological maltreatment will be discussed in a section called distress tolerance and problematic video game engagement. The role of gender in distress tolerance and gaming will also be discussed. The literature review will conclude with an overview of the proposed study.

Literature Review

Problematic Video Game Engagement: Definition and Prevalence

An estimated two billion players engage in video game use globally, with 150 million gamers in the U.S. alone (Newzoo, 2020). Problematic gaming is defined as "excessive use of one or more video games (regardless of gaming platform, e.g., console, PC, mobile, Etc.), resulting in a preoccupation with and loss of control over playing video games, along with various negative psychosocial and/or physical consequences" (Porter et al., 2010). A Norwegian study assessing national prevalence rates of video game use, video game addiction, and problematic video game engagement found a majority, 56.3%, of respondents endorsed playing video games regularly (Mentzoni et al., 2011). Additionally, male biological-gender, and age group, 18-25-years old, were strong predictors of greater video game engagement. Moreover, this finding shows males between the ages of 18-25 endorse playing video games at a greater frequency than females. Self-endorsed video game enthusiasts (i.e., people who identify as gamers) also tend to have higher rates of video game engagement than controls (i.e., people who endorse playing video games as a hobby; Kuss & Griffiths, 2012).

A meta-analysis examining problematic gaming engagement found that about 12% of self-endorsed gamers exhibited problematic levels of video game engagement (Grüsser et al., 2006; Ng & Wiemer-Hastings, 2005; Porter et al., 2010). In a population of massive multiplayer online role-playing (MMORPG) gamers, 8% reported playing at least 40 hours a week while

61% endorsed playing for at least 10 hours (Yee, 2006a, 2006b). Thirty percent of gamers reported playing at problematic levels even though they did not enjoy the game, and an additional 50% considered themselves addicted to video games. Eighteen percent of gamers even reported experiencing health, financial, academic, or relationship problems, suggesting that video game use can be detrimental at high levels. Therefore, identifying the mechanisms that lead individuals to continue gaming despite negative consequences is pertinent (Király et al., 2014; Männikkö et al., 2015).

Problematic Gaming

Researchers have established that the amount of time spent playing, by itself, is an unreliable predictor of problematic engagement (Chiu et al., 2018; Király, Sleczka, et al., 2017; Nakayama et al., 2020). Recent studies have continued using time spent playing as a singular measurement of engagement. It is currently recommended to use time spent playing in conjunction with other measures that assess impairments in functioning (Bányai et al., 2019; Cudo et al., 2019; Fumero et al., 2020; Sanders & Williams, 2016; Triberti et al., 2018). Findings corroborate a robust positive correlation between problematic levels of video game engagement and time spent playing (Bányai et al., 2019; Cudo et al., 2019; Fumero et al., 2020; Sanders & Williams, 2016; Triberti et al., 2018). In the current study, time spent playing will be assessed for both weekdays and weekend days(‘I don’t play at all’, ‘Less than one hour a day’, ‘one-two hours a day’, ‘two-four hours a day’, ‘four-six hours a day’, or ‘More than six hours a day’; Bányai et al., 2019).

Additionally, a reliable measure will be used to assess for problematic video game engagement. The *Ten-Item Internet Gaming Disorder Test* (IGDT-10; Király, Sleczka, et al., 2017) was adapted from the proposed criteria in the *Diagnostic and Statistical Manual of Mental*

Disorders, fifth edition (DSM-5; American Psychiatric Association, 2013). A score of five or more on the IGDT-10 characterizes problematic video game engagement (Chiu et al., 2018; Evren et al., 2020; Király, Sleczka, et al., 2017; Király et al., 2019).

History

The first reports of problematic video game engagement appeared in the psychological literature in the early 1980s (Griffiths et al., 2015). At the time, research on the topic included cases of "video game addiction" (Soper & Miller, 1983), "*Space Invaders* obsession" (Ross et al., 1982), and "computer catatonia" (Nilles, 1982). Other articles reported the use of cognitive-behavioral therapy (CBT) to treat arcade video game addiction in adolescents (Keepers, 1990; Kuczmierczyk et al., 1987). Notably, many of the reports from the formative years were observational, anecdotal case studies based on teenage males with a unique gaming medium (i.e., "pay-to-play" arcade video games). Shotton (1989) assessed video game addiction in a sample of male teenagers. An unvalidated self-report measure assessing whether an individual was "hooked on" video games or not was used in this study. Endorsement of a single item on a measure was all that was used to establish video game addiction. No harmful consequences were reported in the sample, suggesting that endorsement of being "hooked on" video games could be more aligned with a preoccupation rather than an actual gaming addiction (Griffiths et al., 2015). Alternatively, the results could also be attributed to the lack of instruments assessing the construct of problematic gaming.

More systematic research on problematic gaming was conducted in the 1990s. Most research on the topic was conducted in British schools involving adolescents between the ages of 10 and 15 (Brown & Robertson, 1993; Fisher, 1994; Griffiths, 1997, 1998; Griffiths & Hunt, 1995; Phillips et al., 1995). The bulk of these studies examined non-arcade video games (i.e.,

game consoles like *Atari*, *Sega*, handheld games like *Gameboys*, and PC's). In a study assessing the prevalence of video game use in U.K. adolescents, 77% endorsed playing video games as a hobby. Further, 60% of the sample reported playing for a longer period of time than they intended; this was associated with high scores on an "addiction" scale adapted from the pathological gambling criteria of the DSM-III-R (Association & DSM-III., 1987; Phillips et al., 1995). Historically, rates of video game engagement have be alarmingly high. In an epidemiological study that followed school aged adolescents 31% of participants endorsed playing computer games daily. An additional 7% of the participants in the study reported playing over 30 hours a week on average (Griffiths & Hunt, 1995). Most of the initial instruments used to assess problematic video gaming were adapted from the DSM-III-R (Association & DSM-III., 1987) and DSM-IV (American Psychiatric Association, 1994) criteria for pathological gambling (Griffiths et al., 2015).

Interest surrounding video game engagement emerged in the early 2000s. Scholars attribute this to increased popularity in video games and online gaming (e.g., Internet gaming websites, MMORPG's such as World of Warcraft and Everquest; Griffiths et al., 2015). Unlike previous versions of offline gaming, the newer video games offered a multitude of personalization and exploration options that appealed to a younger audience. For instance, *World of Warcraft* allowed gamers to play with people across the internet in sophisticated, expansive, and detailed worlds (Griffiths et al., 2015). These games offered the players a chance to develop a character in a three-dimensional world populated by nonplayer characters (NPC) and human players. In MMORPG's, the focus is on role-playing. Generally, the player is tasked with customizing their avatar before entering the virtual world. They are then tasked with exploring

the world, gaining skills, abilities, and items (i.e., cosmetics, armor, weapons, mounts, etc.) by completing quests and defeating opponents (Griffiths et al., 2015).

Moreover, players are encouraged to continue their progression to "level up" their avatar. This process opens new areas around the virtual world and grants the player access to new items, skills, and quests within the game. Social interactions are also a significant part of this game genre, and in some respects, obligatory to complete quests or objectives (Ghuman & Griffiths, 2012). However, most of the research has focused on specific genres such as MMORPGs. Research encompassing broader gaming trends, in general, is necessary.

Genres and Platforms

MMORPGs are not the only form of the multiplayer game genre. There are hundreds of different game genres that allow for both online and/or offline play. Moreover, rapidly advancing technology and explosions in mobile gaming have transformed the gaming landscape. Additionally, console (i.e., Xbox, Play Station) and PC games such as *Fortnite, Call of Duty, Grand Theft Auto*, and *Minecraft* are reported as some of the most played video games over the past decade (Newzoo, 2020). Unlike previous studies that examined specific games, researchers now call for a more heterogenous inclusion of games, genres, and gaming platforms (Ghuman & Griffiths, 2012; Griffiths et al., 2015; Milani et al., 2018). The current study will collect data on preferred game genres as well as platforms.

Video Games and Substance Use

A notable wealth of research on video game engagement has used theory taken from substance use disorder (SUD). While most studies have examined gaming from an addiction based theory (Chen et al., 2018; Gros et al., 2020; Pass et al., 2017; Saunders, 2017; Stein et al., 2018), a few studies have adopted a neurobiological theory (Burleigh et al., 2020; Dong et al.,

2017; Yip et al., 2018). Neurobiological findings suggest that recreational video game players exercise higher executive control than problematic gamers. Executive control corresponded to greater activation in brain regions that are also implicated in motivational and reward processing (Dong et al., 2017). Similar to individuals with SUDs, neural processing of negative affect is also blunted in gamers independent of the frequency of game engagement (Yip et al., 2018).

While theory taken from substance use/misuse research was initially used to develop an understanding of gaming behaviors, researchers have critiqued this perspective as concepts such as tolerance and withdrawal do not present similarly in gaming behaviors (Kardefelt-Winther, 2015; Kardefelt-Winther, 2017). Instead, it is now posited that gaming, in itself, functions as an emotion-focused regulation tool (Blasi et al., 2019; Melodia et al., 2020), and problematic gaming behaviors are viewed as an emotion-focused strategy for individuals with limited self-regulation skills (Blasi et al., 2019). Research by Kardefelt-Winther (2014) corroborates this theory such that individuals engage in problematic gaming to escape reality into an online environment free of perceived, distressing, mundane events. Pioneers in gaming research now emphasize a continuum perspective and argue against the addictive theory for understanding video game engagement (Griffiths, 2010; King & Delfabbro, 2009; King et al., 2010; King et al., 2013; Salguero & Morán, 2002). Therefore, assessing risk factors associated with problematic gaming will aid in our understanding of gaming as emotion-focused regulatory behavior.

Research has primarily suggested that the gamer's personal characteristics (i.e., ability to handle distress, family background, and motives for playing) contribute to problematic video game engagement above and beyond the type of video games they play or amount of time they dedicate to playing games (Griffiths & Auer, 2013; Griffiths et al., 2015; Griffiths et al., 2012; Király et al., 2018; Király et al., 2015; Kuss & Griffiths, 2012; Lee et al., 2017; Nakayama et al.,

2020). Examining traits such as emotion regulation and other predisposing factors linked to increased gaming is warranted. One factor linked to problematic video game engagement is child maltreatment (Bussone et al., 2020; Kircaburun et al., 2019b; Schneider et al., 2017; Xie et al., 2021a).

Childhood Maltreatment: Definition and Prevalence

Childhood maltreatment is a risk factor for substance use disorder (Cicchetti & Handley, 2019; Elwyn & Smith, 2013; Wendland et al., 2017), alcohol use disorder (Crouch et al., 2018; Kisely et al., 2020; Wang et al., 2020b), emotion regulation problems (Oshri et al., 2015; Warmingham et al., 2020), and personality disorders (Gander et al., 2020; Jaffee, 2017; Laulik et al., 2016). It is defined as emotional abuse, physical abuse, sexual abuse, and/or neglect of children below 18-years-old by parents or guardians even when harm is unintended (Arias et al., 2008). Child maltreatment is a widespread phenomenon. A report from the National Child Abuse and Neglect Data System (NCANDS) estimates that roughly 656,000 children in the U.S. were affected by child maltreatment in 2019 (U.S. Department of Health & Human Services, 2021). About 85% of these victims reported experiencing at least one form of maltreatment. Roughly 61% experienced neglect only, 10% reported experiencing physically abused only, and 7% reported being sexually abused. More than 15% reported experiencing more than one form of child maltreatment (U.S. Department of Health & Human Services, 2021).

In regards to race, ethnicity, and socio-economic status (SES); Caucasians appear to be at the highest risk for being victims of child maltreatment (Kim et al., 2017). Cultural differences act as protective factors for risk severity leading to lower rates of recurring child maltreatment in later generations (Kim & Drake, 2019). Additionally, families from lower SES have higher incident rates of child maltreatment compared to their higher SES counterparts (Kim & Drake,

2018, 2019). Gender differences have also been reported regarding childhood maltreatment. Data obtained from the 2003-2014 National Child Abuse and Neglect Data System (NCANDA) reports lifetime prevalence for girls at 37.6% compared with boys at 36.5% (Kim et al., 2017). Although the overall differences are slight, girls are more likely to be the recipient of sexual and psychological forms of childhood maltreatment. Whereas lifetime prevalence of physical abuse was higher for boys (Kim & Drake, 2019; Kim et al., 2017).

Childhood Psychological Maltreatment

Psychological maltreatment, also known as emotional abuse and neglect, mental violence, and emotional maltreatment, is one of the most underreported forms of child maltreatment (Baker et al., 2021a; Brassard et al., 2020; Haque et al., 2021; Malo et al., 2016). Psychological maltreatment is defined as a repeated pattern of incidents(s) of parental or caregiver behavior that expresses to the child that they are unwanted, unloved, or their needs are unimportant (Kairys et al., 2002). Psychological maltreatment can occur as a stand-alone form of child maltreatment but frequently occurs alongside other types of maltreatment (CPS; Brassard et al., 2020).

Scholars agree that psychological maltreatment is a core issue of childhood maltreatment that warrants further investigation (Arslan, 2018; Brassard & Gelardo, 1987; Hart et al., 1998; Hart & Glaser, 2011; Kaufman, 2020). From the perspective of an observer, psychological maltreatment is challenging to identify; unlike physical abuse and sexual abuse, there is no physical evidence to corroborate reports of psychological maltreatment (i.e., emotional neglect and abuse; Arias et al., 2008; Baker et al., 2021b; Hamarman et al., 2002; Trickett et al., 2009). Arguably, this has made recognizing and reporting psychological maltreatment challenging. Physical abuse, sexual abuse, and neglect are more often reported, yet experiencing any form of

maltreatment likely incites experiences similar to those of psychological maltreatment (Arias et al., 2008; Baker et al., 2021b; Brassard et al., 2020; Hamarman et al., 2002; Trickett et al., 2009). This has made it more difficult to assess the prevalence of psychological maltreatment accurately and has led to underreporting (Brassard et al., 2020).

Recent literature has proposed the idea that psychological maltreatment is one of the most common forms of child maltreatment (de la Vega et al., 2011; Gama et al., 2021; Hibbard et al., 2012; Hoeboer et al., 2021; Merrill et al., 2020; Moulding, 2017, 2018; Nagar et al., 2020). Lifetime prevalence rates of psychological maltreatment range from 12% to 25% in community samples and 18% to 32% in clinical samples (Baker & Maiorino, 2010; Brassard et al., 2020). National community survey samples in the U.S. report lifetime prevalence rates of nearly 27% for emotional abuse.

Childhood Psychological Maltreatment and Problematic Video Game Engagement

There are only a handful of studies looking at the association between child maltreatment and video game engagement. These studies have found that adverse childhood experiences, including child maltreatment, are associated with increased video game use (Kircaburun et al., 2019b; Shi et al., 2020; Xie et al., 2021a). Parental neglect and exposure to adverse early life experiences have been positively associated with excessive adolescent internet usage (Xie et al., 2021b). Kircaburun and colleagues examined childhood emotional trauma and internet gaming disorder. Findings showed that depressive symptoms significantly mediated the relationship between childhood emotional trauma and video game engagement (Kircaburun et al., 2019a). Additionally, child emotional trauma was significantly associated with internet gaming disorder when controlling for gender, age, and time spent playing (Kircaburun et al., 2019b). Nonetheless, there are only a handful of research study examining the link between childhood psychological

maltreatment and video game engagement. Examination of these two specific variables in conjunction deserves more attention.

Child psychological maltreatment has been implicated as a risk for gambling disorder (Gill et al., 2016; Lotzin et al., 2018) and alcohol use disorder (Skinner et al., 2016; Wang et al., 2020a), and excessive internet use (Dalbudak et al., 2014; Yates et al., 2012). Therefore, childhood psychological maltreatment may also act as a risk factor for problematic video game engagement. Yates and colleagues (2012) suggest that excessive internet use is likely due to poor emotion regulation strategies (Yates et al., 2012). Kardeleft and colleagues (2014) suggest that individuals may increase engagement in video games as a means to cope with underlying psychological distress. Therefore, it may be that individuals engage at problematic levels of video gaming to regulate their emotional distress.

Only one study assessing emotional trauma and the direct and indirect associations with internet gaming disorder was found (Kircaburun et al., 2019a). The study found a significant indirect association between emotional trauma and internet gaming disorder through depressive symptoms (Kircaburun et al., 2019a). However, there remains a dearth of literature examining the association between childhood psychological maltreatment, video game engagement, and emotion regulation skills (Yates et al., 2012). Therefore, examining how emotion regulation skills may mediate the link between childhood psychological maltreatment and video game engagement is essential.

Emotion Regulation and Dysregulation: Definition

Emotion regulation can be defined as the external or internal process involved in modifying the expression or experience of emotion (Thompson, 1994). Emotions are continuously being regulated during an individual's emotion generative process (Braunstein et

al., 2017; Gratz et al., 2018; Gross, 1998; Koole & Rothermund, 2011; Koole & Veenstra, 2015). Generally, the emotion generative process occurs after a potential emotion-eliciting situation is experienced by an individual. For example, McRae and Gross (2020) outline a situation in which an individual arrives for a job interview (e.g., situation), notices the calm demeanor of the interviewer (e.g., attention), interprets the calmness as displeasure (e.g., appraisal), and experiences fear and anxiety, subsequently the interviewee begins to fidget in their seat (e.g., response). This process is repeated until the interaction has ended or the individual implements (e.g., consciously, or unconsciously) a different regulatory cycle.

Parents and caregivers play a colossal role in teaching a child how to regulate their emotions (Berzenski, 2019). The particular ways the parental figure regulates their emotions provide the child with models of appropriate and inappropriate emotion regulation behaviors (Morris et al., 2007; Thompson, 1994). Further, if parental figures model maladaptive regulation behaviors – impulsive or aggression reactions – when dealing with adverse situations, children may find themselves with specific emotion regulation deficits manifesting in problematic regulatory behaviors (Silk et al., 2006). Corroboratory evidence for this comes from literature showing neglected children have an overall worse understanding of their emotions compared to their non-neglected counterparts (Alegre, 2011; Pollak et al., 2000; Sullivan et al., 2008). Additionally, childhood psychological maltreatment is a tremendous barrier to developing adaptive emotion regulation behaviors (Berzenski & Yates, 2010; Burns et al., 2010; Egeland et al., 1983; Erickson & Egeland, 2002; Manly et al., 2001). Thus, children who experience psychological maltreatment may evidence specific problems regulating their emotions later in their life (Berzenski, 2019).

In any given situation, an individual will use different emotion regulation strategies to downregulate, upregulate, and/or maintain their emotional expression (Benson et al., 2019). Different situations call for different strategies, and different strategies may be more-or-less effective across different situation (Benson et al., 2019). Therefore, individuals who are successfully able to regulate their emotions, would in principle, need to have varying emotion regulation strategies at their disposal (Aldao et al., 2015). Several developmental life span theories on aging postulate that individuals tend to get better at regulating their emotions as they age (Baltes & Baltes, 1990; Carstensen et al., 2011; Charles, 2010). A ten-year longitudinal study followed early adults into old age and found that overall emotional well-being, stability, and complexity of emotional experiences were positively associated with aging (Carstensen et al., 2011). Additionally, older adults are better than young adults – 20-years-old – at reducing their exposure to emotional distress (Charles, 2010). Conversely, when an individual has a difficult time implementing skills to regulate their emotional states, they may experience emotion dysregulation (Gratz & Roemer, 2004).

Emotion dysregulation is defined as a pattern of attempts to control or suppress unwanted emotions that interfere with goal-directed behaviors. Emotion dysregulation has been associated with increased vulnerability for acquiring internalizing disorders (e.g., depression and anxiety), externalizing disorders (e.g., substance use and eating disorders; Aldao et al., 2010; Hollett & Harris, 2020; Sloan et al., 2017), and problem gambling (Navas et al., 2017; Navas et al., 2016; Pace et al., 2015; Rogier & Velotti, 2018; Weatherly & Miller, 2013). More recently, the field has expanded its examination of emotion dysregulation and its associations between compulsive sexual behavior (Cashwell et al., 2017), compulsive buying (Williams & Grisham, 2012), problematic internet use (Akbari, 2017), and problematic video game engagement (Blasi et al.,

2019; EstÉVez et al., 2017). The purpose of the current study is to further investigate the regulatory factors associated with emotion dysregulation in the link between childhood psychological maltreatment and video game engagement.

Distress Tolerance

One factor closely associated with emotion dysregulation is distress tolerance. Distress tolerance is defined as an individual's ability to withstand negative emotional states. It is multidimensional and defines an individual's ability to tolerate anticipated or presently experienced negative emotions; this includes: (a) the assessment of emotion eliciting situation as acceptable; (b) regulation of emotional states; (c) amount of attention that is awarded to the emotion eliciting situation and the impairment of functioning after that; and (d) a person's ability to tolerate stressors (Leyro et al., 2010; Simons & Gaher, 2005). The inability to tolerate distress has been extensively researched; it is an essential contributor to the development and maintenance of several forms of psychopathology (e.g., mood, anxiety, and substance use disorders; Leyro et al., 2010).

Historically, researchers and clinicians alike have attempted to understand the role of distress tolerance in the context of emotional states (Hajek, 1991; Hajek & Belcher, 1991; Hajek et al., 1987; Linehan, 1993; Simons & Gaher, 2005). The negative reinforcement model of substance use postulates that individuals low in distress tolerance and high in negative affect or valency resort to the use of substances to mitigate their emotional distress (Abrantes et al., 2008; Allan et al., 2015; Kaiser et al., 2012; Simons & Gaher, 2005). The negative reinforcement model is a predominate theory in the SUDs literature. The relationship between distress tolerance and substance use disorders has been extensively researched (Basharpoor et al., 2020; Brown et al., 2014; Burr et al., 2020; Daughters et al., 2017; Shorey et al., 2017; Tull et al., 2020). Simons

& Gaher (2005) found that distress tolerance, as measured by the Distress Tolerance Scale (DTS; Simons & Gaher, 2005), was negatively associated with marijuana and alcohol coping motives, affective distress and dysregulation, and was positivity associated with mood typicality, and mood acceptance.

O'Cleirigh and colleagues (2007) found that distress tolerance scores moderated the associations between frequency of perceived adverse life events occurring over six months, depression symptoms, substance use coping (e.g., alcohol, cocaine), and several missed HIV medication dosage appointments. Distress tolerance has been examined with eating disorders, mood dysregulation symptomology, marijuana use, and coping motives (Anestis et al., 2007; Anestis et al., 2009; Howell et al., 2010; Zvolensky et al., 2010). Together, these studies suggest that individuals with low distress tolerance are more likely to engage in maladaptive response patterns when experiencing distressing or distress-eliciting contexts (Leyro et al., 2010). This suggests that distress tolerance could play a pertinent role in linking different adverse affective and coping outcomes (e.g., substance use, gambling, and video game use).

Distress Tolerance and Video Game Engagement

A plethora of literature examining distress tolerance, substance use disorders, and problem gambling exist; limited research is available on distress tolerance and video game engagement in conjunction. A strong positive correlation between emotion regulation and video game engagement has been established (Amendola et al., 2019; Blasi et al., 2019; Di Blasi et al., 2019; Gaetan et al., 2016; Hollett & Harris, 2020; Kökönyei et al., 2019a; Lin et al., 2020; Liu et al., 2017; Marchica et al., 2020). Specifically, studies have found that maladaptive emotion regulation skills such as self-blame, other-blame, catastrophizing, impulse control, and rumination were positively related to problematic online gaming (Amendola et al., 2019; Blasi et

al., 2019; Hollett & Harris, 2020; Kökönyei et al., 2019a). Exploring the link between distress tolerance and video game engagement is vital to better understanding how an individual's capacity to handle stress impacts their gaming behaviors.

Distress Tolerance and Childhood Psychological Maltreatment

Childhood psychological maltreatment and distress tolerance have garnered researcher interest over the last decade (Banducci et al., 2014; Banducci et al., 2017; Berenz et al., 2018a; Rosencrans et al., 2017; Tozzi et al., 2020). Findings have established childhood psychological maltreatment as a risk factor associated with low distress tolerance. These findings have been replicated in populations of U.S. male, female, adolescents, college students, and adults (Banducci et al., 2014; Banducci et al., 2017; Berenz et al., 2018a; Rosencrans et al., 2017; Tozzi et al., 2020). Further, distress tolerance has been examined as a mediating factor in the link between child maltreatment and outcomes such as psychopathology (Robinson et al., 2019), non-suicidal self-injury (Kang et al., 2018), and personality pathology (Gaher et al., 2013). However, the role of distress tolerance in the link between child psychological maltreatment and problematic gaming is yet to be examined. This study aims to fill this gap in the literature by examining this association in a sample of college-aged gamers.

Biological Sex

Distress Tolerance

Biological sex differences have been observed within the distress tolerance literature. Females have been found to have a lower tolerance to distress compared to males (Albanese et al., 2017; Bujarski et al., 2012; Kang et al., 2018; Simons & Gaher, 2005; Tull et al., 2013). Specifically, females typically have a lower tolerance to distress, while men exhibit greater tolerance to distress (Hayes et al., 2004; Simons & Gaher, 2005). No research has examined

biological sex differences in the association between distress tolerance and video game engagement. However, biological sex differences have been found for both constructs (Tull et al., 2013).

Video Games

Historically, gaming has been seen as a male dominated industry. Although this discrepancy was initially disproportionate, current reports indicate a substantial increase in female gamers (Bányai et al., 2019; Kneer et al., 2019; Morgenroth et al., 2020; Stavropoulos et al., 2020). Nonetheless, males are more likely to engage in problematic gaming behaviors compared to females. These findings have been replicated in samples of adolescents (Desai et al., 2010; Kobylińska & Kusev, 2019; López-Fernández et al., 2020; Stenseng et al., 2020), individuals in a clinical setting (Király, Tóth, et al., 2017), and college aged individuals (Pedrelli et al., 2018; Teng et al., 2020). The link between variables such as emotion regulation (Kobylińska & Kusev, 2019; Pedrelli et al., 2018; Su et al., 2019; Uçur & Dönmez, 2021) and problematic gaming are moderated by gender. These findings suggest that the strength of the association between emotion regulation and problematic gaming is more robust in males than in females (Kobylińska & Kusev, 2019; Pedrelli et al., 2018; Su et al., 2019; Uçur & Dönmez, 2021). Therefore, the current study will explore the interaction of biological sex within the statistical analyses of the model.

Current Study: Overview

In conclusion, previous literature has conceptualized problematic video gaming as a maladaptive behavior and viewed it within the biomedical model of addiction (Petry et al., 2014). Previous studies have shown that emotion dysregulation predicts both avoidance behaviors and problematic gaming behaviors (Blasi et al., 2019; EstÉVez et al., 2017). The

relationship between distress tolerance, childhood psychological maltreatment and problematic gaming is yet to be examined. To that end, the current study aims to address this gap by investigating the proposed model (see Figure 1). In summary, the current study will explore the role of distress tolerance in the relationship between childhood psychological maltreatment and problematic video game engagement. The results from the current study could be used by researchers and clinicians to help understand the relationship between childhood psychological maltreatment and problematic gaming and the impact it has on an individual. The study will test the following hypotheses.

1. Childhood psychological maltreatment will be negatively associated with distress tolerance.
2. Distress tolerance will be negatively associated with problematic gaming engagement.
3. Childhood psychological maltreatment will exhibit positive associations with problematic gaming engagement and a positive indirect association through distress tolerance. All the above effects are hypothesized to occur over and above the effects of biological sex.

Method

Participants

A total of 1214 U.S. residents were screened for eligibility through Prolific Academic, an online data gathering platform used to host human-intelligence tasks, surveys, and experiments. Of these participants, 669 were ineligible (e.g., not consenting, not between the age range of 18-25, did not endorse playing video games for at least two hours on an average weekday or weekend day). Of the 545 eligible participants, 34 (5%) did not respond correctly to at least three of the four instructional manipulation checks (IMC). Thirteen (2%) participatns were excluded for not submitting the appropriate completion code. One (<1%) participant was excluded due to

the haste of their responding to items; the participant was deemed to be a computerized bot. Three (<1%) particiapnts were excluded for providing patterned responses to the survey battery. Finally, participants who compelted the survey battery 15-minutes or more over the estimtaed completion time of 10-12 minutes had their responses reviewed for accuacy and intentionality. Nineteen (3%) participants whos survey completion time exceed 25 minutes were excluded after review due to inaccuracies and patterning across their responses. Thus, the final analyzed sample (56% male) conisted of 474 young adult United States residents ranging from 18-25 (M = 22.26; SD = 2.09) years in age who endorsed playing video games for at least one-two hours on an average weekday or weekend day.

The demographic distribution of the analyzed sample was quite diverse. There was a nearly equal number of males and females in the analyzed sample. About 40% reported obtaining an associate degree or higher. In the sample, 11% of participants self-identified as Asian, 1% as American Indian, 10% as Black, about 1% as Native Hawaiian or Pacific Islander, 65% as white, 8% as Multiracial and nearly 4% as Latino/a or Hispanic or Mestizo or Mexican. First person shooters (FPS) were endorsed as the most played video game genre, slightly ahead of massive multiplayer online role-playing games (MMORPGs). Nearly 40% of the sample reported personal computers (PCs) as their preferred gaming platform. In the current study, the amount of time spent playing video games was also assessed. On average, participants reported playing video games at a greater frequency on weekends (i.e., four – six hours) compared to weekdays (i.e., two – four hours).

Power Analysis

A power analysis for a path model was conducted via computer simulation, using the Monte Carlo feature of Mplus 8.0 (Muthén & Muthén, 2017). The focal effect of interest in this

study is the indirect effect of childhood psychological maltreatment on video game engagement via distress tolerance. Previous research suggests that childhood maltreatment will exert a small effect on distress tolerance (0.09 - 0.19; Berenz et al., 2018; Kang et al., 2018). Therefore, a conservative effect size (β = 0.16) was chosen. Unfortunately, the effect of distress tolerance on video game engagement has not been examined in the literature to date. Thus, the power analysis was done with a similarly small effect size for the path from childhood maltreatment to distress tolerance, to be conservative (β = 0.16). Results of the power analysis using 1,000 replications indicated a sample of 415 individuals as sufficient to yield the power needed to detect the hypothesized indirect effects of childhood maltreatment on video game engagement via distress tolerance for effects of 0.16 or greater.

Measures

Demographics

Demographic information, including age, biological sex, ethnicity, race, academic years completed, and marital status was collected (see Appendix C).

Gaming-Related Variables

To assess gaming, general information on various gaming-related variables were collected. For time spent playing video games on an average weekday and weekend day, response options in the form of time periods were given ('I do not play at all', 'Less than one hour a day', 'one – two hours a day', 'two – four hours a day', 'four – six hours a day' or 'More than six hours a day'). Information regarding the gaming platform(s) and preferred genres of videogames played were also collected (see Appendix D).

Childhood Psychological Maltreatment

The *Childhood Trauma Questionnaire-Short Form* (CTQ-SF; Bernstein et al., 2003) is a retrospective, 28-item self-report measure used to assess a broad range of traumatic experiences during childhood. It assesses physical, emotional, and sexual abuse, as well as physical and emotional neglect. The items are separated into five factors: 'physical abuse' (e.g., "I was punished with a belt, a board, a cord, or some other hard object"), 'emotional abuse' (e.g., "People in my family said hurtful or insulting things to me"), 'emotional neglect' (e.g., "I felt loved"), 'sexual abuse' (e.g., "Someone tried to make me do sexual things or watch sexual things") and 'physical neglect' (e.g., "I did not have enough to eat"). Responses are recorded on a five-point scale according to the frequency of truth at which the experiences had occurred, with five = "very often true" and one = "never true". Scores on this scale can range from five to twenty-five for each of the factors. With higher scores on the CTQ-SF being indicative of greater self-perceived exposure to maltreatment in one's childhood. Studies examining the psychometric properties of the CTQ-SF suggest the measure is a reliable, valid, and internally consistent self-report measure of childhood trauma. The CTQ-SF has demonstrated Cronbach's alpha's ranging from 0.69 to 0.95 for the overall scale (Bernstein et al., 2003; Daly et al., 2017; Nanda et al., 2016). Additionally, the scale reported good test-retest reliability (0.79 to 0.86) over a two- to eight-month interval (Scher et al., 2001). In the current study, we will look primarily at psychological maltreatment. To assess this, we will use the sum score of the emotional abuse, emotional neglect and physical neglect subscales from the CTQ-SF (Nanda et al., 2016; see Appendix E).

Distress Tolerance

The *Distress Tolerance Scale* (DTS; Simons & Gaher, 2005) is a 15-item self-report measure of an individual's perceived ability to tolerate emotional distress. The DTS consists of

four distinct subscales, 'tolerance' (e.g., Feeling distressed or upset is unbearable to me), 'absorption' (e.g., My feelings of distress are so intense that they completely take over), 'regulation' (e.g., I'll do anything to avoid feeling distressed or upset) and 'appraisal' (e.g., I am ashamed of myself when I feel distressed or upset). Items are rated using a five-point scale ('strongly disagree' = five, 'mildly disagree' = four, 'agree and disagree equally' = three, 'mildly agree' = two and 'strongly agree' = one). The higher-order DTS score is formed by computing the mean score from the subscales. With higher scores on the measure being indicative of higher distress tolerance. The internal consistency of the DTS was good with a reported Cronbach alpha of 0.86 (see Appendix F).

Problematic Video Game Engagement

The *Ten-Item Internet Gaming Disorder Test* (IGDT-10; Király et al, 2017) was chosen to assess Internet gaming disorder (IGD) symptomology. The IGDT-10 is a measure comprised of 10-items and was developed using a theoretical approach via experts' discussion to operationalize IGD symptomology using the nine *Diagnostic Statistical Manual of Mental Disorders fifth edition* (DSM-5; American Psychiatric Association, 2013) criteria. The measure implements a precise phrasing for each of the 10-items. Each of the nine DSM-5 criteria was operationalized using a single item approach, except for the last criterion (e.g., "*jeopardy of losing a significant relationship, job, or educational or career opportunity because of participation in Internet games*"). This criterion was disseminated into two specific items, given its complexity and depiction of more than one construct. The IGDT-10 makes use of a three-point scale for the response options on all 10 items ('often' = two, 'sometimes' = one, and 'never' = zero). Items nine and 10 are related to the same IGD criterion. Therefore, the items are combined in the scoring; answering 'often' on either Item nine or 10 (or both) is scored as one

point; answering ‘sometimes' on either item (or both) is scored as one point; answering ‘never’ on either item (or both) is scored as zero points. So, the highest possible score for this combined item is two and the lowest is zero, alike the eight other items on this scale. Instead of using diagnostic categories (i.e., being at risk for IGD vs. not being at risk for IGD), the total scores will be used in the present study. Scores on the IGDT-10 of five or greater are indicative of problematic video game engagement. The IGDT-10 nine-item version reported a Cronbach alpha of 0.64 (see Appendix G).

Procedure

Recruitment

A total of 1214 U.S. residents were screened through Prolific Academic, an online data collection platform. Participants were presented with electronic informed consent detailing information regarding the study, confidentiality, limitations, compensation, and withdrawal procedures (see Appendix A & B). Of these participants, 669 were ineligible (e.g., not consenting, not between the age range of 18-25, did not endorse playing video games for at least two hours on an average weekday or weekend day). The remaining 545 eligible participants were directed to the questionnaire battery, which took approximately 10-12-minutes to complete. Four instructional manipulation checks (IMC) were inserted throughout the battery to minimize careless responding (Hauser & Schwarz, 2016; see Appendix H). IMCs are items that instruct participants to answer in a specific way to help limit careless responding and aid in the maintenance of data handling (e.g., "To verify that the browser works properly and that we are collecting all your answers, please select the category fair from the list below?"). IMC's have not been found to affect the reliability or validity of survey scales (Kung et al., 2018). The battery included demographic questionnaires, gaming-related variables, the *Childhood Trauma*

Questionnaire – Short Form (Bernstein et al., 2003), the *Distress Tolerance Scale* (Simons & Gaher, 2005), and the *Ten-Item Internet Gaming Disorder Test* (Király et al, 2017). All participants were treated as per the American Psychological Association Ethical Guidelines (American Psychological Association, 2013).

Data Handling and Preparation

Preliminary analyses were conducted using Stata 17.0 (StataCorp, 2021) to screen data and assess the range and distribution for the variables. Data cleaning recommendations were followed (Tabachnick & Fidell, 2013). Outliers are data detached from the main body or grouping of data points (Tabachnick & Fidell, 2013). Outliers greater than three standard deviations (z score of ≥ 3.29) were examined and either recoded, removed, or categorized as missing. Three participants were deemed to be significant outliers due to patterning in their responses. Therefore, three participants were omitted from the final analysis. Additionally, histograms and scatter plots were utilized to check normality, homoscedasticity, skewness, and kurtosis; a skew greater than three and kurtosis greater than eight were further assessed (Kim, 2013). Moreover, Cronbach's alpha was calculated to assess the reliability of the self-report measures used in this study.

Data Analysis

Preliminary descriptive statistics were conducted using Stata 17.0 (StataCorp, 2021). For hypotheses one, two and three, an observed variable path model was estimated in Stata using a maximum likelihood (ML) missing values estimation. Goodness of fit was examined, and modification indices were reviewed until a good fitting model was observed. The direct paths were examined to assess the hypothesized negative associations described in hypotheses one and

two. Additionally, the indirect path was examined; childhood maltreatment to video game engagement via distress tolerance as outlined in hypothesis three.

Results

Descriptive Statistics

Descriptive statistics were computed using Stata 17.0 (StataCorp, 2021). Descriptive statistics are presented in Table 1 and bivariate correlations are presented in Table 2. As expected, bivariate associations between childhood psychological maltreatment as measured by the sum score of the emotional abuse, emotional neglect, and physical neglect subscales of the CTQ-SF (Bernstein et al., 2003) were moderately negatively correlated with distress tolerance as measured by the full-scale score of the DTS (Simons & Gaher, 2005). As hypothesized, distress tolerance was weakly negatively correlated with problematic gaming as measured by the full-scale score on the IGDT-10 (Király et al, 2017).

Independent t-tests were used to examine gender differences across the variables investigated. Men scored significantly higher than women on distress tolerance [t (458) = 4.46, p = .001]. There were no significant gender differences observed for childhood psychological maltreatment [t (458) = -1.58, p = .056] or for internet gaming disorder symptoms [t (458) = 0.50, p = .610].

Path Model Analysis Overview

The hypothesized model is depicted in Figure 1. The model fit was estimated using Stata 17.0 (StataCorp, 2021) maximum likelihood estimator with missing values. The model's fit was evaluated using recommendations outlined by (Browne & Cudeck, 1992; Hu & Bentler, 1999; Kline, 2015). Chi-squared test of model fit (non-significant p-value; Hu & Bentler, 1999), standardized root mean square residual (SRMR; values less than .08; Hu & Bentler, 1999), root

mean square error of approximation (RMSEA; values less than .06-.08; Browne & Cudeck, 1992), and the comparative fit index (CFI; index values greater than .95; Hu & Bentler, 1999), were used to evaluate the tested models fitness. When considered together, these indices provide a conservative and trustworthy evaluation of the tested model (Browne & Cudeck, 1992; Hu & Bentler, 1999; Kline, 2015). The estimated model produced a perfect fit to the data [$\chi 2(0, N = 460) = 0.00$, $p < .000$; RMSEA = .00, 90% CI [0.00, 0.00]; CFI = 1.00; TLI = 1.00; SRMR = .000], meaning the tested model did not have any free degrees of freedom. A model with no free degrees of freedom is indicative of a saturated model. Saturated models occur when there are as many estimated parameters in the predicted model as there are data points and therefore the global fit of the model cannot be tested. The final model is presented in Figure 2.

Direct, Indirect, and Total Effects

In the final model, consistent with the hypothesized relationships, psychological maltreatment was weakly positively related to problematic gaming (β = 0.19, CI = [0.11, 0.29]) and moderately inversely related to distress tolerance (β = -0.28, CI = [-0.35, -0.19]). Distress tolerance was weakly inversely related to problematic gaming (β = -0.16, CI = [-0.26, -0.07]). Female sex was moderately inversely associated with distress tolerance (β = -0.31, CI = [-0.49, -0.13]) and weakly inversely associated with problematic gaming (β = -0.19, CI = [-0.38, -0.01]). The significance of the hypothesized indirect effect was evaluated next and was determined by examining the bias-corrected bootstrapped confidence intervals. As hypothesized, the indirect relationship from psychological maltreatment to problematic gaming through distress tolerance resulted in a weak positive association (β = 0.05, CI = [0.02, 0.08]). Finally, the total effect of childhood psychological maltreatment resulted in a weak positive association (β = 0.24, CI = [0.15, 0.33]).

Discussion

The purpose of the current study was to examine the relationships between childhood psychological maltreatment, distress tolerance and problematic video game engagement. Consistent with the hypotheses, a direct relationship from psychological maltreatment to distress tolerance was observed; as was the direct relationship from distress tolerance to problematic gaming, and the direct relationship from psychological maltreatment to problematic gaming. Finally, the indirect relationship from psychological maltreatment to problematic gaming through distress tolerance produced a significant positive relationship.

Psychological Maltreatment, Distress Tolerance and Problematic Gaming

As hypothesized, a direct relationship from psychological maltreatment to problematic gaming was observed. This is consistent with the literature examining childhood maltreatment and gaming pathology (Kircaburun et al., 2019a; Shi et al., 2020; Xie et al., 2021b). The hypothesized indirect relationship from psychological maltreatment to problematic gaming through distress tolerance produced a small effect. There are several reasons as to why the indirect relationship between the examined variables produced a small effect. First, motives for video game engagement were not accounted for in the model. The literature suggests a strong link between video gaming and dimensions of emotion dysregulation (Amendola et al., 2019; Blasi et al., 2019; Hollett & Harris, 2020; Kökönyei et al., 2019b); yet it is unclear why the participants in the current study chose to engage in their video game use. For instance, (2013) found three distinct motives strongly correlated to problematic gaming; ‘escapism’, escaping from reality through immersion into virtual environment; ‘social interaction’, social engagement and support derived from an online community; and ‘grinding’, positive attitudes toward

collecting in-game rewards or items. Future studies should examine the roles of emotion regulatory systems and inter-individual motives for gaming engagement simultaneously.

Second, without knowing age of onset, it becomes more challenging to untangle the complexities of the studied relationships. It is unclear at what age participants began playing video games; and whether their engagement has always been problematic; or if their engagement has shifted from problematic to non-problematic based on external factors. The unaccounted time between childhood and adulthood increases the complexity of understanding this relationship. Participants in the current study were between the ages of 18 to 25, meaning they were born between the years of 1996 to 2003. Technological advancement and ease of access have substantially increased over the last few decades. By not assessing for age of first engagement, it is not clear whether participants started playing video games in their childhood or if they started at a later point in their life when accessibility to engage increased.

Also, it is possible that the motives for participants who started playing video games at a younger age differ from those who started gaming later in life. It is equally likely that motives change across the lifespan and are not concrete. For instance, in childhood, a person may be more motivated by obtaining in-game rewards or items (grinding motive) whereas, social interactions may be more appealing in adulthood (social interaction motive). Therefore, future research should consider cross-lagged factor measurement and assessment of age of onset with attention to developmental changes (i.e., emotional maturity at time of first use, access to alternative regulatory strategies [past and present] and shifts in motives). Lastly, it is likely that there were unknown, yet influential, variables left out of the model that, if included, could have increased the strength of the relationship (e.g., gaming-gambling convergence, virtual reality, COVID-19; Király et al., 2022).

Limitations

In the current study, there are several limitations to guide prospective directions for future researchers. The sample diversity is constrained in a handful of areas. The sample age is limited (18-25), and the prerequisite of playing at least "one-two hours of video games" on an average weekday and/or weekend day limits the generalizability of the current study. Risk factors facilitated from the exposure to psychological maltreatment in one's childhood likely influences emotion dysregulation in adulthood. Thus, these factors may contribute to the relationship between psychological maltreatment and video game use through distress tolerance. Further, a person may use other coping strategies outside of video games if games are not available in their environment. For instance, persons may exercise, seek social engagement, or use substances/alcohol to regulate their affect, but shift toward video games when they are available in their environment. A breadth of emotion regulation strategies should be collected and examined as most individuals use a variety of emotion regulatory strategies across situations (Gross & John, 2003; Rolston & Lloyd-Richardson, 2017).

The cross-sectional, non-experimental, design of the study makes drawing temporal precedence (i.e., causal association) unreasonable. Additionally, the possibility of alternative models cannot be statistically ruled out as the model in this study was relatively simple. For instance, while over 150 million U.S. residents report playing video games regularly, everyone likely plays their preferred games for differing periods of time, with differing levels of engagement, and with their own motivational factor, that likely change over time due to a plethora of internal and/or external factors. Therefore, the model from this study would be best examined using a within-person association design; possibly, using an experience sampling method. A within-person design would allow for a more comprehensive data collection process

by accounting for present moment factors and more accurately assessing video game engagement over time. In turn, this would allow for a stronger more complex model, and could lead to temporal precedence.

The model that was examined in the current study proposed the estimation of a causal chain. However, this should not be done in cross-sectional mediation analysis because of the assumed longitudinal process principle to mediation (MacKinnon & Luecken, 2008). The study used a proposed diagnostic method (i.e., IGDT-10; Király et al., 2019) for assessing problematic video game engagement. At the time of the study's conception, few valid measures assessing pathological engagement were available. Future researchers should examine current literatures for new or updated versions of problematic video game engagement measures. Additionally, inclusion of other dimensions of emotion dysregulation into the future models would be beneficial. Hollett and Harris (2020) found impulse control and perceived limited access to emotion regulation strategies, two dimensions of emotion dysregulation, as significant predictors of problematic gaming.

Conclusion and Implications

The current study contributes to the literature regarding childhood psychological maltreatment, distress tolerance and problematic video game engagement in a population of U.S. young adult gamers. Although the hypothesized model was relatively simple, it produced significant results that supported the hypotheses and provided evidence of how the examined variables are related to one another. Markedly, the results of this study replicate prior literature on the relationship between childhood emotional trauma and problematic gaming, while expanding it in a novel way by introducing distress tolerance into the equation. Although the cross-sectional design of the current study does not provide adequate evidence to make causal

claims, the model does suggest the presence of associations between the measured variables. Particularly, that video games likely play a role as an emotion regulatory strategy and that young adult gamers exposed to psychological maltreatment in their childhood, exhibit a greater proclivity toward playing video games at problematic levels.

Clinicians working with clients whose symptom presentation is aligned with the examined model should pay close attention to the client's level of impairment from their engagement. As noted above, motives for engagement likely differ across individuals. At subclinical levels of engagement (i.e., scores less than five on the IGDT-10), video games appear to be a healthy emotion regulation strategy. In some individuals meeting a clinical threshold, continued engagement may play a protective role against the development of other forms of general psychopathology. The abrupt discontinuation of video games could initiate a domino effect leading to an increased risk for developing more severe forms of psychopathology (i.e., substance use disorder, alcohol use disorder, obsessive-compulsive disorder, major depressive disorder, etc.). It will be important for clinicians to consider the developmental and contextual costs and benefits of a individual's continued engagement.

Ideally, therapeutic focus should be aimed at decreasing pathological dependence by increasing knowledge pertaining to one's engagement and developing new healthy alternative regulation strategies. Additionally, clinicians should pay close attention to demographic characteristics on a person-by-person basis. For instance, obtaining information regarding a person's motives, socio-economic status, living conditions, cultural differences, and access to coping resources, in addition to a clinical interview and psychodiagnostics assessment, would likely lead to the most optimal treatment outcome. Further, not all motives correlated with pathological gaming have negative underpinnings. Social interaction motives and grinding

motives may buffer against the development of more severe forms of psychopathology. Yet, this association should be further researched. Encouraging clients to build new healthy alternative emotion regulation strategies, as opposed to promoting the extinction of their video game engagement, would be most optimal in fostering a positive treatment outcome.

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ugopax@gmail.com

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ariella.pass@gmail.com
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Appendix A

UNIVERSITY OF SOUTH DAKOTA
Institutional Review Board
Informed Consent Statement

Title of Project: Psychological Maltreatment and Video Game Engagement

Principal Investigator: Elizabeth Boyd, Ph.D., South Dakota Union Building, USD, Room 105A, Vermillion, SD 57069
(605)-658-3701, Beth.Boyd@usd.edu

Other Investigators: Mason L. Hatwan, South Dakota Union Building, Room 312, USD, Vermillion, SD 57069,
(605)-658-3710, Mason.Hatwan@coyotes.usd.edu

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be between 18 and 25 years and be willing to complete this survey in a place where you can focus well and where it is unlikely that anyone will distract you. Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why are we doing it?

The purpose of the study is to investigate the associations between childhood experiences, distress tolerance, and video game engagement. About 415 people will take part in this research.

What will happen if you take part in the study?

If you agree to take part in this study, you will be asked to answer demographic questions, videogame-related questions and questionnaires about childhood maltreatment, distress tolerance, and video game engagement via Qualtrics. The survey contains sensitive questions regarding perceived childhood maltreatment. It will take approximately 35 minutes to complete the survey.

What risks might result from being in this study?

There are some risks you might experience from being in this study. You may experience frustration that is often experienced when completing long surveys and some of the questions are personal and might cause discomfort to some people. Due to survey anonymity, we are inhibited from providing direct support. If you would like to talk to someone about your feelings regarding such sensitive questions, you are encouraged to contact the Student Counseling Center by calling 605-658-3580 or by email at scc@usd.edu. There are no further risks in participating in this research study.

How could you benefit from this study?

Although you will not directly benefit from being in this study, you may be helping others by contributing to our understanding of the associations between childhood maltreatment, distress tolerance, and video game engagement. The results of this study may help us develop better interventions and prevention strategies to reduce long-term effects of childhood maltreatment and mitigate distress arising from video game engagement.

How will we protect your information?

The study does not ask for any information that would identify who the responses belong to. Therefore, your responses are recorded anonymously. If this research is published, no information that would identify you will be included, and only group data will be published. All survey responses that we receive will be treated confidentially and stored on a secure server and to protect your privacy, we will not include any information that could identify you.

However, given that the surveys can be completed from any computer (e.g., personal, work, school), we are unable to guarantee the security of the computer on which you choose to enter your responses. As a participant in our study, we want you to be aware that certain "key logging" software programs exist that can be used to track or capture data that you enter and/or websites that you visit.

How will we compensate you for being part of the study?

If participants successfully qualify for participation in the study, they will receive 5 SONA credits upon completion of the survey, for their time and efforts. Participants must pass at least 4 of the 5 attentions checks to receive the SONA credits. Study investigators reserve the right to reject a HIT for not passing the attention checks. You may also withdraw from the study at any time without being reprimanded. If you choose not to participate or withdraw from the study mid-way, please note that you will not receive SONA credit for your time.

Your Participation in this Study is Voluntary

It is totally up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. *However*, if you decide to withdraw from the study, you will not be compensated for your time.

Contact Information for the Study Team and Questions about the Research

The researchers conducting this study are Dr. Elizabeth Boyd and Mason L. Hatwan. If you have any questions, concerns, or complaints about the research please contact Dr. Elizabeth Boyd at (605)-658-3701 during the day.

If you have questions regarding your rights as a research subject, you may contact The University of South Dakota- Office of Human Subjects Protection at (605) 658-3743. You may

also call this number with problems, complaints, or concerns about the research. Please call this number if you cannot reach research staff, or you wish to talk with someone who is an informed individual who is independent of the research team.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. Keep this copy of this document for your records. If you have any questions about the study later, you can contact the study team using the information provided above.

Do you wish to participate in this study?
Yes
No

If "Yes" continue survey, if "No" show end of survey message.

Appendix B

UNIVERSITY OF SOUTH DAKOTA
Institutional Review Board
Informed Consent Statement

Title of Project: Psychological Maltreatment and Video Game Engagement

Principal Investigator: Elizabeth Boyd, Ph.D., South Dakota Union Building, USD, Room 105A, Vermillion, SD 57069
(605)-658-3701, Beth.Boyd@usd.edu

Other Investigators: Mason L. Hatwan, South Dakota Union Building, Room 312, USD, Vermillion, SD 57069,
(605)-658-3710, Mason.Hatwan@coyotes.usd.edu

Invitation to be Part of a Research Study

You are invited to participate in a research study. In order to participate, you must be between 18 and 25 years and be willing to complete this survey in a place where you can focus well and where it is unlikely that anyone will distract you. Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the study about and why are we doing it?

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What risks might result from being in this study?

There are some risks you might experience from being in this study. You may experience frustration that is often experienced when completing long surveys and some of the questions are personal and might cause discomfort to some people. Due to survey anonymity, we are inhibited from providing direct support. If you would like to talk to someone about your feelings regarding such sensitive questions, you are encouraged to contact SAMHSA's National Helpline, which is a free, confidential, 24/7, 365-day-a-year treatment referral and information service (in English and Spanish) for individual and families who may need treatment referral in their area. You can

contact the helpline by calling the following number 1-800-662-4357. There are no further risks in participating in this research study.

How could you benefit from this study?

Although you will not directly benefit from being in this study, you may be helping others by contributing to our understanding of the associations between childhood maltreatment, distress tolerance, and video game engagement. The results of this study may help us develop better interventions and prevention strategies to reduce long-term effects of childhood maltreatment and mitigate distress arising from video game engagement.

How will we protect your information?

The study does not ask for any information that would identify who the responses belong to. Therefore, your responses are recorded anonymously. If this research is published, no information that would identify you will be included, and only group data will be published. All survey responses that we receive will be treated confidentially and stored on a secure server and to protect your privacy, we will not include any information that could identify you.

However, given that the surveys can be completed from any computer (e.g., personal, work, school), we are unable to guarantee the security of the computer on which you choose to enter your responses. As a participant in our study, we want you to be aware that certain "key logging" software programs exist that can be used to track or capture data that you enter and/or websites that you visit.

How will we compensate you for being part of the study?

If participants successfully pass 4 out of 5 of the attention checks, they will receive $2.00 for their time and efforts. Study investigators reserve the right to reject a HIT for not passing the attention checks. You may also withdraw from the study at any time without being reprimanded. If you choose not to participate or withdraw from the study mid-way, please note that you will not be compensated for your time.

Your Participation in this Study is Voluntary

It is totally up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. *However*, if you decide to withdraw from the study, you will not be compensated for your time.

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Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. Keep this copy of this document for your records. If you have any questions about the study later, you can contact the study team using the information provided above.

Do you wish to participate in this study?
Yes
No

If "Yes" continue survey, if "No" show end of survey message.

Appendix C

Demographics Questionnaire

Please select the most appropriate answer.

1) **What is your age? (Please enter only numbers) ____**
2) **What was your biological sex at birth?**

   a) Female

   b) Male
3) **What ethnicity do you most closely identify with?**

   a) Hispanic or Latinx

   b) Not Hispanic or Latinx
4) **Please select one racial group that best described you**

   a) Asian

   b) American Indian or Alaska Native

   c) Black or African American

   d) Native Hawaiian or other Pacific Islander

   e) Caucasian or European American or White

   f) Multiracial

   e) Other (Please specify) _____
5) **Please select highest level of education completed (if applicable)**

   a) Some high school

   b) GED

   c) Diploma

   d) Some college

e) Associates

f) Bachelors

g) Some graduate school

h) Graduate degree

f) Other (Please specify) _____

Appendix D

Gaming-related Variables

Please select the most appropriate answer.

6) **How much time do you spend playing video games on an average weekday?**

   a) I don't play at all

   b) Less then 1 hour a day

   c) 1-2 hours a day

   d) 2-4 hours a day

   e) 4-6 hours a day

   f) More than 6 hours a day

7) **How much time do you spend playing video games on an average weekends (e.g., Saturday and Sunday)**

   a) I don't play at all

   b) Less then 1 hour a day

   c) 1-2 hours a day

   d) 2-4 hours a day

   e) 4-6 hours a day

   f) More than 6 hours a day

8) **What gaming platform do you play most often?** (If you own more than one, please select the one you most often play)

   a) Xbox

   b) PlayStation

   c) Nintendo Switch

d) Mobile Device

e) PC

f) Other _____

9) **What video game genre do you most often play?** (If you play more than one, please select the one you most often play)

a) Massive Multiplayer Online Role-Playing Game (MMORPG) (e.g., World of War Craft)

b) First Person Shooter (FPS) (e.g., Call of Duty, Counter Strike, Rainbow Six)

c) Sports (e.g., Fifa, 2K, Maden)

d) Fighting (e.g., Tekken, Super Smash Bros)

e) Multiplayer Online Battle Arena (MOBA) (e.g., League of Legends, DOTA)

f) Strategy Games (e.g., StarCraft, Clash of Clans, Civilization)

Appendix E

Childhood Trauma Questionnaire – Short Form (CTQ-SF)

Directions: When I was growing up…

	Never True	Rarely True	Somewhat True	Often True	Very Often True
01. I didn't have enough to eat.	1	2	3	4	5
02. I knew that there was someone to take care of me and protect me.	1	2	3	4	5
03. People in my family called me things like "Stupid", "Lazy", or "Ugly".	1	2	3	4	5
04. My parents were too drunk or high to take care of the family.	1	2	3	4	5
05. There was someone in my family who helped me feel that I was important or special.	1	2	3	4	5
06. I had to wear dirty clothes.	1	2	3	4	5
07. I felt loved.	1	2	3	4	5
08. I thought that my parents wished I had never been born.	1	2	3	4	5
09. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.	1	2	3	4	5
10. There was nothing I wanted to change about my family.	1	2	3	4	5
11. People in my family hit me so hard that it left me with bruises or marks.	1	2	3	4	5
12. I was punished with a belt, a board, a cord, or some other hard object.	1	2	3	4	5
13. People in my family looked out for each other	1	2	3	4	5
14. People in my family said hurtful or insulting things to me.	1	2	3	4	5
15. I believed that I was physically abused. 16. I had the perfect childhood.	1	2	3	4	5

17. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.	1	2	3	4	5
18. I felt that someone in my family hated me.	1	2	3	4	5
19. People in my family felt close to each other.	1	2	3	4	5
20. Someone tried to touch me in a sexual way or tried to make me touch them.	1	2	3	4	5
21. Someone threatened to hurt me or tell lies about me unless I did something sexual for them.	1	2	3	4	5
22. I had the best family in the world.	1	2	3	4	5
23. Someone tried to make me do sexual things or watch sexual things.	1	2	3	4	5
24. Someone molested me.	1	2	3	4	5
25. I believed that I was emotionally abused.	1	2	3	4	5
26. There was someone to take me to the doctor if I needed it.	1	2	3	4	5
27. I believed that I was sexually abused.	1	2	3	4	5
28. My family was a source of strength and support.	1	2	3	4	5

Items 2, 5, 7, 13, 19, 26, 28 on the Emotional Neglect subscale are reverse scored.

Appendix F

The Distress Tolerance Scale (DTS)

Directions: Think of times that you feel distressed or upset. Select the item from the menu that best describes your beliefs about feeling distressed or upset.

1. Strongly agree
2. Mildly agree
3. Agree and disagree equally
4. Mildly disagree
5. Strongly disagree

	Strongly Agree	Mildly Agree	Agree and Disagree Equally	Mildly Disagree	Strongly Disagree
1. Feeling distressed or upset is unbearable to me.	1	2	3	4	5
2. When I feel distressed or upset, all I can think about is how bad I feel.	1	2	3	4	5
3. I can't handle feeling distressed or upset.	1	2	3	4	5
4. My feelings of distress are so intense that they completely take over	1	2	3	4	5
5. There's nothing worse than feeling distressed or upset.	1	2	3	4	5
6. I can tolerate being distressed or upset as well as most people.	1	2	3	4	5
7. My feelings of distress or being upset are not acceptable.	1	2	3	4	5

8. I'll do anything to avoid feeling distressed or upset.	1	2	3	4	5
9. Other people seem to be able to tolerate feeing distressed or upset better than I can.	1	2	3	4	5
10. Being distressed or upset is always a major ordeal for me.	1	2	3	4	5
11. I am ashamed of myself when I feel distressed or upset.	1	2	3	4	5
12. My feelings of distress or being upset scare me.	1	2	3	4	5
13. I'll do anything to stop feeling distressed or upset.	1	2	3	4	5
14. When I feel distressed or upset, I must do something about it immediately.	1	2	3	4	5
15. When I feel distressed or upset, I cannot help but concentrate on how bad the distress actually feels.	1	2	3	4	5

Scoring: Item 6 is reverse scored. Subscale scores are the mean of the items. The higher-order DTS is formed from the mean of the four subscales.

Appendix G

Ten-Item Internet Gaming Disorder Test (IGDT-10)

Please read the statements below regarding online gaming. The questionnaire refers to VIDEO GAMES (both online and offline, played on any platform), but the reference to 'game' or 'gaming' is used for the sake of simplicity. Please, indicate on the scale from 0 to 2 (Never, Sometimes, Often) to what extent, and how often, these statements applied to you over the **PAST 12 MONTHS!**

	Never	Sometimes	Often
1. When you were not playing, how often have you fantasized about gaming, thought of previous gaming sessions, and/or anticipated the next game?	0	1	2
2. How often have you felt restless, irritable, anxious and/or sad when you were unable to play or played less than usual?	0	1	2
3. Have you ever in the past 12 months felt the need to play more often or played for longer periods to feel that you have played enough?	0	1	2
4. Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?	0	1	2
5. Have you ever in the past 12 months played games rather than meet your friends or participate in hobbies and pastimes that you used to enjoy before?	0	1	2
6. Have you played a lot despite negative consequences (for instance losing sleep, not being able to do well in school or work, having arguments with your family or friends, and/or neglecting important duties)?	0	1	2
7. Have you tried to keep your family, friends or other important people from knowing how much you were gaming or have you lied to them regarding your gaming?	0	1	2
8. Have you played to relieve a negative mood (for instance helplessness, guilt, or anxiety)?	0	1	2
9. Have you risked or lost a significant relationship because of gaming?	0	1	2
10. Have you ever in the past 12 month jeopardized your school or work performance because of gaming?	0	1	2

Scoring: In order to measure the DSM-5 criteria items are recoded into a dichotomous format according to the following: answers "Never" and "Sometimes" are evaluated as the criterion is not met (0 point), while "Often" is evaluated as the criterion is met (1 point). Important: Question 9 and 10 belong to the same criterion, that is, answer "Often" on either Item 9 or Item 10 (or both items) means only 1 point. Evaluation: DSM-5 considers the case clinically relevant if five or more criteria are met

Appendix H

Instructional Manipulation Checks and Instructed-Response Items

01. I do not understand a word of English.

    a. Strongly Disagree

    b. Moderately Disagree

    c. Neither Agree nor Disagree

    d. Moderately Agree

    e. Strongly Agree

02. All my friends are aliens.

    a. Agree Strongly

    b. Agree Somewhat

    c. Disagree Somewhat

    d. Disagree Strongly

03. To verify that the browser works properly and that we are collecting all your answers, please select the category fair from the list below?

    a. Very Good

    b. Good

    c. Fair

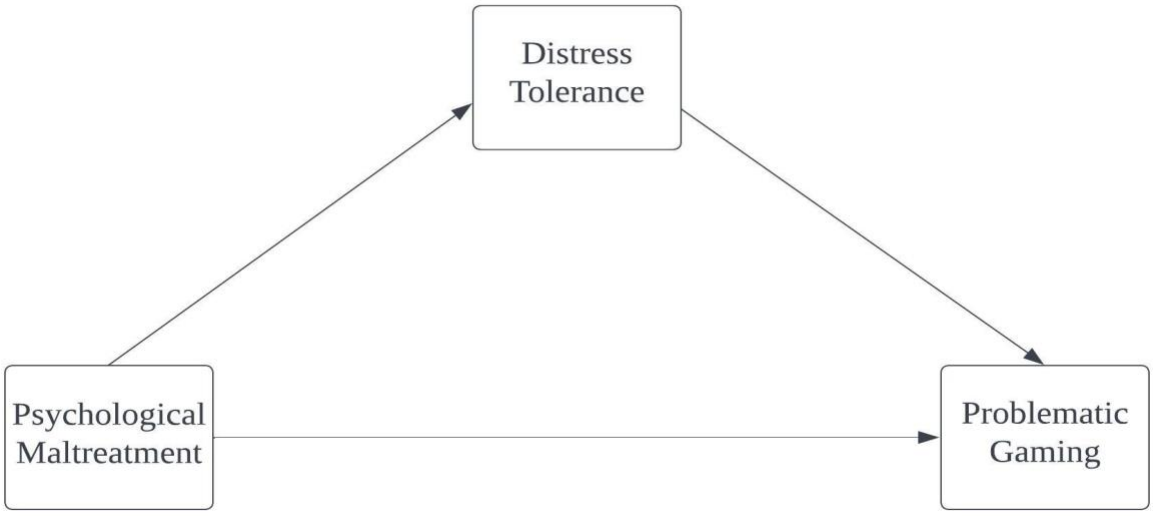
    d. Bad

    e. Very Bad

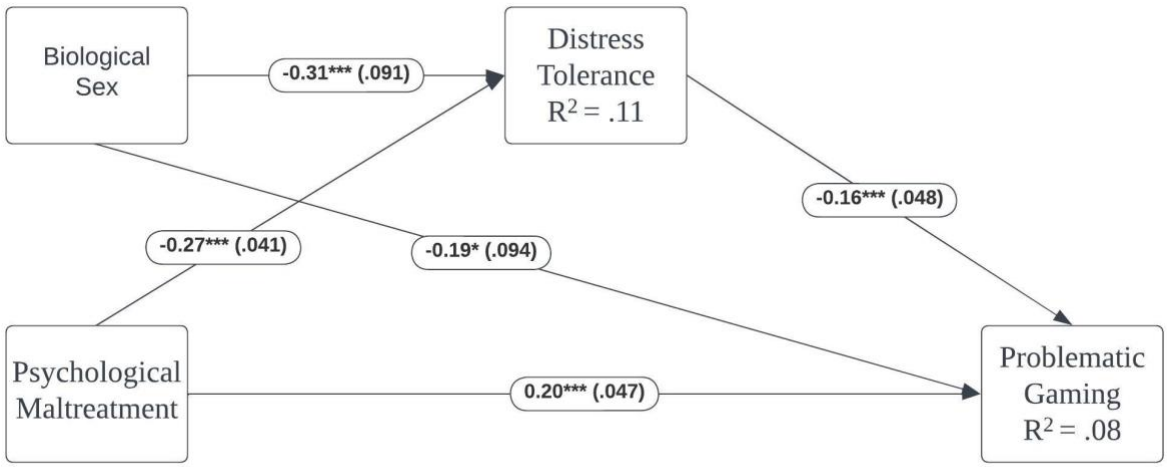
04. Most modern theories of decision making recognize the fact that decisions do not take place in a vacuum. Individual preferences and knowledge, along with situational variables can greatly impact the decision process. To facilitate our research on decision

making, we are interested in knowing certain factors about you, the decision-maker. Specifically, we are interested in whether you take the time to read the directions; if not, then some of our manipulations that rely on changes in the instructions will be ineffective. So, to demonstrate that you have read the instructions, please ignore the sports item below. Instead, write "I read the instructions" in the box marked "Other". Which of these activities do you engage in regularly?

a. Hiking
b. Cooking
c. Reading
d. Swimming
e. Ice-skating
f. Other _____



Note. Figure 1. Hypothesized mediation model of associations between psychological maltreatment, distress tolerance, and problematic gaming in a sample of young-adult United States residents. Biological sex was included as a covariate in the model but was left out of the diagram for clarity.



Note. Figure 2. Final path model with standardized coefficients. Biological sex (male = 0 and female = 1) was included in the model as a covariate.
*p < .05. **p < .01. ***p < .001.

Table 1

Demographic Characteristics of Participants

Demographic characteristics	Analyzed sample		Full sample	
	N	%	*N*	%
Biological sex				
Male	256	55.65	279	55.03
Female	204	44.35	228	44.97
Educational attainment				
Some high school	18	3.79	20	3.82
GED	26	5.47	27	5.15
Diploma	87	18.32	92	17.56
Some college	151	31.79	169	32.25
Associates degree	41	8.63	45	8.59
Bachelor's degree	131	27.58	150	28.63
Some graduate school	11	2.32	11	2.10
Graduate degree	10	2.11	10	1.91
Race				
Asian	54	11.37	64	12.21
American Indian	5	1.05	6	1.15
Black or African American	48	10.11	52	9.92
Native Hawaiian or other Pacific Islander	3	0.63	3	0.57
Caucasian or white	309	65.05	339	64.69

Multiracial	39	8.21	42	8.02
Latino/a or Hispanic or Mestizo or Mexican	17	3.58	18	3.44
Ethnicity				
Hispanic or Latinx	91	19.16	102	19.47
Not Hispanic or Latinx	384	80.84	422	80.53
Preferred video game genre				
MMORPG [a]	157	33.05	191	32.71
FPS [b]	179	37.68	205	35.10
Sports games	15	3.16	24	4.11
Fighting games	27	5.68	36	6.16
MOBA [c]	31	6.53	44	7.53
Strategy games	66	13.89	84	14.38
Preferred gaming platform				
Xbox	80	16.84	103	17.64
Play Station	84	17.68	100	17.12
Nintendo Switch	82	17.26	100	17.12
Mobile Devices [d]	54	11.37	75	12.84
PC [e]	175	36.84	206	35.27
Play time on average weekday				
DNP [f]	_	_	6	1.03
Less than 1 hour a day	_	_	24	4.12
1-2 hours a day	193	40.72	222	38.08

2-4 hours a day	156	32.91	191	32.76
4-6 hours a day	75	15.82	83	14.24
More than 6 hours a day	50	10.55	57	9.78
Play time on average weekend day				
DNP [f]	_	_	5	0.86
Less than 1 hour a day	_	_	7	1.20
1-2 hours a day	64	13.50	90	15.44
2-4 hours a day	181	38.19	217	37.22
4-6 hours a day	144	30.38	166	28.47
More than 6 hours a day	85	17.93	98	16.81

Note. $N = 582$ ($N = 474$ for analyzed sample). Participants were on average 22.2 years old ($SD = 2.09$).
[a] MMORPG = Massive multiplayer role-playing game.
[b] FPS = First person shooter.
[c] MOBA = Multiplayer online battle arena.
[d] Mobile Devices = Cell phones, iPad, Tablets, or Laptops.
[e] PC = Personal Computer.
[f] DNP = Do not play at all.

Table 2

Bivariate Correlation Table

Variable	*n*	*M*	*SD*	1	2	3	4
1.Problematic Gaming [a]	475	6.73	3.73	_			
2.Psychological Maltreatment [b]	475	30.79	12.65	.23***	_		
3.Distress Tolerance	475	3.02	0.90	-.20***	-.32***	_	
4.Biological Sex [c]	460	-	-	-.02	.21***	-.20***	_
Male	256						
Female	204						

[a] Problematic Gaming = continuous variable computed as the mean of the IGDT-10 total score.
[b] Psychological Maltreatment = sum score of emotional abuse, emotional neglect, and physical neglect subscales from the CTQ-SF.
[c] 0 = male and 1 = female.
*$p < .05$. **$p < .01$. ***$p < .001$.