

REFRAMING ADDICTION AS A COPING RESPONSE: A NEEDED  
SHIFT IN MODERN PUBLIC HEALTH PARADIGMS

By

Anthony King

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Anthony King

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Doctor of Philosophy – Psychological and Brain Sciences  
Department of Psychology

Gloria Wong-Padoongpatt, Ph.D.  
*Examination Committee Chair*

Alyssa Crittenden, Ph.D.  
*Vice Provost for Graduate Education &  
Dean of the Graduate College*

Shane Kraus, Ph.D.  
*Examination Committee Member*

Colleen Parks, Ph.D.  
*Examination Committee Member*

Brett Abarbanel, Ph.D.  
*Graduate College Faculty Representative*

## Abstract

What are the primary risk factors that compel one person towards addiction and not another? After decades of research, there is still no clear consensus. Some experts say addiction is a brain disease; others say it is a willful act, or even an outright crime. Nevertheless, the three research studies contained within this dissertation suggest an alternative, more parsimonious public-health-centered framework for viewing addictive behavioral patterns: as a biopsychosocial coping strategy for past and present stressors. In Study 1, this idea was examined by evaluating how symptoms of posttraumatic stress disorder (PTSD) were associated with problem gambling severity, different gambling motives, and positive play practices (i.e., responsible gambling behaviors and beliefs) using a census-matched sample of adults from the United States (U.S.;  $N = 2,806$ ). In Study 2, the same sample was used, but this time, the relationships between PTSD symptoms, motives for playing video games, and gaming disorder severity were investigated. Finally, in Study 3, the connections between 10 categories of adverse childhood experiences and 13 types of significant problems involving substances (e.g., alcohol, cocaine) and/or behaviors (e.g., gambling, internet use) were investigated amongst a large sample of U.S. college students ( $N = 1,993$ ). Collectively, the results from this work point to an often forgotten truth about substance and behavioral addictions: they are developed in response to a person's past experiences and current milieu. When addiction is viewed this way, it permits the possibility of finding more pragmatic solutions beyond medical treatments and the legal system for helping individuals struggling with these sometimes useful but often harmful coping strategies.

## Table of Contents

<b>Abstract</b> .....	iii
<b>List of Tables</b> .....	ix
<b>List of Figures</b> .....	x
<b>Chapter 1: Introduction</b> .....	1
Coping Theories of Addiction .....	4
The Dislocation Theory of Addiction .....	4
The Syndrome Model of Addiction .....	6
The Self-Medication Hypothesis .....	6
Research Agenda .....	7
<b>Chapter 2: Can Positive Play Deficits Explain the Associations Between Posttraumatic Stress Symptoms, Gambling Motives, &amp; Problem Gambling? Results of a National U.S. Sample</b> .....	10
Abstract.....	10
Introduction.....	12
Posttraumatic Stress Symptoms, Gambling Motives, and Gambling Disorder .....	13
Positive Play as a Potential Mediator.....	16
Current Study .....	17
Method .....	18
Participants and Procedure.....	18
Measures .....	20
Posttraumatic Stress Disorder (PTSD).....	20
Problem Gambling .....	20

Gambling Motives .....	21
Positive Play.....	21
Analytical Plan.....	22
Data Preparation.....	22
Primary Analysis.....	23
Results.....	24
Descriptive Statistics.....	24
Mediation Models .....	25
H1: PTSD Symptoms → Gambling Motives → PG Severity.....	25
H2: PTSD Symptoms → Positive Play → PG Severity.....	26
H3: Coping Motives → Positive Play → PG Severity.....	27
H4: PTSD Symptoms → Coping Motives → Positive Play → PG Severity .....	28
ANOVA Tests for Group Differences .....	29
Seeking Treatment for Gambling (2 Groups) .....	29
PG Severity (3 Groups).....	30
PTSD Symptom Severity (3 Groups) .....	31
Discussion.....	31
Implications.....	34
Limitations .....	35
Conclusion .....	36
Tables and Figures of Study 1 .....	38
References.....	45
<b>Chapter 3: Manuscript 1 Summary &amp; Bridge .....</b>	<b>54</b>

## Chapter 4: Coping and Escape Motives Mediate Associations Between Posttraumatic Stress

<b>Symptoms and Video Game Disorders in U.S. adults</b> .....	55
Abstract .....	55
Introduction .....	57
PTSD Symptoms and Addictive Disorders .....	57
PTSD Symptoms and IGD Symptoms: Gaming Motives as a Mediator .....	59
Current Study .....	60
Method .....	61
Participants and Procedure .....	61
Measures .....	63
Posttraumatic Stress Disorder (PTSD) Symptomology .....	63
Internet Gaming Disorder (IGD) .....	63
Gaming Motives .....	64
Analytical Plan .....	65
Data Preparation .....	65
Primary Analyses .....	65
Results .....	66
Descriptive Statistics .....	66
Mediation Analysis .....	66
PTSD Symptoms → Gaming Motive: Competition → IGD Severity .....	66
PTSD Symptoms → Gaming Motive: Coping → IGD Severity .....	67
PTSD Symptoms → Gaming Motive: Escape → IGD Severity .....	67
PTSD Symptoms → Gaming Motive: Fantasy → IGD Severity .....	68

PTSD Symptoms → Gaming Motive: Recreation → IGD Severity .....	68
PTSD Symptoms → Gaming Motive: Skill Development → IGD Severity .....	69
PTSD Symptoms → Gaming Motive: Social → IGD Severity.....	69
ANOVA Tests for Group Differences by IGD and PTSD Symptom Severity.....	70
Discussion.....	71
Implications.....	73
Limitations .....	74
Conclusion .....	75
Tables and Figure of Study 2 .....	76
References.....	81
<b>Chapter 5: Manuscript 2 Summary &amp; Bridge .....</b>	<b>89</b>
<b>Chapter 6: Associations Between Childhood Adversity, Risk Factors for Poor Health, and</b>	
<b>    Significant Problems with Substances and Behaviors Amongst U.S. College Students</b>	
<b>    .....</b>	<b>91</b>
Abstract.....	91
Introduction.....	93
Current Study .....	97
Method .....	98
Participants and Procedure.....	98
Measures .....	98
Adverse Childhood Experiences (ACEs).....	98
Impulsivity .....	99
Depression, Anxiety, and Stress .....	100

Loneliness .....	100
Problematic Behaviors and/or Substance Use .....	101
Data Analysis .....	101
Results.....	102
Objective 1: Associations Between Cumulative ACEs, Health Risk Factors, and Problems .....	102
Objective 2: Group Differences for ACEs By Problem Type .....	104
Objective 3: Cumulative ACEs and Health Risk Factors Predicting Problem Type .....	104
Discussion.....	105
Implications.....	108
Limitations .....	108
Conclusion .....	109
Tables of Study 3 .....	110
References.....	114
<b>Chapter 7: Manuscript 3 Summary .....</b>	<b>122</b>
<b>Chapter 8: Discussion &amp; Implications .....</b>	<b>123</b>
<b>Chapter 9: Conclusions .....</b>	<b>126</b>
<b>References .....</b>	<b>127</b>
<b>Curriculum Vitae .....</b>	<b>130</b>



## List of Tables

Table 2.1: Participant Demographics.....	38
Table 2.2: Bivariate Correlations of Key Variables with Descriptive Statistics.....	39
Table 2.3: Mediation of PTSD Symptoms Predicting PG via Coping Motives and Positive Play .....	40
Table 2.4: Serial Mediation of PTSD Symptoms Predicting PG via Coping Motives and Positive Play .....	41
Table 2.5: ANOVAs for Key Variables Across Different Gambler Groups .....	42
Table 4.1: Participant Demographics.....	76
Table 4.2: Bivariate Correlations of Key Variables with Descriptive Statistics.....	77
Table 4.3: Mediations of PTSD Symptoms Predicting IGD Severity via Motives for Playing Video Games.....	78
Table 4.4: ANOVAs for Primary Variables Across Gamer Groups.....	79
Table 6.1: Bivariate Correlations of Primary Variables .....	110
Table 6.2: Bivariate Correlations and Prevalence Rates of Problematic Behaviors and Substance Use .....	111
Table 6.3: ACE Frequencies and Difference Tests by Problem Type .....	112
Table 6.4: Multinomial Logistic Regression Model .....	113

## List of Figures

Figure 2.1: Conceptual Diagrams of Proposed Mediation Models.....	43
Figure 2.2: Standardized Regression Results of Mediation Tests .....	44
Figure 4.1: Standardized Mediation Results of PTSD Symptoms Predicting IGD Severity via Gaming Motives.....	80

## Chapter 1: Introduction

The term “addiction” no longer carries a distinct meaning to it. In the medical field, the word represents a disease or a disorder; in many religious and spiritual groups, it signifies moral deviance or disobedience; and in the legal system, addiction tends to imply some form of criminality, or at least the strong potential for it. Beyond those official circles, though, the general public also uses the word addiction and its derivative forms to describe everything from relatively benign behaviors, like being “addicted” to Taylor Swift’s music, to more serious health-impairing behavioral patterns, such as daily intravenous drug use. Yet, despite the different ways in which the meaning of addiction has been distorted with its widespread usage, one point is generally agreed upon by most parties: the people of the United States (U.S.) have a serious problem with addiction.

For well over a century now, both official and unofficial experts from nearly every field have intensely studied the myriad manifestations of this addiction problem within the U.S. each in their own ways, often attempting to find some semblance of an answer as to what ultimately drives addictive behaviors, including their own in many cases. So after billions of dollars in funding and decades of interdisciplinary research and treatment programs designed to prevent and reduce addiction rates in this country, what does the U.S. population have to show for these efforts? Today, drug-related overdoses have reached all-time highs in the U.S. (CDC, 2023); approximately 47 million Americans were diagnosed with a substance or alcohol use disorder within the last year (i.e., 13–14% of the entire U.S. population); and around another 8 million Americans received diagnoses for comorbid substance and alcohol use disorders (SAMHSA, 2023)—keeping in mind that these figures neglect to account for the number of people outside of

the medical system who also experience problems from their use of illegal or legal substances (alcohol included).

Furthermore, many of these problems stemming from addictive behavioral patterns are often easier to identify when they involve a potent psychoactive drug, like fentanyl, rather than a mood-altering activity, such as gambling, sex, or video-gaming. In part, this difference in identification seems to be due to how the negative consequences of behavioral addictions are often more insidious than some of the faster-acting functional impairments that can accompany repetitive drug and alcohol use (Griffiths, 2005). For example, it is generally harder for a person to disguise the harmful physical effects from a night of heavy drinking the next day than it is for them to hide the immediate aftermath of a personally significant financial loss to gambling. Nevertheless, there are some recent trends that may hint at possible problems in some of these activity-based behavioral areas as well.

Specifically, it has been observed that people who gamble problematically have significantly higher suicide rates in comparison to the rest of the public (Marionneau & Nikkinen, 2022), and males are not only more likely to be gamblers than females but are also more likely to be classified as problem gamblers (Hing et al., 2016). These patterns are potentially concerning when placed within the context of legalized gambling's continued expansion across the U.S. because as the nation's gambling industry continues to set new revenue records for its third year in a row (American Gaming Association, 2024), male suicide rates have occurred at roughly four times the rate of females (Garnett et al., 2022)—but again, it is difficult to tease apart correlation from causation in many of these non-substance-based behavioral trends. In addition to this, it is worth noting that male enrollment in 4-year college degree programs has been dropping steadily in the U.S. since 2011 (Pew Research Center, 2023),

which may only further encourage many younger men without college educations to pursue the seemingly easy-to-win financial rewards that are heavily promoted for modern-day gambling options.

Moreover, beyond the potential problems related to addictive gambling patterns, identifying major public health problems and trends for other (non-substance) behavioral addictions can appear almost impossible. One reason for this difficulty is that, in the U.S., the primary medical manual used by health professionals and insurance companies—that is, the *Diagnostic and Statistical Manual of Mental Disorders-5<sup>th</sup> Edition, Text Revision* or DSM-5-TR (American Psychiatric Association [APA], 2022)—does not include an official diagnosis for addictive disorders that involve activities other than drug use or gambling. Therefore, since little to no official data is being collected in relation to these other possible addiction-related behaviors amongst the U.S. population, the full extent of significant problems in these areas remain unknown despite a general indication of their rising prevalence across society (Alexander, 2008). In contrast to the APA, the World Health Organization’s *International Classification of Diseases-11<sup>th</sup> Edition* (ICD-11; WHO, 2019) deemed it necessary to broaden its clinical descriptions to formally include video-gaming disorder and compulsive sexual behavior disorder alongside gambling disorder, so more data is starting to emerge on this topic from the global population. Yet, interestingly, both medical manuals made it a point to emphasize how there is considerable overlap between the different classifications of addictive disorders—regardless of their opportunistic expression at any given point in time for addiction-prone individuals (APA, 2022; WHO, 2019).

Currently, this idea that all addiction types share a common pattern of energy and etiology has been immensely obscured by the categorical thinking inherent to the medical

system's separate diagnostic categories for addictive disorders, which can give both health professionals and their patients the false impression that these diagnoses are distinct from one another. Further complicating this picture: while many scientists pay considerable lip-service to the principles of parsimony in research, the scientific study of addiction today appears stubbornly predicated on the assumption that there can never be simple answers to seemingly complex problems like an individual's addiction. Maintaining this assumption allows billions of dollars in funding to continue flowing into the hands of "addiction experts" year after year, but it does not seem to be moving us any closer towards finding any tangible solutions for the country's addiction crisis. It is for that reason, as well as many others, that this dissertation is issuing a national call for a fundamental shift in the present ways that Americans view and approach addiction-related problems across this country. In the following sections, the main theories that support why addictive behavioral patterns are best viewed as a coping response to an individual's past experiences and current milieu are discussed, as well as the possible ways this perspective might improve the comprehensiveness our current addiction approaches.

## **Coping Theories of Addiction**

### ***The Dislocation Theory of Addiction***

The Canadian psychologist Bruce Alexander posits that all addictive behaviors—whether they involve a substance or activity—are an adaption to the effects of, what he calls, *dislocation*, or the lack of an individual being psychologically and socially integrated into their larger community (2008). When this dislocation is experienced, Alexander theorizes that it leads to an abnormal relationship between a person and their surrounding social structures, hindering the affected individual's potential for healthy personal growth and for finding a sense of purpose, meaning, and identity in their everyday life. To Alexander, the reason that dislocation can be so

harmful and most often leads to addictive coping styles is because psychosocial integration is a non-negotiable human need. People *need* to feel like they belong to a community larger than themselves, like they have a functional role amongst their peers in society—after all, there is a good reason why humans are called “the social animal” (Aronson & Aronson, 2018, p. 11).

It took Bruce Alexander several decades to come up with his dislocation theory of addiction, but it was initially inspired by his role in the famous “Rat Park” studies. In that research, Alexander and his colleagues (1980) found that they could get isolated rats physically addicted to intense psychoactive substances like heroin and cocaine, yet they were unable to keep those rats addicted if they removed the animals from isolation and put them in—what equated to—a rodent’s paradise. Outside of their previous isolation, when the physically addicted (or chemically dependent) rats had other rodents to interact with and fun activities to pursue, the researchers saw that these animals would naturally decrease their drug intake in the new, richer environment. This particular finding challenged many beliefs at the time (and plenty of them that still persist to this day) about how it takes only one use of some drugs for someone to become fiendishly addicted to them—a belief which Bruce likes to label The Myth of the Demon Drug.

Although realizing that rats are not humans, Alexander eventually decided to shift his focus to how this same pattern of addiction could be playing out in human societies as well. This led him to extensively analyze the cross-cultural and historic records of addictive patterns that have occurred over the last few millennia. Through these efforts, Alexander identified a consistent trend in human societies that are plagued by addiction: a significant portion of the individuals in those communities were in a relatively constant state of cultural breakdown and, in turn, were suffering from dislocation. In many ways, he proposes that this trend has only been further amplified by our modern-day versions of capitalism, arguing, “Free-market society can

no more be addiction-free than it can be free of intense competition, income disparity, environmental destruction, unequal access to life-saving medical care, or dishonest business practices” (2008, p. 64). To support this point, Alexander outlines the steady rise in addiction rates for different indigenous and native populations in the 19<sup>th</sup> and 20<sup>th</sup> centuries, as Western expansion increasingly became a threat to many of those people’s traditional ways of life—a trend which is unfortunately still impacting the generations that have followed them (Soto et al., 2022).

### ***The Syndrome Model of Addiction***

Shaffer et al. (2004) suggested that the given target of a person’s addiction matters less than the underlying pattern driving their intense craving for an external source of relief or pleasure. Using a biopsychosocial framework, Shaffer and his colleagues proposed that a syndrome model of addiction offers a more comprehensive clinical approach for treating addictive patterns, which can frequently change over the course of someone’s lifetime (Sinclair et al., 2021). This model emphasizes how the numerous similarities between different addictive disorder classes are indicative of a shared etiology amongst these kinds of behaviors and how object-specific treatments for addicted individuals could be a major contributor to the consistently high relapse rates of many present-day addiction programs (Nagy et al., 2022). In support of these claims, Shaffer et al. (2004) offered extensive evidence detailing why and how people with behavioral addictions are more likely to report co-occurring substance addictions, and vice versa. Although, possibly to maintain their transparency, this research team did admit there would be immense difficulty and resistance in trying to incorporate this broader conceptualization of addiction into the U.S.’s current healthcare system.

### ***The Self-Medication Hypothesis***



In his book *Treating Addiction as a Human Process*, Khantzian (1999) explained his reasons for perceiving addictive patterns as a personalized form of self-medication. Speaking from a wholistic psychodynamic perspective, Khantzian asserted that "...every human trouble or psychological symptom has its reasons and represents an attempt to solve a problem" (1999, p. 4). This idea is fundamental to the self-medication hypothesis (Khantzian, 1997, 1999) because it explains how someone can become over-reliant on accessible addiction-related coping strategies within their environment when dealing with certain difficulties or disappointments in life, but also how these strategies can change as a person's circumstances do. Khantzian largely uses this hypothesis to detail the relationship between an individual and their preferred drug, yet research in recent decades has now made it clear that mood-altering behaviors like gambling and video-gaming can stimulate similar areas of the brain as habit-forming substances do (APA, 2022; WHO, 2019).

### **Research Agenda**

The overall aim of the three research studies contained within this document was to better understand the risk and protective factors that are most associated with current addictive behavioral patterns in the U.S. population, focusing particularly on how these behaviors might be used as a coping strategy for other problems or challenges in a person's life (e.g., managing symptoms of trauma or anxiety). In Study 1, this aim was examined within the context of the general public's gambling participation, where we investigated whether the associations between symptoms of posttraumatic stress disorder (PTSD) and problem gambling (PG) severity were better explained by an individual's coping motivations for gambling, rather than other gambling motives (i.e., enhancement, financial, and social), responsible gambling (RG) behaviors and beliefs (i.e., honesty and control, pre-commitment, personal responsibility, and gambling

literacy), or some combination of the two. As part of this investigation, we sought to answer two specific questions: (1) Are there key differences in gambling motives or RG practices between treatment-seeking gamblers and non-treatment-seeking gamblers in the U.S. who report PTSD symptoms? and (2) Are there key differences in gambling motives or RG practices between gamblers classified as non-problematic, at-risk for PG, and problematic gamblers who report PTSD symptoms?

Moreover, in Study 2, the main aim of this dissertation was further examined by testing whether higher symptom levels of PTSD were predictive of greater problems with video games and whether coping-related motives were the primary mechanism involved in that connection (if one was found). Using the same national sample of U.S. adults from Study 1, an interesting variation of this study's analyses was that seven motives for playing video games were measured (i.e., competition, coping, escape, fantasy, recreation, skill development, and social), opposed to the four gambling motives that were analyzed in the previous study. This important difference between Studies 1 and 2 allowed us to observe whether it was possible for coping-related motives to still emerge as the strongest predictor of different behavioral problems when separate psychometric scales were used. A secondary aim of Study 2 was to estimate the general prevalence rates of disordered gaming behaviors amongst non-clinical U.S. adults because, as mentioned previously, it is difficult to find any national data on this condition without it being associated with a formal medical diagnosis in the DSM-5-TR (APA, 2022).

In this dissertation's third and final study, a large sample of U.S. college students was collected to evaluate a different angle of this manuscript's primary aim. So instead of focusing on PTSD symptoms and their connections to different motives and problems with gambling and video-gaming, this study evaluated how general and specific adverse childhood experiences

(ACEs) were linked to later personal problems with 13 potentially addictive substances and behaviors (i.e., alcohol, cannabis, cocaine, gambling, internet use, opioids, over-eating, prescription pills, sex, shopping, tobacco, video-gaming, and work) and six common psychosocial risk factors for poor health (i.e., anxiety, depression, positive and negative urgency, loneliness, and stress). Compared to the other studies in this manuscript, Study 3 had three unique features: (1) it used one of the U.S.'s highest risk groups for addictive disorders: 18–25 year-olds; (2) it measured a wider variety of problematic behaviors and their connection to other psychosocial issues in a person's life; and (3) it analyzed the effects of childhood adversity opposed to PTSD symptoms.

## **Chapter 2: Can Positive Play Deficits Explain the Associations Between Posttraumatic Stress Symptoms, Gambling Motives, & Problem Gambling? Results of a National U.S.**

### **Sample**

Anthony King  
University of Nevada, Las Vegas

Shane W. Kraus  
University of Nevada, Las Vegas

Gloria Wong-Padoongpatt  
University of Nevada, Las Vegas

Joshua B. Grubbs  
University of New Mexico

### **Abstract**

Past research has demonstrated a consistent connection between symptoms of posttraumatic stress disorder (PTSD) and problematic gambling in both general and clinical United States (U.S.) populations. Little is known, however, about the mediating role that responsible gambling practices related to positive play might have in the relationships between symptoms of PTSD, problem gambling (PG) severity, and different motives for gambling. Therefore, using mediation analysis, this study investigated these associations within a census-matched national sample of U.S. adults ( $N = 2,806$ ). Results indicated PTSD symptoms and PG often co-occur in this population ( $r = .43, p < .01$ ), and coping motives for gambling were the key mechanism connecting PTSD symptoms to PG severity rather than deficits in positive play practices or other gambling motives. Moreover, it was found that the average gambler who had sought treatment for gambling in the past not only had more severe PTSD symptoms and PG but also had the strongest gambling motives, the largest deficits in positive play, and was more likely to be

younger than 50 years old. In this sample, approximately 1 in 10 people who gambled in the past year were classified as problem gamblers, 1 in 5 met criteria for a provisional PTSD diagnosis, and 1 in 33 sought out gambling treatment previously. These findings provide further evidence for the relationship between symptoms of posttraumatic stress and problematic gambling behaviors in the U.S. population and offer critical insights into the explanatory roles of coping motives and positive play practices in this connection.

*Keywords:* PTSD symptoms, problem gambling, positive play, coping motives, gambling motivations, responsible gambling

## Introduction

A complex, yet consistent relationship exists between the symptoms of posttraumatic stress disorder (PTSD) and problematic gambling behaviors (see Moore & Grubbs, 2021 for a review). Nevertheless, the psychological mechanisms underlying this association have remained largely understudied, especially for non-clinical populations (Grubbs et al., 2018; Poole et al., 2017). Within nationally representative samples from the United States (U.S.), both PTSD and problematic gambling behaviors have demonstrated relatively high rates of comorbidity with each other, as well as anxiety, impulse control, mood, personality, and substance use disorders (Hasin & Grant, 2015; Kessler et al., 1995, 2008; Wisco et al., 2017). Notably, though, PTSD symptoms have been shown to predict one's level of problem gambling (PG) better than trauma-exposure or a PTSD diagnosis alone are able to (Ogle et al., 2014; Moore & Grubbs, 2021). This is, perhaps, because individuals with subclinical symptom levels of PTSD or gambling disorder<sup>1</sup> can still experience significant functional impairments without meeting all of the specified diagnostic requirements for these disorders (Najavits et al., 2011; Weinstock et al., 2017). For example, the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision* (DSM-5-TR) specifies that in order to satisfy Criterion A of a PTSD diagnosis, an individual's exposure to trauma must involve the presence of a serious physical threat (APA, 2022), which might exclude individuals who experienced less severe physical threats or more emotion-based traumas from receiving this medical diagnosis.

Furthermore, symptoms of PTSD appear to uniquely exacerbate gambling-related problems and elevate risky gambling involvement (Galatzer-Levy & Bryant, 2013; Najavits et

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<sup>1</sup> The reader should note that this study measured the severity of one's problem gambling and not gambling disorder symptomology; while all individuals with gambling disorder are considered to be problem gamblers, not all problem gamblers are considered to have a gambling disorder; thus, the term *problem gambling* applies to a larger spectrum of people who gamble and gambling behaviors than the label of *gambling disorder* conventionally does.

al., 2011; Shaffer et al., 2004), possibly by increasing an individual's coping motivations and positive expectancies for gambling (Blaszczynski & Nower, 2002; Grubbs et al., 2018; Grubbs & Rosansky, 2020; Ledgerwood & Milosevic, 2015). As legalized gambling continues to expand across the U.S., identifying relevant responsible gambling practices that can assist in reducing the connection between posttraumatic stress symptoms and disordered gambling patterns seems critical for supporting public health and industry efforts to decrease the negative consequences stemming from legal participation in gambling. Yet, one obstacle to this objective is that relatively few tools exist which measure what is considered to be responsible gambling. Wood and colleagues' (2017) Positive Play Scale is one of those few, if not the only, widely used psychometric measure that assesses four categories of responsible behaviors and beliefs associated with one's gambling participation—that is, personal responsibility, honesty and control, pre-commitment, and gambling literacy—and this scale was developed specifically to create responsible gambling programming that could be personalized for different gamblers based on their individual needs in those areas.

Therefore, utilizing this scale, a primary aim of this study was to investigate the mediating role of different responsible gambling behaviors and beliefs related to positive play in the associations between PTSD symptoms, gambling motives, and PG severity, while also examining group differences across these variables. This study's second aim was to update previous estimations of PTSD symptoms, PG severities, and positive play practices for different groups of gamblers in the U.S. general population.

### **Posttraumatic Stress Symptoms, Gambling Motives, and Gambling Disorder**

Exposure to traumatic events is a common part of most human experiences (Benjet et al., 2016), and it often leads to additional traumas when individuals attempt to respond to the

aftermath of these experiences (Gelkopf, 2018). Kilpatrick and associates ( $N = 2,953$ ; 2013) found that 89.7% of U.S. adults from a representative sample were previously exposed to at least one traumatic event, as defined by the DSM-5's Criterion A for PTSD (APA, 2013), and exposure to three traumatic events was most commonly reported by participants with trauma histories. Decades of research indicates that, in general, the more a person is exposed to potentially traumatizing events—especially in the earlier stages of their development—the greater the risk they have for an array of mental disorders and physical illnesses, including but not limited to PTSD and gambling disorder (Dube et al., 2003; Kalmakis & Chandler, 2015; Murthy & Gould, 2020; Poole et al., 2017). Clinical presentations of comorbid PTSD and gambling disorder also tend to be more severe than when these disorders occur independently from one another, with people who report only gambling disorder symptoms appearing to function better than others with symptoms of PTSD or with co-occurring PTSD and gambling disorder symptomology (Najavits et al., 2011).

Theories of disordered gambling, such as Nower and colleagues' (2022) revised pathways model and Jacobs' (1986) general addictions theory, propose that most people gamble for a wide variety of reasons. But the vast majority of disordered gamblers are thought to engage in gambling primarily as a means to escape from—or otherwise cope with—distressing memories, thoughts, or feelings. Several studies have supported this theoretical notion that the most prominent reason disordered gamblers gamble is to escape—escape from their negative mood states, escape from their life problems and responsibilities, or even just to escape from a lack of excitement in their lives (Biddle et al., 2005; Estevez et al., 2021; Flack & Stevens, 2018; Ledgerwood & Milosevic, 2015; Puiras et al., 2020; Rockloff & Dyer, 2006; Vaughan & Flack, 2022; Wood & Griffiths, 2007). Moreover, escape-based coping motives for gambling have been



linked, both cross-sectionally and over time, to more symptoms of gambling disorder in U.S. adults ( $N = 812$ ; Grubbs & Rosansky, 2020). This result highlights how individuals experiencing symptoms of PTSD, whether subclinical or not, might be particularly vulnerable to seeking out gambling opportunities as a long-term, maladaptive coping strategy for managing their negative emotional states (Dowling et al., 2021; Grubbs et al., 2018; Horak et al., 2020; Sharpe, 2002; Stewart et al., 2008).

To compound this vulnerability, research suggests people exposed to trauma tend to display more impulsivity and perceive significantly greater benefits and fewer harms related to their participation in risky behaviors than people without similar trauma histories (Ouimette & Brown, 2003; Smith et al., 2004). Although in a nationally representative U.S. sample ( $N = 9,282$ ), Kessler et al. (2008) found that it was actually pathological gambling (i.e., the DSM-IV's version of gambling disorder; APA, 1994) that predicted the prospective onset of PTSD symptoms—instead of the other way around—with the two disorders displaying a lifetime comorbidity rate of 14.8% in the adult population; it should be noted, however, that the age of onset for all disorders in that study were assessed retrospectively, and the onset of PTSD symptoms may not immediately follow the occurrence of a traumatic event (APA, 2013). Other studies have found contrary evidence that indicates symptoms of PTSD and childhood maltreatment more often tend to precede disordered gambling than to follow it (Bristow et al., 2021; Poole et al., 2017). But, regardless of which disorder might present first, there is conclusive evidence that demonstrates the presence of both sets of symptoms is associated with more severe clinical profiles and greater treatment difficulties (Moore & Grubbs, 2021).

Therefore, this study's statistical models explored the idea that specific deficits in gamblers' positive play practices might partially explain the relationship between PTSD

symptoms, motives for gambling, and PG severity. After all, it still remains unclear how different positive play practices are actually associated with these variables when their effects are tested simultaneously. Theoretically, it seems plausible that promoting certain positive play practices could lead to a reduction in gambling-related problems for some individuals. Although any sort of concrete evidence to support this claim seems to be lacking (Shaffer et al., 2023), and this study aims to take the initial steps to address that gap in the literature by showing how positive play practices are associated with both PG severity and PTSD symptoms in a national sample of U.S adults.

### **Positive Play As A Potential Mediator**

Previous research on gambling has almost exclusively focused on disordered gambling, leaving responsible gambling and its associations with symptoms of PTSD and problematic gambling significantly less understood (Gainsbury et al., 2013). This lack of understanding for responsible gambling, in part, stems from the absence of a standardized definition of the term—although a more common issue with this type of research may be that responsible gambling tends to be determined deductively by concluding any gambling participation that avoids creating noticeable, immediate problems must inherently qualify as responsible gambling (Wood et al., 2017). Responsible gambling practices, however, appear to involve much more than simply avoiding major problems related to the activity (Blaszczynski et al., 2011). Specifically, it has been argued that the presence of positive gambling behaviors and beliefs, such as accurate perceptions about the odds of winning and staying within reasonable limits of one’s resources, is what ultimately distinguishes responsible gambling behaviors from irresponsible, risky, or ordinary gambling involvement (Hing et al., 2017; Wood et al., 2017). Yet, even this description has been deemed too narrow by some experts and said to merely represent a subset of

responsible gambling’s conceptual umbrella (Shaffer et al., 2023). More importantly, though, consistent evidence to either confirm or deny the efficacy of various responsible gambling approaches at any level of implementation—consumers, industry, health care providers, and governments—is incredibly scarce (Smith, 2017).

Adding to this, recent epidemiological research indicates that most gambling-related harms are experienced by people who are not considered disordered gamblers and usually come from marginalized populations (Abbott, 2020). This general trend is likely amplified by the fact that in the U.S., people from marginalized groups are more likely to experience higher levels of trauma and stress than non-marginalized people (Lund, 2021). Thus, there appears to be an urgent public health need to identify the role positive play and other responsible gambling practices might have in the connection between concurrent symptoms of PTSD and the gambling-related problems for different groups of U.S. gamblers. Due to the limited empirical research surrounding responsible gambling, as well as the heterogeneity of the U.S. gambling population, an additional aim of this research was to explore how common gambling motives might interact with positive play practices and vary across different gambler groups in the sample.

### **Current Study**

This study sought to investigate whether deficits in positive play behaviors and beliefs were able to explain the connections between symptoms of PTSD, gambling motivations, and PG severity within a national sample of U.S. adults from the general population ( $N = 2,806$ ). Few studies have examined the cumulative and independent mediating effects of positive play practices on the PTSD-PG relationship, as well as how certain types of positive play are actually associated with problematic gambling behaviors and might interact with different gambling

motives that ultimately effect an individual's PG severity. As a consequence, it is still remains unclear to what extent positive play practices are related to PG and whether or not these practices might explain the connection between PTSD symptomology and PG severity in non-clinical U.S. gamblers. Therefore, to fill these gaps in the literature, this study used both parallel and serial mediation analysis to test the following hypotheses (see Figure 1 for model conceptualizations):

**H<sub>1</sub>:** Gambling motives related to coping (opposed to enhancement, financial, and social motives) will mediate the association between symptoms of PTSD and PG severity: PTSD symptoms → Coping motives → PG severity; however, this does not exclude the possibility of other gambling motives co-occurring to a lesser extent in this relationship.

**H<sub>2</sub>:** Positive play practices (personal responsibility, honesty and control, pre-commitment, and gambling literacy) will mediate the association between symptoms of PTSD and PG severity: PTSD symptoms → Positive play → PG severity.

**H<sub>3</sub>:** Positive play practices will mediate the association between coping gambling motives and PG severity: Coping motives → Positive play → PG severity.

**H<sub>4</sub>:** Positive play practices will mediate the associations between symptoms of PTSD, coping gambling motives, and PG severity, with the following sequence being tested:

PTSD symptoms → Coping motives → Positive play → PG severity

Alternative model: PTSD symptoms → Positive play → Coping motives → PG severity

## Method

### Participants and Procedure

This study used an archival dataset from Grubbs and Kraus (2022, 2023a, 2023b)<sup>2</sup> that contained a recent national sample of 2,806 non-clinical U.S. adults (response rate = 87.6%).

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<sup>2</sup> The original dataset referenced in Grubbs and Kraus (2022, 2023a, 2023b) contained an additional oversample of 1,557 sports-wagering participants who were not included in this study's analyses.

These archival data were census-matched and weighted according to the 2019 American Community Survey in order to obtain a participant sample that was representative of the demographic norms of adults living in the general population according to age, census region, education, gender, and race/ethnicity (U.S. Census Bureau, 2019). All participants within this dataset were originally recruited by the international polling firm YouGov, which offers a wide range of data-collection services and has been shown to outperform most other survey vendors regarding the quality of their data and the representativeness of their samples (Kennedy et al., 2016; Rivers, 2016).

For this study, YouGov recruited participants in two stages with a stratified sampling technique that used weighted samples with replacements. In Stage 1, a total of 2,806 demographically representative respondents from the U.S. general population were recruited. In Stage 2 (i.e., one week after Stage 1), a total of 1,938 respondents from Stage 1 were re-contacted to answer additional survey questions. All gambling-related variables were measured during Stage 1, and PTSD symptoms were measured during Stage 2. Therefore, these collected data were considered cross-sectional since each primary measure was only answered by participants at a single point in time. Survey advertisements used to recruit participants for this study described this research as being related to mental health, personality, and recreational activities, with no direct references to gambling being given prior to participation.

Moreover, before releasing the dataset, YouGov conducted additional post-stratification modifications to calculate the final weights for the previously mentioned demographic characteristics. The purpose of weighting these data was to decrease the amount of bias in the overall survey estimates since each recruited participant represented some portion of the target population. Beyond YouGov's high-quality participant screening processes, this study's primary

inclusion criteria for the final analytic sample was that participants were at least 18 years old, resided in the U.S. at the time of the survey, had gambled during the past 12 months, and completed at least 90% of each primary measure in this study. These requirements resulted in a final sample of 982 participants (see Table 1 for characteristics). Data collection for this study occurred from March 17<sup>th</sup> to April 6<sup>th</sup> of 2022.

## **Measures**

### ***Posttraumatic Stress Disorder (PTSD)***

The 20-item PTSD Checklist-5 (PCL-5; Blevins et al., 2015) measured how much participants were affected by symptoms associated with posttraumatic stress during the past 30 days (e.g., “Have you been taking too many risks or doing things that could cause you harm?”). Each item on this scale was scored 0 (*Not at all*) to 4 (*Extremely*), with a final score determined by summing a participant’s responses to reflect a continuous measure of one’s PTSD symptom severity. Final scores on this measure ranged from 0 to 80, with higher scores reflecting more severe PTSD symptomology. Prior research recommends PCL-5 cutoff scores between 31 and 33 as a provisional indication of a PTSD diagnosis (Bovin & Marx, 2023). The PCL-5 has continually displayed sufficient validity and reliability in diverse populations around the world (Bovin et al., 2016; Ghazali & Chen, 2018). For this study, Cronbach’s alpha of the PCL-5 was excellent (0.96).

### ***Problem Gambling***

The 9-item Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) assessed the frequencies of participants’ problematic gambling behaviors during the past 12 months (e.g., “Has gambling caused you any health problems, including stress or anxiety?”). All scale items were scored 0 (*Never*) to 3 (*Almost always*), with total scores ranging from 0 to 27. Based on

Currie et al.'s (2013) revised scoring procedure for this measure, the following classifications for different types of gamblers were applied: total scores of 0 indicated *non-problem gamblers*, total scores from 1 to 7 indicated *at-risk problem gamblers*, and total scores of 8 or higher indicated *probable problem gamblers*. The PGSI is one of the most widely used assessments for measuring problematic gambling behaviors in non-clinical populations around the world (Holtgraves, 2009). For this study, Cronbach's alpha of the PGSI was excellent (0.95).

### ***Gambling Motives***

The 16-item Gambling Motives Questionnaire-Financial (GMQ-F; Dechant, 2014) measured participants' gambling motivations related to four domains: (a) *coping* (e.g., "How often do you gamble to forget your worries?"), (b) *enhancement* (e.g., "How often do you gamble because it's exciting?"), (c) *social* (e.g., "How often do you gamble to be sociable?"), and (d) *financial* (e.g., "How often do you gamble to earn money?"). Each scale item was scored 1 (*Never or almost never*) to 4 (*Almost always or always*), with an average score computed for each motivational domain and higher values representing more of the construct. The GMQ-F has demonstrated sufficient validity and reliability in measuring distinct motives associated with gambling behaviors in U.S. adults (Tabri et al., 2015). For this study, Cronbach's alpha of the GMQ-F subscales ranged from acceptable to good (0.79–0.85).

### ***Positive Play***

The 14-item Positive Play Scale (PPS; Wood et al., 2017) assessed participants' responsible gambling practices using four categories of positive play: (a) *personal responsibility* (e.g., "It's my responsibility to spend only money that I can afford to lose"), (b) *honesty and control* (e.g., "I was honest with my family and/or friends about the amount of TIME I spent gambling"), (c) *pre-commitment* (e.g., "I consider the amount of TIME I was willing to spend

BEFORE I gambled”), and (d) *gambling literacy* (e.g., “If I gamble more often, it will help me to win more than I lose”). Response options for the subscales related to personal responsibility and gambling literacy ranged from 1 (*Strongly disagree*) to 7 (*Strongly agree*), and the response options for the subscales related to pre-commitment and honesty and control ranged from 1 (*Never*) to 7 (*Always*). All variables were coded so higher values represented more of the construct, with an average score computed for each category; the subscale for gambling literacy contained the only items that needed to have their coding reversed. The PPS has shown adequate validity and reliability in measuring responsible gambling behaviors and beliefs related to positive play within large samples of non-clinical adults (Wood et al., 2017). For this study, Cronbach’s alphas for all subscales ranged from good to excellent (0.82–0.91).

## **Analytical Plan**

### ***Data Preparation***

All statistical analyses were conducted using IBM SPSS Statistics, Version 28.0, and PROCESS Macro for SPSS 4.0. Prior to the study’s primary analysis, standard data-cleaning procedures and key assumption checks for regression analysis were completed (Berry, 1993; Hayes, 2017), with all key variables coded so that higher values reflect more of the construct. Preliminary data screenings revealed potential concerns related to the PG severity variable’s skewness (2.90) and kurtosis (8.55), since skewness between -2 and +2 and kurtosis between -7 and +7 are usually considered normal ranges. Due to this result, a square root transformation was performed on the PG severity variable in order to obtain a more acceptable skewness and kurtosis output. Nevertheless, when both versions of the PG variable were examined in the primary models, the results were negligible so the non-transformed version of the variable was retained for a clearer interpretation of the primary regression models.



### ***Primary Analysis***

Conceptual diagrams of this study's mediation models are provided in Figure 1. These models were developed using biopsychosocial theoretical frameworks that postulate how trauma-related conditions might link to problematic gambling behaviors (Blaszczynski & Nower, 2002; Jacobs, 1986; Shaffer et al., 2004; Sharpe, 2002). Moreover, given the limited research on the responsible gambling mechanisms underlying the association between PTSD symptoms and problematic gambling, statistical analyses were largely exploratory in nature for positive play practices in order to expand the scholarly literature on these relationships. In this study, an effect was considered statistically significant at  $p < .05$  if its 95% confidence interval (CI) did not include zero, based on 5,000 bias-corrected bootstrap samples (Preacher & Hayes, 2008). When a confidence interval was unavailable, the alpha level remained at  $p < .05$  to determine statistical significance. All primary analyses controlled for demographic characteristics related age, education, employment and marital status, gender, and race/ethnicity

The first parallel mediation model used PROCESS Macro Model 4 to analyze four specific gambling motives—coping, enhancement, financial, and social—in order to identify the most significant motivational mechanisms involved in the primary relationship (Model 1). For a similar purpose, two additional Model 4 parallel mediations were conducted to identify significant positive play practices—personal responsibility, honesty and control, pre-commitment, and gambling literacy—that either fully or partially explain the association between symptoms of PTSD and PG severity (Model 2) and coping motives and PG severity (Model 3). Mediators demonstrating a statistically significant indirect effect in Models 1 to 3 were retained for Models 4 and 5.

The final two mediation models in this study tested the parallel and serial indirect effects of the retained mediators on the relationship between PTSD symptoms and PG severity (Models 4 and 5, respectively). To test the parallel mediation model, PROCESS Macro Model 4 was used again with the same bootstrapping specifications as the previous models, and to test the serial mediation model, PROCESS Macro Model 6 was used with bootstrapping. Several alternative mediating pathways were explored in the serial model by switching the initial positions of the retained positive play and gambling motive mediators. In addition to these analyses, three separate univariate analysis of variance (ANOVA) tests were conducted to examine group differences in seeking treatment for gambling, PG severity, and PTSD symptom levels across all primary variables and demographics.

## **Results**

### **Descriptive Statistics**

Table 1 contains frequencies related to the sample's characteristics, including demographic data and prevalence rates of PTSD symptoms, PG severity, and seeking treatment for gambling behaviors. Table 2 shows a correlational matrix and other descriptive statistics of the study's primary variables. Each of the four gambling motives and four positive play practices had significant bivariate associations with both PTSD symptoms and PG severity ( $p < .01$ ); however, the direction of these associations were opposite one another. That is, all gambling motives had positive associations with PTSD symptoms and PG severity, whereas all positive play practices demonstrated negative associations. Notably, coping motives for gambling had a stronger association with PTSD symptoms ( $r = .34$ ) and PG severity ( $r = .56$ ) than any other motive or positive play practice assessed in this study. Further, PG severity was found to have a moderate-to-strong association with PTSD symptoms ( $r = .43$ ) and all positive play practices ( $r =$

-.31 to -.43), and the associations for PTSD symptoms and positive play practices ranged from small-to-moderate in strength ( $r = -.19$  to  $-.24$ ).

## **Mediation Models**

### ***H<sub>1</sub>: PTSD Symptoms → Gambling Motives → PG Severity***

The first parallel mediation model tested the effect of PTSD symptoms on PG severity via four motives for gambling: coping, enhancement, financial, and social. Overall, the direct effect model explained 39.28% of the variance in PG severity,  $F(11, 961) = 56.51, p < .001$ , and the total effect model explained 20.78% of it,  $F(7, 965) = 36.17, p < .001$ . Out of the four gambling motives, only coping motives for gambling were significantly associated with both PTSD symptom severity (PTSD → Coping:  $\beta = 0.30, p < .001$ ) and PG severity (Coping → PG:  $\beta = 0.46, p < .001$ ). PTSD symptom severity also had a significant direct effect on PG severity ( $\beta = 0.25, p < .001$ ), as well as a significant total effect ( $\beta = 0.39, p < .001$ ). PTSD symptom severity also predicted the other three gambling motives: enhancement ( $\beta = 0.13, p < .001$ ), financial ( $\beta = 0.15, p < .001$ ), and social ( $\beta = 0.16, p < .001$ ).

The total indirect effect of PTSD symptom severity on PG severity via all four gambling motives was significant (Indirect effect  $\beta = 0.143$ , Boot 95% CI = [0.10, 0.19]), but coping motives for gambling accounted for most of that effect size and was the only mediator to demonstrate a significant indirect effect (Indirect effect  $\beta = 0.139$ , Boot 95% CI = [0.09, 0.19]). Based on these results, the other three non-coping motives for gambling were removed from the subsequent mediation models that were tested. Collectively, these results supported the study's first hypothesis that coping motives for gambling would primarily mediate the association between symptoms of PTSD and PG severity, without excluding the possibility of other

gambling motives co-occurring in this relationship. See Figure 2 for visualization of all mediation models.

***H2: PTSD Symptoms → Positive Play → PG Severity***

The second parallel mediation model tested the effect of PTSD symptom severity on PG severity via the four responsible gambling practices related to positive play measured by the PPS (Wood et al., 2017): personal responsibility, honesty and control, pre-commitment, and gambling literacy. Overall, the direct effect model explained 35.34% of the variance in PG severity,  $F(11, 961) = 47.75$ ,  $\Delta R^2 = -3.94\%$ ,  $p < .001$ , and the results of the total effect model remained the same as Model 1. Higher PTSD symptom levels were found to be associated with lower levels of all positive play categories: personal responsibility ( $\beta = -0.15$ ,  $p < .001$ ), honesty and control ( $\beta = -0.17$ ,  $p < .001$ ), pre-commitment ( $\beta = -0.16$ ,  $p < .001$ ), and gambling literacy ( $\beta = -0.18$ ,  $p < .001$ ). Although when it came to predicting PG severity, positive play related to pre-commitment was not found to be a significant predictor like the other categories: personal responsibility ( $\beta = -0.12$ ,  $p < .001$ ), honesty and control ( $\beta = -0.12$ ,  $p < .01$ ), and gambling literacy ( $\beta = -0.26$ ,  $p < .001$ ).

The total indirect effect of PTSD symptom severity on PG severity via all four positive play practices was significant (Indirect effect  $\beta = 0.091$ , Boot 95% CI = [0.06, 0.13]), with gambling literacy accounting for approximately half of that effect size (Indirect effect  $\beta = 0.047$ , Boot 95% CI = [0.02, 0.08]), followed by honesty and control (Indirect effect  $\beta = 0.019$ , Boot 95% CI = [0.001, 0.04]) and personal responsibility (Indirect effect  $\beta = 0.018$ , Boot 95% CI = [0.004, 0.04]). In line with earlier results, pre-commitment did not have a significant indirect effect on the association between PTSD symptoms and PG severity. Nevertheless, pre-commitment was retained in the next mediation model to observe its association with coping

motives for gambling. Taking into account the lack of an indirect effect for pre-commitment, these results partially supported the study's second hypothesis that positive play practices would, to some extent, mediate the association between symptoms of PTSD and PG severity.

***H3: Coping Motives → Positive Play → PG Severity***

The third parallel mediation model tested the effect of coping motives for gambling on PG severity via the same positive play practices that were used in the previous model. Overall, the direct effect model explained 40.44% of the variance in PG severity,  $F(11, 961) = 59.31$ ,  $\Delta R^2 = 5.10\%$ ,  $p < .001$ , and the total effect model explained 34.04% of it,  $F(7, 965) = 71.13$ ,  $\Delta R^2 = 13.26\%$ ,  $p < .001$ . Coping motives for gambling predicted all positive play practices: personal responsibility ( $\beta = -0.27$ ,  $p < .001$ ), honesty and control ( $\beta = -0.19$ ,  $p < .001$ ), pre-commitment ( $\beta = -0.15$ ,  $p < .001$ ), and gambling literacy ( $\beta = -0.50$ ,  $p < .001$ ), indicating that higher levels of coping motives for gambling were associated with lower levels of positive play both generally and specifically. Coping motives also demonstrated a significant direct effect on PG severity ( $\beta = 0.43$ ,  $p < .001$ ), as well as a significant total effect ( $\beta = 0.54$ ,  $p < .001$ ). Moreover, all positive play practices were shown to predict PG severity at similar levels: personal responsibility ( $\beta = -0.09$ ,  $p < .01$ ), honesty and control ( $\beta = -0.11$ ,  $p < .01$ ), pre-commitment ( $\beta = -0.09$ ,  $p < .05$ ), and gambling literacy ( $\beta = -0.09$ ,  $p < .01$ ). Unlike the previous model, though, pre-commitment was predictive of PG severity in this analysis, despite its  $p$ -value being the least significant when compared to the other associations.

The total indirect effect of coping motives for gambling on PG severity via all positive play practices was significant (Indirect effect  $\beta = 0.10$ , Boot 95% CI = [0.06 0.15]), but in this model, personal responsibility was the only mediator to demonstrate a significant indirect effect (Indirect effect  $\beta = 0.025$ , Boot 95% CI = [0.002, 0.05]). Comparing these results to the previous

model's indirect effects, pre-commitment was removed from subsequent mediation models because it did not display a significant indirect effect in either model. These results partially supported the study's third hypothesis that positive play practices would mediate the association between coping motives for gambling and PG severity because personal responsibility was shown to have an indirect effect on the model's primary association.

***H4: PTSD Symptoms → Coping Motives → Positive Play → PG Severity***

Table 3 shows the results of the fourth parallel mediation model that tested the effect of PTSD symptoms on PG severity via coping motives and the three retained positive play practices: personal responsibility, honesty and control, and gambling literacy. Overall, the direct effect model explained 44.86% of the variance in PG severity,  $F(11, 961) = 69.13$ ,  $\Delta R^2 = 3.73\%$ ,  $p < .001$ , with the variance results of the total effect model remaining the same as Models 1 and 2. PTSD symptom severity predicted coping motives for gambling ( $\beta = 0.30$ ,  $p < .001$ ) and each positive play category: personal responsibility ( $\beta = -0.15$ ,  $p < .001$ ), honesty and control ( $\beta = -0.17$ ,  $p < .001$ ), and gambling literacy ( $\beta = -0.18$ ,  $p < .001$ ). As in previous models, PTSD symptom severity demonstrated a significant direct effect on PG severity ( $\beta = 0.23$ ,  $p < .001$ ), as well as a significant total effect ( $\beta = 0.39$ ,  $p < .001$ ).

Moreover, all retained positive play categories predicted PG severity: personal responsibility ( $\beta = -0.11$ ,  $p < .001$ ), honesty and control ( $\beta = -0.14$ ,  $p < .001$ ), and gambling literacy ( $\beta = -0.09$ ,  $p < .01$ ). By comparison, though, coping motives were a more robust predictor of PG severity:  $\beta = 0.37$ ,  $p < .001$ . The total indirect effect of PTSD symptom severity on PG severity via coping motives for gambling and the three remaining positive play categories was found to be significant (Indirect effect  $\beta = 0.17$ , Boot 95% CI = [0.13, 0.21]); however, coping motives accounted for the majority of that effect size (Indirect effect  $\beta = 0.11$ , Boot 95%

CI = [0.08, 0.15]). Positive play related to personal responsibility and honesty and control were found to have relatively smaller but still significant indirect effects on the PTSD-PG association. Nonetheless, the indirect effect displayed by coping motives in this model was up to 10 times stronger than any indirect effect demonstrated by positive play practices for gambling.

Table 4 shows the indirect effect results of Model 5 that tested for the presence of a serial mediation effect between coping motives and the three retained positive play practices on the PTSD-PG association. Similar results as Model 4 were yielded, which revealed coping motives for gambling were the key mechanism for the relationship between PTSD symptoms and PG severity, and that deficits in personal responsibility and honesty and control appeared to have a much smaller role in mediating this connection. These results partially supported the study's fourth hypothesis that positive play practices would mediate the associations between symptoms of PTSD, coping motives, and PG severity because two out of the three positive play categories in the final models were shown to be partial mediators. With that said, it was not anticipated that coping motives for gambling would independently explain the vast majority of the PTSD-PG relationship and that positive play deficits would not account for more of the total indirect effect.

## **ANOVA Tests for Group Differences**

### ***Seeking Treatment for Gambling (2 Groups)***

Table 5 shows a summary of the ANOVA results for the primary variables examined across several different groups of gamblers. In the first ANOVA model, treatment-seeking gamblers ( $n = 30$ ) and non-treatment-seeking gamblers ( $n = 952$ ) were evaluated. Significant between-group differences were found for all of the study's primary variables ( $p < .001$ ), revealing that treatment-seeking gamblers had stronger gambling motives and less positive play in every category that was assessed. Furthermore, treatment-seeking gamblers were more likely

to qualify for a provisional diagnosis of PTSD based on their PCL-5 score (Blevins et al., 2015; Bovins & Marx, 2023) and to report, on average, more than twice the number of PTSD symptoms reported by non-treatment-seeking gamblers. In terms of demographic characteristics, only a gambler's age demonstrated a significant between-group difference,  $F(1, 981) = 4.86, p < .05, \eta^2 = .01$ , with relatively younger adults in the sample displaying an increased likelihood of seeking treatment for gambling as compared to older participants. In this analysis, the three largest between-group differences were found for PG severity, coping motives for gambling, and gambling literacy.

### *PG Severity (3 Groups)*

In the second ANOVA model, the primary variables were examined across the following three groups of gamblers: non-problematic ( $n = 598$ ), at-risk for problems ( $n = 289$ ), and problematic ( $n = 95$ ). Significant between-group differences were found again for all of the study's primary variables ( $p < .001$ ), which indicated problematic gamblers, regardless of whether they had sought treatment for gambling or not, had the most severe PTSD symptoms, the highest levels of all gambling motives, and the lowest levels of positive play relative to other groups. Individuals in the problem gambling group were also more likely to identify as non-White Americans, with moderate levels of secondary education, part- or full-time employment, and a single relationship status. Age, once again, demonstrated the largest between-group differences out of the demographic variables,  $F(2, 981) = 28.95, p < .001, \eta^2 = .06$ , revealing that the problem gambling group had an average age that was about 10 years younger than the average age reported by other gambler groups. Similar to the previous ANOVA test, the three largest between-group differences were observed for the same variables: PG severity, coping motives for gambling, and gambling literacy.



### *PTSD Symptom Severity (3 Groups)*

In the third ANOVA model, the primary variables were examined across three groups of gamblers categorized by their symptom levels of PTSD: gamblers with no PTSD symptoms ( $n = 86$ ), gamblers with subclinical PTSD symptom levels ( $n = 676$ ), and gamblers with symptom levels indicative of a provisional PTSD diagnosis ( $n = 220$ ). Significant between-group differences were found again for all of the study's primary variables ( $p < .001$ ), revealing that participants in the most severe symptom group had more problems with gambling, stronger gambling motives, and less positive play in comparison to the other groups reporting less PTSD symptomology or none at all. In examining the six demographic covariates across PTSD symptom levels, a relatively younger age emerged, again, as the prime demographic risk factor for a U.S. adult to experience more severe forms of PTSD symptomology,  $F(2, 981) = 45.13, p < .001, \eta^2 = .08$ . In this analysis, the three largest between-group differences were found on PG severity, coping motives for gambling, and age.

### **Discussion**

This study is among the first of its kind to investigate how responsible gambling practices related to four categories of positive play factor into the diverse associations that exist between symptoms of posttraumatic stress, gambling motives, and problematic gambling behaviors within a representative sample of non-clinical U.S. adults. In the first mediation model, coping motives were shown to be the only motive for gambling that was able to mediate the relationship between PTSD symptoms and PG severity, supporting hypothesis one ( $H_1$ ). In the second and third mediation models, positive play related to personal responsibility, honesty and control, and gambling literacy were also found to mediate the PTSD-PG association and/or the association between coping motives and PG severity, with pre-commitment being the one category of

positive play without an indirect effect on either relationship; these results provided partial support for hypotheses two and three (H<sub>2</sub> and H<sub>3</sub>). Taking those results into account, the final two mediation tests examined the parallel and serial mediating effects of coping motives and positive play practices together, revealing that coping motives for gambling—and not deficits in positive play practices—were the key mechanism that explained the relationship between symptoms of posttraumatic stress and problematic gambling behaviors.

Moreover, while positive play related to personal responsibility and honesty and control did manage to achieve statistically significant indirect effects in the final mediation models, their effect sizes were weak (< 0.10) and roughly five to 10 times smaller than the effect displayed by coping motives. This result partially supported hypothesis four (H<sub>4</sub>) because two positive play practices were able to mediate a small portion of the effect of PTSD symptoms on PG severity. Yet, when juxtaposed with the mediating effect of coping motives for gambling, lower levels of positive play were far less relevant to the relationship between PTSD symptoms and PG severity than higher levels of coping motivations were in this study's sample. One interpretation of this finding is that problematic gamblers who report PTSD symptomology could be using their participation in gambling activities as a way to cope with negative emotional states—stemming from traumatic events, day-to-day stressors, or some combination of the two—and until those coping motives for gambling are addressed with those individuals, responsible gambling programs that encourage such practices as positive play may have little to no effect on reducing problems for those gamblers.

Furthermore, the positive associations found between PTSD symptoms, coping motives, and PG severity are consistent with the previous literature on these topics (Grubbs et al., 2018; Grubbs & Chapman, 2019; Grubbs et al., 2019; Grubbs & Rosansky, 2020; Ledgerwood &

Milosevic, 2015) and offer additional support to the idea that experiencing PTSD symptomology at any level can elevate a person's risk of problematic gambling both directly and indirectly. The consistency of this result is important to consider because, as mentioned earlier, experiencing traumatic events is extremely common for U.S. adults (Kilpatrick et al., 2013)—so much so, in fact, that an adult without at least one of these experiences could technically be classified as *abnormal* in today's general population. To this point, for every gambler without symptoms of PTSD in the final sample, there were approximately nine gamblers experiencing those symptoms, with a clear positive association taking place between the amount of PTSD symptoms and gambling problems that were reported. Considering this result in the current context of legalized gambling's expanding reach within the U.S., it is apparent that additional research is needed to uncover different ways to mitigate this connection between symptoms of posttraumatic stress and problematic gambling behaviors.

Another result of this study that is consistent with the previous literature is that symptom levels of PTSD were predictive of which gamblers in the sample had previously sought treatment for their gambling behaviors (Ledgerwood & Petry, 2006). Specifically, treatment-seeking gamblers had an average score on the PCL-5 that would normally qualify them for a provisional PTSD diagnosis (Blevins et al., 2015; Bovin & Marx, 2023), whereas non-treatment-seeking gamblers were more likely to have subclinical levels of PTSD symptomology or no symptoms at all. Adding to this, across all of the groups that were examined, the strongest gambling motives and the largest deficits in positive play practices were found for the gamblers who met the criteria for PG, PTSD, and/or were treatment-seeking gamblers. In each of these instances, coping motives for gambling emerged as the main factor accounting for group differences outside of PG and PTSD symptom levels. Nevertheless, out of the study's demographic

characteristics, being younger than approximately 50 years old appeared to be a reliable indicator of which participants were more likely to have PTSD symptoms, problems with gambling, and to seek treatment for their gambling behaviors.

## **Implications**

Overall, results of this research carry several implications for legalized gambling amongst U.S. adults in the general public. In particular, this study speaks to the potentially exacerbating effects that symptoms of posttraumatic stress, whether subclinical or officially diagnosed, can have on the gambling behaviors and motives of different adults, as well as the widespread prevalence of PTSD symptomology within the non-clinical population today. These findings also highlight the unique role that coping motives appear to have in the co-occurrence of PTSD symptoms and PG, especially for younger U.S. adults, which may suggest that if individuals are able to find healthier ways of coping with their personal stressors—or at least, less harmful ways (e.g., gambling options with lower stakes)—then the strength of these associations might be more likely to weaken over time.

Throughout this study's analyses, positive play practices were shown to have a limited role in explaining the connection between PTSD symptoms and PG severity in the sample. In many ways, this finding appears to lend support to previous claims of how responsible gambling programs are not really intended to address individuals who are already gambling problematically and are better suited to reduce or prevent problematic gambling behaviors by creating healthier norms around legal gambling participation (Blaszczynski et al., 2004). Although, it seems necessary to emphasize that the target audience for most responsible gambling programs is often misperceived by the public as being primarily intended for current

problem gamblers (Shaffer et al., 2023), which raises additional questions about this programming's capacity to reduce overall rates of PG within the general public.

But even so, findings from this research indicate there might be more advantageous responsible gambling approaches for public health and industry officials to consider besides focusing on the promotion of positive play practices, such as these programs using advertisement campaigns to better inform members of the general public about how to recognize the possible warning signs that someone in their life, or even them personally, might be using gambling as a way to cope with distressing emotions or other events in their life. Because if problematic motives can be identified early on in a person's gambling participation, that simple act of identification alone might increase an individual's awareness enough to prevent their gambling-related problems from further escalation or, perhaps, from developing at all. In short, if the ultimate objective of responsible gambling programming is to truly reduce and prevent PG within the gambling public, these results indicate that the average U.S. adult's risk level for PG has more to do with their motives for gambling and less to do with whether or not they are using positive play practices.

### **Limitations**

There are several limitations of this research to consider when interpreting these results. First, all data used in this study were considered cross-sectional and self-reported by participants, so the directions in which these relationships were examined do not imply causality due to the correlational nature of the dataset. Second, while the PGSI is one of the most widely used gambling screeners for non-clinical populations, there is evidence to suggest that the PGSI may have difficulty identifying lower risk levels of PG (Molander & Wennberg, 2022). Thus, it is possible that a different problem gambling screener could have yielded a more conservative

estimate of at-risk problem gamblers and probable problem gamblers in this sample. Three, there was an underrepresentation of participants who were recruited for the 18-to-20-year-old age group despite the higher risk levels for PG that are associated with a youthful age. This age group can gamble in some areas of the U.S. and more research is needed to better understand the extent of PG amongst the youngest adult members of our modern society, particularly in relation to online gambling. Four, the original PPS developed by Wood and colleagues (2017) is a 14-item measure, but during data collection for this study, two separate items related to the subcategory of honesty and control appeared to be asked as a single item. These items were “I was honest with my family and/or friends about the amount of money I spent gambling” and “I felt in control of my gambling behavior.” While scores for this subscale were averaged and the coding was the same for both of these items, it is possible that these questions being asked together could have potentially biased some participant responses for this subscale.

## **Conclusion**

Regardless of whether PTSD symptoms cause problematic gambling behaviors or the other way around, this study makes one fact about this association clear: PTSD symptoms and PG severity often share a bidirectional relationship with one another, where just the mere presence of one of these conditions tends to amplify the effects of the other. This pattern of co-occurrence has been largely consistent throughout both cross-sectional and longitudinal research in this area and demonstrates the unmistakable overlap that symptoms of posttraumatic stress appear to have with many PG behaviors (Moore & Grubbs, 2021). Therefore, it seems that trauma-informed approaches have a vital role to play not only in health care settings treating disordered gamblers, but also in public health and regulatory decision-making processes related to legalized gambling. Because, if more attention can be directed towards understanding the

larger reasons *why* certain people gamble in problematic ways—that is, what perceived benefit an individual gets from repeating a particular gambling behavior—instead of a near-constant focus on the negative effects of these behaviors. Then, possibly, more compassionate and effective responses can be developed and implemented in the future.

## Tables and Figures for Study 1

**Table 2.1**

*Participant Demographics*

Variable	Full Sample: <i>N</i> = 2,806	Final Sample: <i>n</i> = 982
Mean age ( <i>SD</i> )	51.59 (16.32)	53.47 (15.42)
Female	53.1%	48.1%
Ethnicity/Race		
Asian American	2.9%	1.7%
African American/Black	12.5%	12.5%
Caucasian/White	66%	67.4%
Latin/Hispanic American	13.1%	12.8%
“Other”	5.6%	5.5%
Education		
No high school	3.7%	3.6%
High school	32.6%	32.1%
Some college	19.6%	20.4%
2-year	10%	10.9%
4-year	20.9%	20.2%
Post-grad	13.2%	12.9%
Employment		
Part-time	9.8%	9.4%
Full-time	35.9%	39.2%
Unemployed/Other	54.3%	51.4%
Gambler type by PG severity		
Non-problem gambler (PGSI = 0)	31.4%	60.9%
At-risk problem gambler (PGSI = 1–7)	16.3%	29.4%
Problem gambler (PGSI = 8–27)	5.5%	9.7%
Not asked	46.8%	0%
PTSD Symptom Severity		
No Symptoms (PCL-5 = 0)	6.9%	8.8%
Subclinical Symptoms (PCL-5 = 1–30)	43.8%	68.8%
Provisional Diagnosis (PCL-5 = 31–80)	13.9%	22.4%
Not asked	35.4%	0%
Seeking Treatment for Gambling Behavior		
Yes	1.9%	3.1%
No	51.4%	96.9%
Not asked	46.7%	0%

*Note.* PGSI = Problem Gambling Severity Index (Ferris & Wynne, 2001); PCL-5 = Posttraumatic stress disorder (PTSD) Checklist for DSM-5 (Blevins et al., 2015). Participants were able to select more than one ethnicity/race category when applicable



**Table 2.2***Bivariate Correlations of Key Variables with Descriptive Statistics*

<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
1. PTSD Symptoms	-									
2. PG Severity	<b>.43</b>	-								
3. PP: Personal Responsibility	<b>-.20</b>	<b>-.36</b>	-							
4. PP: Honesty & Control	<b>-.20</b>	<b>-.33</b>	<b>.45</b>	-						
5. PP: Pre-Commitment	<b>-.19</b>	<b>-.31</b>	<b>.50</b>	<b>.76</b>	-					
6. PP: Gambling Literacy	<b>-.24</b>	<b>-.43</b>	<b>.39</b>	<b>.27</b>	<b>.25</b>	-				
7. Coping Motives	<b>.34</b>	<b>.56</b>	<b>-.29</b>	<b>-.21</b>	<b>-.17</b>	<b>-.54</b>	-			
8. Enhancement Motives	<b>.13</b>	<b>.29</b>	-.01	<b>-.07</b>	-.01	<b>-.35</b>	<b>.58</b>	-		
9. Financial Motives	<b>.18</b>	<b>.30</b>	.01	<b>-.07</b>	-.02	<b>-.39</b>	<b>.47</b>	<b>.48</b>	-	
10. Social Motives	<b>.18</b>	<b>.32</b>	<b>-.12</b>	-.01	.03	<b>-.39</b>	<b>.57</b>	<b>.53</b>	<b>.25</b>	-

*Note.* PTSD = Posttraumatic stress disorder; PG = Problem gambling; PP = Positive Play Scale (Wood et al., 2017). All variables were coded so higher values reflect more of the construct. All motives refer to gambling. Bold font indicates statistical significance.

† See Method section Analytic Plan: Data Preparation for details about how skewness and kurtosis values were addressed.

**Table 2.3***Mediation of PTSD Symptoms Predicting PG via Coping Motives and Positive Play*

<b>Mediation pathways</b>	<b><i>B</i></b>	<b><math>\beta</math></b>	<b><i>SE</i></b>	<b>95% CI</b>
Total effect				
PTSD → PG ( <i>c</i> )	<b>0.10***</b>	<b>0.39***</b>	<b>0.01</b>	<b>[0.08, 0.11]</b>
Direct effects				
PTSD → PG ( <i>c'</i> )	<b>0.06***</b>	<b>0.23***</b>	<b>0.01</b>	<b>[0.04, 0.07]</b>
PTSD → Coping motives ( <i>a<sub>1</sub></i> )	<b>0.01***</b>	<b>0.30***</b>	<b>0.001</b>	<b>[0.01, 0.014]</b>
PTSD → PP: Personal responsibility ( <i>a<sub>2</sub></i> )	<b>-0.01***</b>	<b>-0.15***</b>	<b>0.002</b>	<b>[-0.01, -0.02]</b>
PTSD → PP: Honesty/Control ( <i>a<sub>3</sub></i> )	<b>-0.02***</b>	<b>-0.17***</b>	<b>0.003</b>	<b>[-0.02, -0.01]</b>
PTSD → PP: Gambling literacy ( <i>a<sub>5</sub></i> )	<b>-0.01***</b>	<b>-0.18***</b>	<b>0.003</b>	<b>[-0.02, -0.01]</b>
Coping motives → PG ( <i>b<sub>1</sub></i> )	<b>2.35***</b>	<b>0.37***</b>	<b>0.19</b>	<b>[1.98, 2.73]</b>
PP: Personal responsibility → PG ( <i>b<sub>2</sub></i> )	<b>-0.48***</b>	<b>-0.11***</b>	<b>0.13</b>	<b>[-0.74, -0.23]</b>
PP: Honesty/Control → PG ( <i>b<sub>3</sub></i> )	<b>-0.36***</b>	<b>-0.14***</b>	<b>0.07</b>	<b>[-0.49, -0.22]</b>
PP: Gambling literacy → PG ( <i>b<sub>5</sub></i> )	<b>-0.28**</b>	<b>-0.09**</b>	<b>0.10</b>	<b>[-0.48, -0.09]</b>
<b>Standardized indirect effects (<i>a<sub>i</sub> × b<sub>i</sub></i>)</b>	<b><i>B</i></b>	<b><math>\beta</math></b>	<b>Boot <i>SE</i></b>	<b>Boot 95% CI</b>
Total	<b>0.04</b>	<b>0.17</b>	<b>0.01</b>	<b>[0.03, 0.05]</b>
PTSD → Coping motives → PG	<b>0.03</b>	<b>0.11</b>	<b>0.01</b>	<b>[0.02, 0.04]</b>
PTSD → PP: Personal responsibility → PG	<b>0.004</b>	<b>0.02</b>	<b>0.002</b>	<b>[0.001, 0.01]</b>
PTSD → PP: Honesty/Control → PG	<b>0.006</b>	<b>0.02</b>	<b>0.002</b>	<b>[0.002, 0.01]</b>
PTSD → PP: Gambling literacy → PG	0.004	0.02	0.002	[-0.001, 0.01]
<b>Interaction tests</b>		<b><i>df1</i></b>	<b><i>df2</i></b>	<b><i>F</i></b>
PTSD × Coping motives		<b>1</b>	<b>960</b>	<b>100.31***</b>
PTSD × PP: Personal responsibility		<b>1</b>	<b>960</b>	<b>43.69***</b>
PTSD × PP: Honesty/Control		<b>1</b>	<b>960</b>	<b>11.61***</b>
PTSD × PP: Gambling literacy		<b>1</b>	<b>960</b>	<b>72.67***</b>

*Note.* PTSD = refers to posttraumatic stress disorder symptoms; PG = Problem gambling severity; PP = Positive Play Scale (Wood et al., 2017). Standard errors and 95% CIs are unstandardized. All key variables were coded so higher values reflect more of the construct. Bold font indicates statistical significance; *p*-values were not assigned to indirect effects. → = affects.

\*\* =  $p < .01$ . \*\*\* =  $p < .001$ .

**Table 2.4***Serial Mediation of PTSD Symptoms Predicting PG via Coping Motives and Positive Play*

<b>Standardized indirect effects</b>	<b><i>B</i></b>	<b><i>β</i></b>	<b>Boot <i>SE</i></b>	<b>Boot 95% CI</b>
Total	<b>0.041</b>	<b>0.167</b>	<b>0.022</b>	<b>[.127, .211]</b>
PTSD → Coping motives (Cope) → PG	<b>0.028</b>	<b>0.113</b>	<b>0.020</b>	<b>[.076, .152]</b>
PTSD → PP: Personal responsibility (PR) → PG	0.002	0.008	0.005	[-.0001, .021]
PTSD → PP: Honesty/Control (HC) → PG	<b>0.003</b>	<b>0.012</b>	<b>0.006</b>	<b>[.003, .026]</b>
PTSD → PP: Gambling literacy (GL) → PG	0.0002	0.001	0.003	[-.005, .008]
PTSD → Cope → PR → PG	<b>0.002</b>	<b>0.008</b>	<b>0.004</b>	<b>[.002, .016]</b>
PTSD → Cope → HC → PG	0.001	0.003	0.002	[-.0001, .007]
PTSD → Cope → GL → PG	0.003	0.011	0.007	[-.001, .026]
PTSD → PR → HC → PG	<b>0.001</b>	<b>0.004</b>	<b>0.002</b>	<b>[.0001, .010]</b>
PTSD → PR → GL → PG	0.0003	0.001	0.001	[-.0002, .003]
PTSD → HC → GL → PG	0.0001	0.001	0.0004	[-.0001, .002]
PTSD → Cope → PR → HC → PG	<b>0.001</b>	<b>0.004</b>	<b>0.001</b>	<b>[.002, .007]</b>
PTSD → Cope → PR → GL → PG	0.0003	0.001	0.001	[-.0001, .003]
PTSD → Cope → HC → GL → PG	0.0000	0.0001	0.0001	[-.0001, .0004]
PTSD → PR → HC → GL → PG	0.0000	0.0002	0.0002	[-.0001, .001]
PTSD → Cope → PR → HC → GL → PG	0.0000	0.0002	0.0001	[-.0001, .001]

*Note.* PTSD = refers to posttraumatic stress disorder symptoms; PG = Problem gambling severity; PP = Positive Play Scale (Wood et al., 2017). Standard errors and 95% CIs are standardized. All key variables were coded so higher values reflect more of the construct. Bold values indicate statistical significance. → = affects.

**Table 2.5***ANOVAs for Key Variables Across Different Gambler Groups*

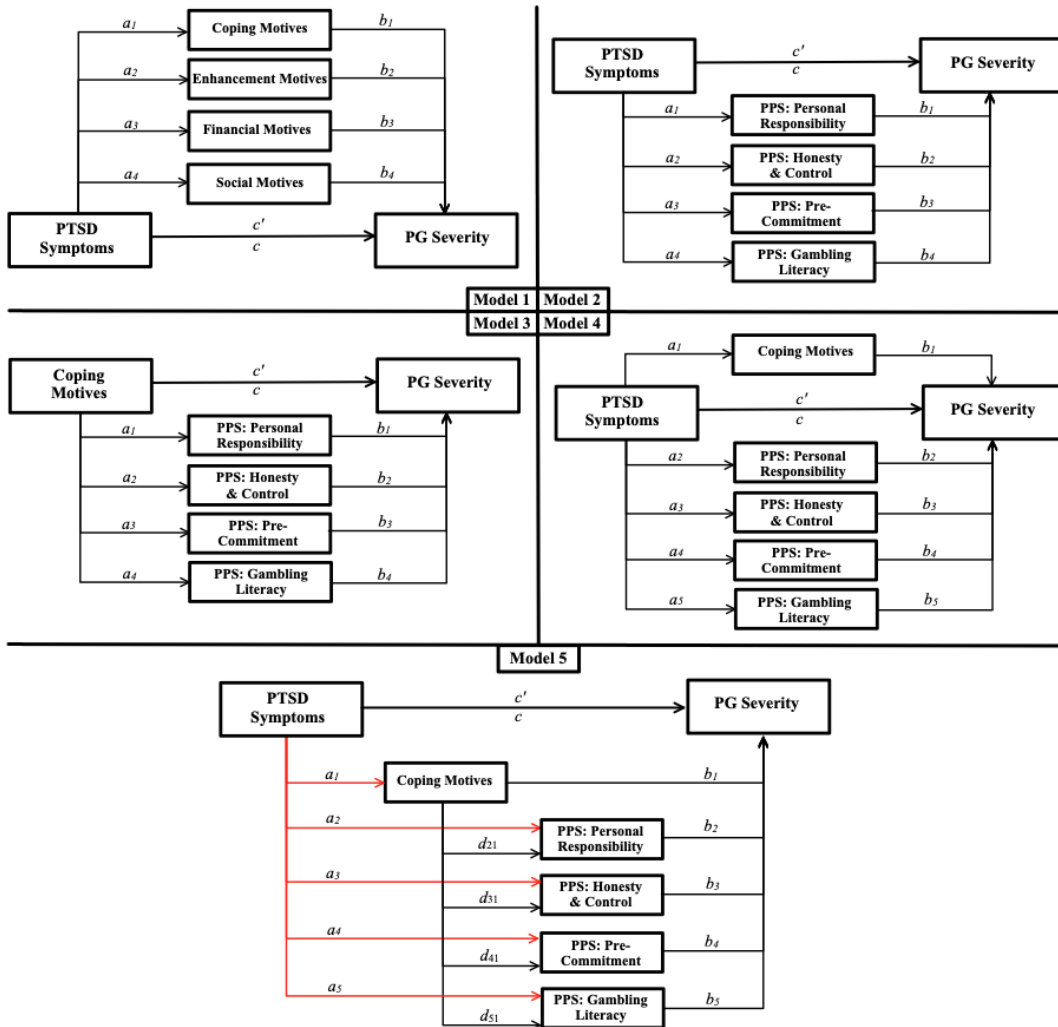
Variable	Gambler Type by Seeking Treatment for Gambling			<i>F</i> ( <i>df1</i> , <i>df2</i> )	$\eta^2$
	Yes: <i>n</i> = 30 <i>M</i> ( <i>SD</i> )	No: <i>n</i> = 952 <i>M</i> ( <i>SD</i> )			
PTSD Symptom Severity	36.57 (22.09)	17.70 (17.14)		<i>F</i> (1, 981) = 34.60***	0.03
PG Severity	13.10 (7.22)	1.67 (3.71)		<i>F</i> (1, 981) = 255.40***	0.21
Coping Motives	2.64 (0.80)	1.48 (0.65)		<i>F</i> (1, 981) = 90.43***	0.08
Enhancement Motives	2.80 (0.73)	2.22 (0.78)		<i>F</i> (1, 981) = 16.07***	0.02
Financial Motives	2.92 (0.80)	2.27 (0.82)		<i>F</i> (1, 981) = 18.06***	0.02
Social Motives	2.43 (0.91)	1.80 (0.69)		<i>F</i> (1, 981) = 24.06***	0.02
Positive Play: Personal Responsibility	5.48 (1.31)	6.34 (0.93)		<i>F</i> (1, 981) = 24.39***	0.02
Positive Play: Honesty & Control	4.42 (1.80)	5.92 (1.71)		<i>F</i> (1, 981) = 22.32***	0.02
Positive Play: Pre-Commitment	4.55 (1.51)	5.78 (1.42)		<i>F</i> (1, 981) = 21.71***	0.02
Positive Play: Gambling Literacy	4.16 (2.02)	5.65 (1.28)		<i>F</i> (1, 981) = 37.89***	0.04
Variable	Gambler Type by PG Severity			<i>F</i> ( <i>df1</i> , <i>df2</i> )	$\eta^2$
	Non-Problem: <i>n</i> = 598 <i>M</i> ( <i>SD</i> )	At-Risk: <i>n</i> = 289 <i>M</i> ( <i>SD</i> )	Problem Gambler: <i>n</i> = 95 <i>M</i> ( <i>SD</i> )		
PTSD Symptom Severity	14.21 (15.20)	19.73 (17.02)	39.42 (17.72)	<i>F</i> (2, 981) = 103.37***	0.17
PG Severity	0 (0)	2.33 (1.65)	13.77 (4.65)	<i>F</i> (2, 981) = 2,707.53***	0.85
Coping Motives	1.29 (0.52)	1.66 (0.66)	2.52 (0.70)	<i>F</i> (2, 981) = 197.84***	0.29
Enhancement Motives	2.03 (0.73)	2.51 (0.75)	2.79 (0.65)	<i>F</i> (2, 981) = 71.97***	0.13
Financial Motives	2.08 (0.81)	2.53 (0.77)	2.85 (0.70)	<i>F</i> (2, 981) = 59.24***	0.11
Social Motives	1.68 (0.65)	1.91 (0.70)	2.41 (0.76)	<i>F</i> (2, 981) = 51.71***	0.10
Positive Play: Personal Responsibility	6.46 (0.82)	6.38 (0.80)	5.14 (1.29)	<i>F</i> (2, 981) = 95.00***	0.16
Positive Play: Honesty & Control	6.29 (1.54)	5.54 (1.77)	4.24 (1.60)	<i>F</i> (2, 981) = 74.96***	0.13
Positive Play: Pre-Commitment	6.04 (1.39)	5.55 (1.31)	4.44 (1.27)	<i>F</i> (2, 981) = 61.16***	0.11
Positive Play: Gambling Literacy	6.00 (1.10)	5.25 (1.30)	4.17 (1.50)	<i>F</i> (2, 981) = 111.79***	0.19
Variable	Gambler Type by PTSD Symptom Severity			<i>F</i> ( <i>df1</i> , <i>df2</i> )	$\eta^2$
	0 PCL Score: <i>n</i> = 86 <i>M</i> ( <i>SD</i> )	1-30 PCL Score: <i>n</i> = 676 <i>M</i> ( <i>SD</i> )	31-80 PCL Score: <i>n</i> = 220 <i>M</i> ( <i>SD</i> )		
PG Severity	0.65 (2.19)	1.20 (2.85)	5.06 (6.71)	<i>F</i> (2, 981) = 82.53***	0.14
Coping Motives	1.47 (0.69)	1.41 (0.60)	1.86 (0.83)	<i>F</i> (2, 981) = 38.28***	0.07
Enhancement Motives	2.15 (0.89)	2.21 (0.76)	2.36 (0.78)	<i>F</i> (2, 981) = 3.70*	0.01
Financial Motives	2.24 (0.87)	2.22 (0.80)	2.51 (0.86)	<i>F</i> (2, 981) = 10.81***	0.02
Social Motives	1.74 (0.78)	1.76 (0.65)	2.02 (0.80)	<i>F</i> (2, 981) = 11.42***	0.02
Positive Play: Personal Responsibility	6.47 (0.80)	6.42 (0.82)	5.91 (1.24)	<i>F</i> (2, 981) = 26.38***	0.05
Positive Play: Honesty & Control	6.09 (1.74)	6.05 (1.59)	5.24 (1.98)	<i>F</i> (2, 981) = 19.71***	0.04
Positive Play: Pre-Commitment	6.01 (1.52)	5.87 (1.30)	5.23 (1.67)	<i>F</i> (2, 981) = 18.77***	0.04
Positive Play: Gambling Literacy	5.66 (1.46)	5.80 (1.19)	4.99 (1.50)	<i>F</i> (2, 981) = 32.31***	0.06

*Note.* PG = Problem gambling; PTSD = Posttraumatic stress disorder; PCL = PTSD Checklist for DSM-5 (Blevins et al., 2015; 0 score = No symptoms, 1-30 score = Subclinical symptoms, 31-80 score = Provisional diagnosis). All motives refer to gambling.

\* =  $p < .05$ . \*\*\* =  $p < .001$ .

**Figure 2.1**

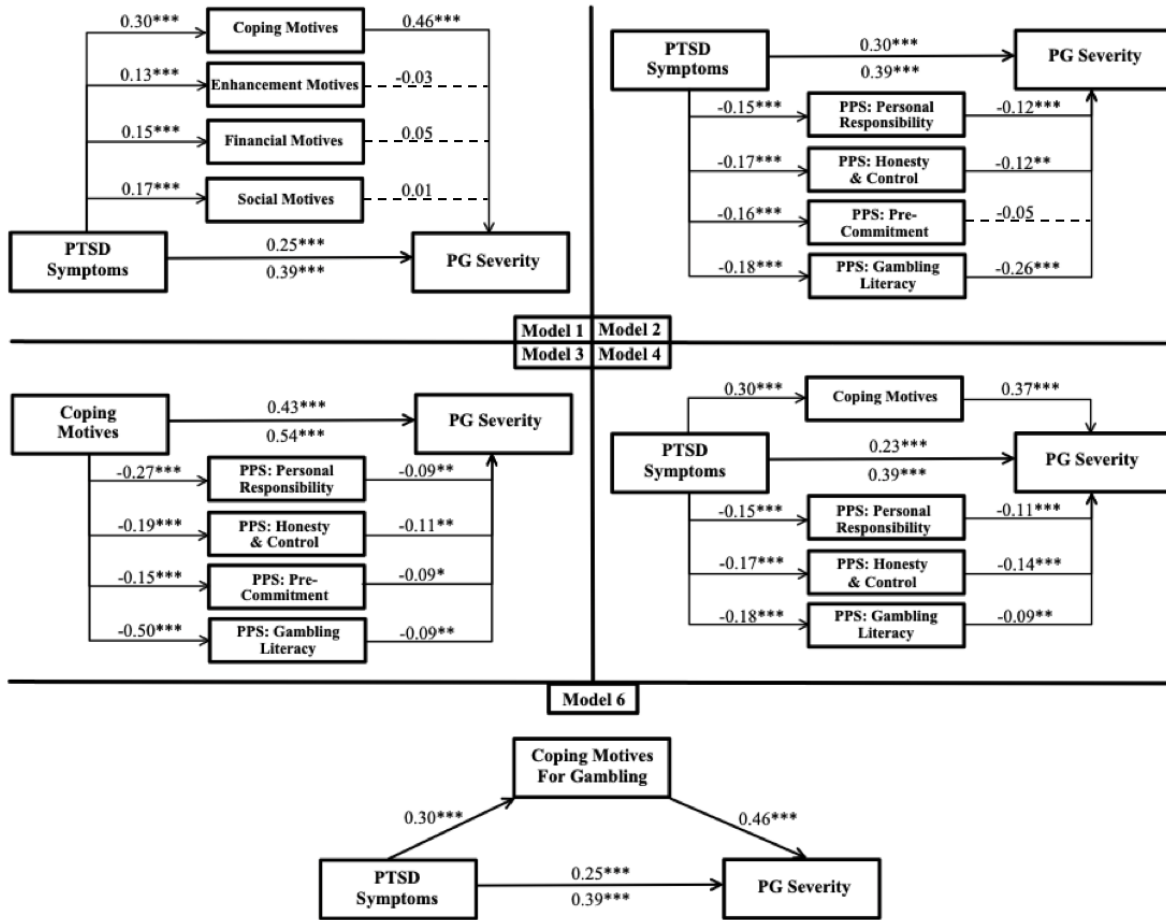
*Conceptual Diagrams of Proposed Mediation Models*



*Note.* PTSD = Posttraumatic stress disorder; PPS = Positive Play Scale (Wood et al., 2017). All motives refer to gambling. Red lines are for distinction. → = affects.

**Figure 2.2**

*Standardized Regression Results of Mediation Tests*



*Note.* PTSD = Posttraumatic stress disorder; PPS = Positive Play Scale (Wood et al., 2017). All motives refer to gambling. Solid lines denote statistically significant regression pathway; dashed lines denote statistically non-significant regression pathway. Based on the serial mediation results of Model 5 (see Table 4), a follow-up Model 6 was conducted (total effect model summary:  $F(7, 965) = 36.17^{***}$ ,  $R^2 = 20.78\%$ ; direct effects model summary:  $F(8, 964) = 77.45^{***}$ ,  $R^2 = 39.13\%$ ; indirect effect model summary:  $\beta = 0.14$ , Boot 95% CI = [0.10, 0.18]). → = affects.

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

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### **Chapter 3: Study 1 Summary and Bridge**

In Study 1, we investigated how coping motives for gambling were involved in the relationships between posttraumatic stress disorder (PTSD) symptoms, positive play practices (i.e., responsible gambling behaviors and beliefs), and problem gambling (PG) severity in a nationally representative sample of United States adults. Overall, the main finding of this research was that higher symptom levels of PTSD were associated with more severe forms of PG, and coping motives for gambling were revealed as the primary risk factor (out of those that were measured) in the development and maintenance of this connection, rather than other gambling motives or positive play practices. Although, even outside of the effects of PTSD symptoms, higher levels of coping motives for gambling were shown as the best predictor of which individuals were more likely to gamble in problematic ways, underscoring the importance of gamblers and their loved ones being aware of what may be motivating a person's consistent participation in gambling activities. Due to the increasing similarity between modern video-gaming and gambling options, Study 2 sought to test a similar relationship as Study 1 by examining whether coping-related motives for playing video games would be predictive of problematic video-gaming behaviors and explain the connection between symptoms levels of PTSD and Internet gaming disorder in the same census-matched sample.



## **Chapter 4: Coping and Escape Motives Mediate Associations Between Posttraumatic Stress Symptoms and Video Game Disorders in U.S. Adults**

Anthony King  
University of Nevada, Las Vegas

Shane W. Kraus  
University of Nevada, Las Vegas

Gloria Wong-Padoongpatt  
University of Nevada, Las Vegas

Joshua B. Grubbs  
University of New Mexico

### **Abstract**

Little is known about the relationship between symptoms of posttraumatic stress disorder (PTSD) and Internet gaming disorder (IGD) severity, despite IGD's similarity with other addictive disorders (e.g., gambling disorder). Due to the limited research in this area amongst United States (U.S.) adults, it is still unclear whether PTSD symptoms are significantly associated with concurrent IGD severity and whether specific motives for playing video games can explain this relationship in this population. Therefore, using mediation analysis, this study examined the strength of these associations within a census-matched sample of U.S. adults ( $N = 2,806$ ). Results indicated PTSD symptoms predicted IGD severity ( $\beta = 0.38, p < .001$ ) and gaming motives related to escaping and coping with life stressors best explained the relationship between a person's PTSD symptoms and the severity of their disordered gaming. Furthermore, when compared to other participants in the sample, gamers with five or more IGD symptoms (i.e., the proposed diagnostic threshold for the disorder) reported the highest average symptom levels of PTSD and the strongest gaming motives in all seven categories. Prevalence estimates of

probable IGD and PTSD in the full sample were 0.7% and 13.9%, respectively, and amongst only past-year gamers, these prevalence rates jumped to 1.9% for IGD and 26.1% for PTSD. Taken together, these findings emphasize the critical role that a person's gaming motives can have in the connection between symptoms of PTSD and IGD, as well as the suitability of trauma-informed care for treating and preventing disordered gaming behaviors in the U.S. population.

*Keywords:* PTSD symptoms, gaming disorder, video games, motives, coping, escape, addictive disorders, problem behaviors

## **Introduction**

Trauma symptoms and addictive disorders often co-occur. Yet, beyond the research realms of substance use and disordered gambling, this connection has remained largely unexplored. One area in particular that still remains a mystery today is the relationship between concurrent posttraumatic stress disorder (PTSD) symptoms and the proposed diagnostic criteria of American Psychiatric Association's Internet gaming disorder (IGD; APA, 2022). This is despite the fact that over the last decade, gaming disorders have gained increasing attention as a growing public health issue in many countries around the globe (World Health Organization, 2018, 2019). Nevertheless, the role that co-occurring posttraumatic stress symptoms have in the development and maintenance of disordered gaming behaviors has been generally overlooked in the research literature (Yuan et al., 2022), especially within populations from the United States (U.S.). Therefore, this study aimed to examine how symptom levels of PTSD are associated with one's IGD severity within a census-matched sample of U.S. adults from the general population, in addition to identifying how specific motives for playing video games might further explain this relationship and vary across different groups of gamers.

### **PTSD Symptoms and Addictive Disorders**

According to the APA (2022), a formal PTSD diagnosis increases one's likelihood of qualifying for a comorbid mental disorder by 80% compared to an undiagnosed individual, with addictive disorders in particular having an exceptionally high rate of comorbidity. One probable explanation for the frequent co-occurrence of PTSD symptoms and addictive disorders is that individuals are likely self-medicating, or self-soothing, trauma-related symptomology through addictive coping patterns, with or without anxiety and depressive symptoms also presenting (Brady et al., 2000; Khantzian, 1999; Weyler, 2017). In other words, these individuals are

trying—for better or for worse—to cope with or escape from the consequences of a specific stressful experience or set of stressful experiences. Coping then, from this perspective, appears to be more accurately viewed as a *process*, rather than a static personality trait, where someone attempts to manage their stress over time and adapts their coping strategies to varying contextual factors they encounter (Lazarus, 1993).

Stress-coping theoretical frameworks have defined *stress* “...as a situation that is appraised by the individual as personally significant and as having demands that exceed the person’s resources for coping” (Folkman, 2010, p. 120). But, in the U.S. at least, simply experiencing a stressor as personally significant and displaying symptoms related to PTSD or an addictive disorder does not guarantee any person an official medical diagnosis, even though subclinical symptom levels of either disorder when left undiagnosed have been shown to create significant impairments within a person’s life (Kessler et al., 2005; Weinstock et al., 2017). There are also instances where someone might not qualify for a PTSD diagnosis because the event associated with their symptoms lacked—what a clinician determines to be—a serious physical threat, also known as PTSD’s Criterion A in the DSM-5 and DSM-5-TR (APA, 2013, 2022). However, there is now considerable evidence indicating that typical life events, such as relationship problems, discrimination, or the non-sudden/non-violent death of a loved one, can lead to similar PTSD symptom levels seen in—what are often considered—more objectively traumatic events, such as the murder of a loved one or surviving a major natural disaster (Maté, 2022; Mol et al., 2005).

A history of trauma, whether subjectively perceived or not, is one of the leading risk factors recognized for addictive disorders, along with higher levels of stress and a lower socioeconomic status (Shaffer et al., 2004). This is possibly because, over the short-term,

addictive coping patterns of behavior—such as overwhelming involvement with video games or gambling—can effectively mitigate some negative emotional states by providing a temporary escape from or way to cope with one’s problems (Melodia et al., 2022; Puiras et al., 2020; Yuan et al., 2022). However, when continued over the long-term, addictive behavioral patterns tend to accumulate increasingly harmful consequences which often counteract or diminish the potential benefits that might result from repeating a particular behavior (Jacobs, 1986).

### **PTSD and IGD Symptoms: Gaming Motives as a Mediator**

For the most part, people who play video games without problems tend to report a variety of reasons for their participation in the activity, such as socializing with friends or enjoying the competition. In contrast, though, people who experience significant problems from (video) gaming typically have a much narrower list of motives for their involvement. In one of the few available studies examining the connection between PTSD and gaming disorders, Yuan et al. (2022) found that escape motives for video games were a central factor involved in the co-occurrence of these conditions for a sample of young Chinese adults ( $N = 341$ ). However, it is unknown whether these same associations and factors will apply to adult gamers living in the U.S. and how the underlying motivational mechanisms for gaming are involved in this relationship.

While data is limited regarding gaming disorders and posttraumatic stress conditions, previous research has demonstrated a consistent relationship between symptoms of PTSD and disordered gambling (Moore & Grubbs, 2021), as well as compulsive phone usage (Evren et al., 2018; Yuan et al., 2022). For gamblers—a group known to share many similarities with gamers (King et al., 2020; King & Wong, 2022; Kristiansen & Severin, 2020)—coping motivations have been shown to robustly predict future gambling problems in longitudinal research with U.S.

adults (Grubbs & Rosansky, 2020). Moreover, a systematic review of the PTSD-gambling literature by Moore and Grubbs (2021) revealed that symptoms of PTSD often demonstrate a greater effect on one's gambling disorder severity than trauma exposure alone is able to account for, which may further support the notion that some individuals experiencing PTSD symptoms could be using their participation in gambling, or video games, as one means of handling or avoiding personal stressors in their life. Put differently, "Addiction is a deeply ingrained response to stress, an attempt to cope with it through self-soothing. Maladaptive in the long term, it is highly effective in the short term" (Maté, 2010, p. 207).

A study relevant to this topic by Puiras et al. (2020) examined negative and positive escapism in Canadian college students who self-identified as being a gamer, a gambler, or a gamer and a gambler ( $N = 387$ ). Findings revealed that both forms of escapism were more likely to be reported by gamers rather than gamblers, and participants who identified as being both a gamer and gambler demonstrated significantly higher levels of escapism for gaming compared to gambling. Yet, whether one's desire for escapism is directed towards gaming or gambling or even substance use, escape and coping motives appear to be unique risk factors for both men and women developing addictive disorder symptomology (Estevez et al., 2021; Flack & Stevens, 2018; Grubbs et al., 2018; Grubbs & Rosansky, 2020; Marchica et al., 2019; Vaughan & Flack, 2022; Wong et al., 2013).

### **Current Study**

The present study investigated the association between concurrent symptoms of PTSD and IGD severity amongst non-clinical adults from the U.S. general population, while also examining whether certain motives for playing video games mediated this relationship. At the moment, a paucity of research exists detailing how varying levels of posttraumatic stress

symptomology are linked to concurrent IGD severities, especially within nationally representative U.S. samples. Furthermore, overall prevalence rate estimations of IGD have not been recently documented in the U.S. general population and could be higher than rates observed prior to the COVID-19 pandemic (King & Wong, 2022). Thus, using data collected from a large census-matched U.S. adult sample, the following hypotheses were tested:

**H<sub>1</sub>:** Symptoms of PTSD will have a positive association with IGD severity: PTSD symptoms (X) → IGD severity (Y);

**H<sub>2</sub>:** Motives to play video games for reasons related to coping and escaping will be the primary motivational mediators for the relationship between symptoms of PTSD and IGD severity: PTSD symptoms (X) → Gaming motives (M<sub>1-7</sub>) → IGD severity (Y); however, this does not exclude the possibility of other gaming motives co-occurring in this relationship.

## **Method**

### **Participants and Procedure**

This study used an archival dataset from Grubbs and Kraus (2022, 2023a, 2023b)<sup>3</sup> that contained a recent national sample of 2,806 non-clinical U.S. adults (response rate = 87.6%). These archival data were matched and weighted according to the 2019 American Community Survey in order to obtain a participant sample that was representative of the demographic norms of adults living in the general population, according to age, census region, education, gender, and race/ethnicity (U.S. Census Bureau, 2019). All participants within this dataset were originally recruited by the international polling firm YouGov, which offers an array of data-collection services and has been shown to outperform most other survey vendors in regard to the quality of their data and representativeness of their samples (Kennedy et al., 2016; Rivers, 2016).

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<sup>3</sup> The original dataset referenced in Grubbs and Kraus (2022, 2023a, 2023b) contained an additional oversample of 1,557 sports-wagering participants who were not included in this study's analyses.

For this study, YouGov recruited participants in two stages with a stratified sampling technique that used weighted samples with replacements. In Stage 1, a total of 2,806 demographically representative respondents from the U.S. general population were recruited. In Stage 2 (i.e., one week after Stage 1), a total of 1,938 respondents from Stage 1 were re-contacted to answer additional survey questions. Gaming-related frequencies were measured during both Stages 1 and 2, and PTSD symptoms and IGD severity were measured during Stage 2. Nevertheless, these collected data were treated as cross-sectional since each primary measure was only answered by participants at a single point in time. Survey advertisements used to recruit participants for this study described this research as being related to mental health, personality, and recreational activities, with no direct references to video games or gaming being given prior to a participant's participation.

Moreover, before releasing the dataset, YouGov conducted additional post-stratification modifications in order to calculate the final weights for the previously mentioned demographic characteristics. The purpose of weighting these data was to decrease the amount of bias in the overall survey estimates since each recruited participant represented some portion of the target population. Beyond YouGov's high-quality participant screening processes, this study's primary inclusion criteria for the analytic sample was that participants were at least 18 years old, resided in the U.S. at the time of the survey, had played video games within the past year, and completed at least 90% of each primary psychometric measure in this study. These requirements resulted in a final sample of 898<sup>4</sup> participants (see Table 1 for demographic characteristics) after removing

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<sup>4</sup>Out of 1,527 participants who reported playing video games during Stage 1, there were 494 participants who never returned during Stage 2 sampling, and another 90 participants who were included in both sampling stages were also removed from the final sample because they reported playing video games during Stage 1 but not in Stage 2.



45 participants for ineligibility. All data collection for this study occurred from March 17<sup>th</sup> to April 6<sup>th</sup> of 2022.

## **Measures**

### ***Posttraumatic Stress Disorder (PTSD) Symptomology***

The 20-item PTSD Checklist-5 (PCL-5; Blevins et al., 2015) measured how much participants have been affected by symptoms associated with their trauma-related experiences during the past month (e.g., “Have you been taking too many risks or doing things that could cause you harm?”). Each item on this scale was scored 0 (*Not at all*) to 4 (*Extremely*), with a final score determined by summing a participant’s responses to reflect a continuous measure of one’s overall PTSD symptom severity. The highest possible total score on this measure was 80, and prior research recommends PCL-5 cutoff scores between 31 and 33 as a provisional indication of a PTSD diagnosis (Bovin & Marx, 2023). The PCL-5 has continually displayed sufficient validity and reliability in diverse populations around the world (Bovin et al., 2016; Geier et al., 2019; Ghazali & Chen, 2018). For this study, the Cronbach’s alpha of the PCL-5 was excellent (0.96).

### **Internet Gaming Disorder (IGD)**

The 10-item IGD Test (IGDT-10; Király et al., 2017) measured the severity of each participant’s disordered gaming. This scale is based on the diagnostic criteria of the DSM-5 (APA, 2013), with each item assessing a specific symptom associated with the disorder (e.g., “Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?”). All initial response options were coded as follows: 0 (*Never*), 1 (*Sometimes*), 2 (*Often*). However, following the scoring instructions of Király et al. (2017), these response options were further condensed into a dichotomous format: 0 (Never or Sometimes) and 1

(Often). Additionally, one score was calculated for items 9 and 10 of this measure because these items were designed to represent the final IGD criterion of the DSM-5, with a response of often to either of these items scored 1 and all other responses scored 0. Final scores for this measure ranged from 0 to 9 and were calculated by summing a participant's responses to reflect the overall severity of their disordered gaming. Based on the proposed IGD criteria (APA, 2013, 2022), individuals reporting scores between 5 and 9 were considered to have clinically significant impairments related to playing video games. This measure has demonstrated adequate reliability and validity in large, cross-cultural samples of gamers (Király et al., 2019). For this study, the Cronbach's alpha of the IGDT-10 was good (0.89).

### **Gaming Motives**

The 27-item Motives for Online Gaming Questionnaire (MOGQ; Demetrovics et al., 2011) assessed participants' motivations for playing online video games. This scale measures seven motivational factors related to online video gaming: competition, coping, escape, fantasy, recreation, skill development, and social motives. Each scale item asked participants to complete the statement "I play online games because..." with response options ranging from 1 (*Almost never/Never*) to 5 (*Always/Almost always*). The following statements represent examples of each online gaming motive that was measured: *escape* (e.g., "...because gaming helps me escape reality"); *coping* (e.g., "...because it helps me get into a better mood"); *social* (e.g., "...because I can meet many different people"); *competition* (e.g., "...for the pleasure of defeating others"); *recreation* (e.g., "...because it is entertaining"); *fantasy* (e.g., "...to feel as if I was someone else"); and *skill development* (e.g., "...because gaming sharpens my senses"). Scores for each motivational category were independently summed and averaged. This questionnaire has previously displayed acceptable reliability and validity in adult samples of gamers (Wu et al.,

2017). For this study, the Cronbach's alpha of the MOGQ subscales ranged from good to excellent (0.80–0.91).

## **Analytical Plan**

### ***Data Preparation***

All statistical analyses were conducted using IBM SPSS Statistics, Version 28.0, and PROCESS Macro for SPSS 4.0. After determining the analytic sample for this study, standard data-cleaning procedures and key assumption checks for regression analysis were completed (Berry, 1993; Hayes, 2017). Preliminary data screenings revealed potential concerns related to high levels of multicollinearity between coping, escape, and fantasy motives for playing video games, as well as between competition and social gaming motives (see Table 2). Since these motives had strong correlations near .70 or above it, these motivational mediators were considered more suitable for simple mediation analysis rather than multiple mediation analysis in order to better identify the independent mediating effects of each motive on the relationship between PTSD symptoms and IGD severity.

### ***Primary Analyses***

For this study, each mediation analysis was conducted using Hayes' (2013) PROCESS Macro Model 4. Seven simple mediation models tested which of the independent gaming motives—competition (M<sub>1</sub>), coping (M<sub>2</sub>), escape (M<sub>3</sub>), fantasy (M<sub>4</sub>), recreation (M<sub>5</sub>), skill development (M<sub>6</sub>), and social (M<sub>7</sub>)—best explained the association between PTSD symptoms (X) and IGD severity (Y). In addition to these analyses, two separate univariate analysis of variance (ANOVA) tests were conducted to examine group differences for varying symptom levels of PTSD and IGD across the study's primary variables. An effect was considered statistically significant at  $p < .05$  if its 95% confidence interval did not include zero, based on

5,000 bias-corrected bootstrap samples (Preacher & Hayes, 2008); when a confidence interval was unavailable, the alpha level remained at  $p < .05$  to determine statistical significance. All primary analyses adjusted for participant demographics related age, education, and gender.

## Results

### Descriptive Statistics

Table 1 contains frequencies related to the sample's characteristics, including demographic data and prevalence rates of PTSD symptoms, IGD severity, and gaming participation. Table 2 shows a correlational matrix and other descriptive statistics of the study's primary variables. A positive bivariate association was found between PTSD symptoms and IGD severity ( $r = .39, p < .01$ ), which supported the study's first hypothesis and permitted follow-up testing for the mediating effects of different gaming motives on this association. Moreover, out of the seven motives for playing video games, gaming motives related to coping and escape, respectively, demonstrated the strongest correlations with PTSD symptoms ( $r = .36, r = .42, p < .01$ ) and IGD severity ( $r = .40, r = .41, p < .01$ ). Besides recreational motives, all other motives displayed significant bivariate relationships with both PTSD and IGD symptom severity ( $p < .01$ ), indicating that stronger gaming motives, generally and specifically, were associated with more severe symptom levels of posttraumatic stress and IGD; these associations were small-to-moderate in strength ( $r = .21-.39$ ).

### Mediation Analysis

#### *PTSD Symptoms → Gaming Motive: Competition → IGD Severity*

For all mediation models, see Table 3 for a summary of the regression coefficients and Figure 1 for a visualization. Model 1 examined the effect of PTSD symptoms on IGD severity via competition motives for playing video games. This direct effect model explained 23.74% of

the variance in IGD severity,  $F(5, 878) = 54.67, p < .001$ , and the total effect model explained 15.31% of it,  $F(4, 879) = 39.74, p < .001$ . PTSD symptoms predicted competition motives for playing video games ( $\beta = 0.21, p < .001$ ), with younger men in particular reporting the strongest competition motives ( $p < .001$ ). As indicated by the preliminary analyses, PTSD symptoms were also found to have a direct effect on IGD severity ( $\beta = 0.31, p < .001$ ). Further, competition motives predicted IGD severity ( $\beta = 0.31, p < .001$ ) and were indicated as a small, but significant partial mediator in the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.06$ , Boot  $SE = 0.01$ , Boot 95% CI [0.04, 0.09].

***PTSD Symptoms → Gaming Motive: Coping → IGD Severity***

Model 2 examined the effect of PTSD symptoms on IGD severity via coping motives for playing video games. This direct effect model explained 22.90% of the variance in IGD severity,  $F(5, 878) = 52.17, p < .001$ , with results of the total effect model remaining the same as the previous mediation test. PTSD symptoms predicted coping motives for playing video games ( $\beta = 0.31, p < .001$ ), with younger people who had lower levels of education appearing to have the strongest coping motives ( $p < .001$ ). Coping motives were also found to predict IGD severity ( $\beta = 0.30, p < .001$ ) and were indicated as a small, but significant partial mediator in the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.09$ , Boot  $SE = 0.01$ , Boot 95% CI [0.07, 0.12].

***PTSD Symptoms → Gaming Motive: Escape → IGD Severity***

Model 3 examined the effect of PTSD symptoms on IGD severity via escape motives for playing video games. This direct effect model explained 22.56% of the variance in IGD severity,  $F(5, 878) = 51.15, p < .001$ , with results of the total effect model remaining the same. PTSD symptoms predicted escape motives for playing video games ( $\beta = 0.35, p < .001$ ), with younger

adults appearing to have the strongest escape motives ( $p < .001$ ). Escape motives were also found to predict IGD severity ( $\beta = 0.31, p < .001$ ) and were indicated as a small, but significant partial mediator in the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.11$ , Boot  $SE = 0.01$ , Boot 95% CI [0.08, 0.14].

***PTSD Symptoms → Gaming Motive: Fantasy → IGD Severity***

Model 4 examined the effect of PTSD symptoms on IGD severity via fantasy motives for playing video games. This direct effect model explained 22.56% of the variance in IGD severity,  $F(5, 878) = 51.15, p < .001$ , with results of the total effect model remaining the same. PTSD symptoms predicted fantasy motives for playing video games ( $\beta = 0.24, p < .001$ ), with younger men who had lower levels of education reporting the strongest fantasy motives ( $p < .05$ ). Fantasy motives were also found to predict IGD severity ( $\beta = 0.31, p < .001$ ) and were—once again—indicated as a small, but significant partial mediator of the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.08$ , Boot  $SE = 0.01$ , Boot 95% CI [0.05, 0.10].

***PTSD Symptoms → Gaming Motive: Recreation → IGD Severity***

Model 5 examined the effect of PTSD symptoms on IGD severity via recreational motives for playing video games. Although recreational motives for playing video games did not initially demonstrate a significant bivariate relationship with PTSD symptoms, this mediator was still tested to expand the literature around PTSD symptoms' connection to IGD severity. This direct effect model explained 16.39% of the variance in IGD severity,  $F(5, 878) = 34.43, p < .001$ , with the total effect model remaining the same. In line with the earlier results, PTSD symptoms were not shown to predict recreational motives for playing video games ( $p = .43$ ), but recreational motives did predict IGD severity ( $\beta = 0.11, p < .001$ ). Nevertheless, recreational

motives had no significant mediating effect on the relationship between PTSD symptoms and IGD severity.

***PTSD Symptoms → Gaming Motive: Skill Development → IGD Severity***

Model 6 examined the effect of PTSD symptoms on IGD severity via skill development motives for playing video games. This direct effect model explained 20.13% of the variance in IGD severity,  $F(5, 878) = 44.24, p < .001$ , with results of the total effect model remaining the same. PTSD symptoms predicted skill development motives for playing video games ( $\beta = 0.22, p < .001$ ), with people who had lower levels of education reporting the strongest motives in this area ( $p < .001$ ). Further, skill development motives were found to predict IGD severity ( $\beta = 0.23, p < .001$ ) and were indicated as a small, but significant partial mediator of the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.05$ , Boot  $SE = 0.01$ , Boot 95% CI [0.03, 0.07].

***PTSD Symptoms → Gaming Motive: Social → IGD Severity***

Model 7 examined the effect of PTSD symptoms on IGD severity via social motives for playing video games. This direct effect model explained 22.77% of the variance in IGD severity,  $F(5, 878) = 51.78, p < .001$ , with results of the total effect model remaining the same. PTSD symptoms predicted social motives for playing video games ( $\beta = 0.19, p < .001$ ), with younger men who had lower levels of education reporting the strongest social motives ( $p < .05$ ). Further, social motives were found to predict IGD severity ( $\beta = 0.29, p < .001$ ) and were indicated as a small, but significant partial mediator of the relationship between PTSD symptoms and IGD severity: Indirect effect  $\beta = 0.06$ , Boot  $SE = 0.01$ , Boot 95% CI [0.03, 0.08].

Based on these results, escape motives for gaming were indicated as the strongest mediator out of the seven motivational categories that were tested. Coping motives demonstrated

a slightly smaller mediation effect on the PTSD-IGD association than escape motives displayed, followed by fantasy motives and competition motives for playing video games. These findings supported the study's second hypothesis that coping and escape motives would primarily mediate the relationship between symptoms of PTSD and IGD severity with the possibility of other gaming motives co-occurring in this relationship.

### **ANOVA Tests for Group Differences by IGD and PTSD Symptom Severity**

Table 4 shows the full results of two ANOVA models examining the study's primary variables across different groups of people who play video games (i.e., gamers). In the first model, three gamer groups were evaluated according to IGD symptom levels: no IGD symptoms (*Non-problem*), 1 to 4 IGD symptoms (*At risk*), and 5+ IGD symptoms (*Provisional diagnosis*). Significant between-group differences related to IGD symptom levels were detected for all primary variables ( $p < .001$ ), with the largest differences found for escape motives,  $F(2, 897) = 120.95, \eta^2 = 0.21$ , and coping motives,  $F(2, 897) = 117.57, \eta^2 = 0.21$ . The next largest between-group difference was observed for PTSD symptom severity,  $F(2, 897) = 93.58, \eta^2 = 0.17$ , revealing that gamers exceeding IGD's diagnostic threshold, on average, reported the highest levels of PTSD symptomology, as well as the strongest gaming motives for each category. Notably, as symptom levels increased for either PTSD or IGD, it was associated with more symptoms of the other condition. Smaller between-group differences were also found across IGD severity levels for gaming frequency rates,  $F(2, 897) = 5.41, p < .01, \eta^2 = 0.01$ , with the average gamer who reported 1 to 4 IGD symptoms playing video games slightly more often than the average gamer from other groups.

In the second ANOVA model, three gamer groups were examined according to PTSD symptom levels: no symptoms (PCL-5 score 0), subclinical symptoms (PCL-5 score 1-30), and



provisional diagnosis symptoms (PCL-5 score 31-80). Significant between-group differences for PTSD symptom levels were detected for all primary variables besides recreational motives for gaming ( $p < .001$ ), and the largest differences were found for escape motives,  $F(2, 895) = 60.75$ ,  $\eta^2 = 0.12$ , and IGD severity,  $F(2, 895) = 56.05$ ,  $\eta^2 = 0.11$ . The next largest between-group difference was observed for coping motives,  $F(2, 895) = 46.96$ ,  $\eta^2 = 0.10$ , which indicated the average levels of coping and escape motives for gaming increased alongside the average number of PTSD symptoms that were reported. No significant between-group differences were found across PTSD symptom levels for gaming frequency rates, with similar levels of gaming participation observed across all groupings.

### **Discussion**

To address current gaps in the research literature, our study examined to what extent seven motives for playing video games were able to mediate the effect of PTSD symptoms on IGD severity. Using a census-matched sample of non-clinical adults, results from this work suggest there is a significant connection between concurrent symptoms of posttraumatic stress and disordered gaming behaviors in the U.S. general population (i.e., 18+ years old) and, together, coping- and escape-based motives for gaming appear to be the primary mechanisms involved in the connection between PTSD symptoms and IGD severity. These results are consistent with previous studies related to this topic that have been conducted with Canadian and Chinese participants (Purias et al., 2020; Yuan et al., 2022) and could indicate that the relationship between symptoms of PTSD and disordered gaming may transcend some cultural and ethnic boundaries. To a lesser extent, other gaming motives in this study related to competition, fantasy, skill development, and socializing were also shown to mediate the PTSD-IGD relationship, with recreational motives identified as the one exception to that pattern.

Collectively, these results highlight the wide range of motivations that U.S. adults experience when playing modern-day video games and how these motives can vary across IGD and PTSD symptom levels. One notable finding of this research was that gamers who reported five or more IGD symptoms—which is the proposed diagnostic threshold for the disorder (APA, 2022)—had the strongest gaming motives in all seven categories that were measured, as well as the highest average symptom levels of PTSD in comparison to gamers with lower levels of IGD or who had no symptoms at all. In each of the study’s models, it was demonstrated that an increase in either IGD or PTSD symptoms predicted concurrent increases in the other disorder’s symptoms. Although this study did not examine the causal nature of these relationships, it seems plausible that symptoms of these disorders share a bidirectional association with one another, where the presence or absence of one set of symptoms could possibly exacerbate or alleviate symptoms of the other, respectively (Lin et al., 2020; Yang et al., 2022).

Another important result of this study was that most gamers regardless of their IGD and PTSD symptoms were found to spend similar amounts of time playing video games, with gamers who reported subclinical levels of IGD symptoms having the highest average levels of involvement with gaming. This finding underscores a critical point about the proposed IGD diagnosis and how disordered gaming cannot be identified purely by the amount of time that a person devotes to the activity—although that information can certainly be relevant to understanding a person’s overall involvement with video games. In addition to this, demographic risk factors associated with IGD and stronger gaming motives in this sample included being younger than 45 years old, a man, and having lower levels of education.

Furthermore, results from this study revealed IGD prevalence rates that ranged from 0.7% in the nationally representative sample that included both gamers and non-gamers to 1.9%

in the final analytic sample that included only participants who reported past-year gaming. At the moment, there are few studies that have examined IGD prevalence rates amongst U.S. adults in large census-matched samples, so this research provides an excellent point of reference for future studies investigating this topic within similar populations. In general, these IGD prevalence rates appear to be in line with past studies that have taken place in other countries and with adolescents (Laconi et al., 2017; Petry et al., 2015; Przybylski et al., 2017), indicating that clinically diagnosable IGD is relatively uncommon amongst U.S. adults but, nonetheless, still present. By comparison, PTSD symptoms were much more common than IGD's, with the vast majority of participants reporting some level of posttraumatic stress symptoms—a result that may signify the importance of trauma-informed care when it comes to understanding and addressing a person's overall mental health needs, whether in relation to video games or not.

### **Implications**

These results speak to not only the complexity of posttraumatic stress symptomology and its potential effects on different individuals, but also to how these symptoms are associated with concurrent IGD severity and seven motives for playing modern video games. As this research shows, people who like to play video games often have several motives tied to their overall gaming participation. Yet, when adults are motivated to game primarily as a means to cope with or escape from difficulties in their life, these particular motives appear to lead to more severe problems with video games than other motives for gaming that were evaluated. Importantly, symptoms of PTSD might further increase the likelihood of gamers using video games as a coping or avoidance mechanism for stress, which suggests that these motives could be key targets for both preventative and treatment efforts related to IGD in the U.S. population. While participants in this study were recruited solely from the general population, there is a strong

possibility that these relationships could be even more robust for individuals in clinical settings. Thus, trauma-informed care, which is already becoming the standard in addressing substance-based addictive disorders, seems to also have a place when it comes to preventing and treating disordered gaming behaviors in the U.S., particularly for adult gamers under 40 years old.

### **Limitations**

When interpreting the results of this study, there are several limitations that should be considered. First, all of the data used in this research was self-reported by participants and treated as cross-sectional (i.e., correlational) since the primary measures in this dataset were administered only once. For the interested reader, however, it is worth mentioning that this dataset is just the first portion of a larger longitudinal study on U.S. sports wagering that is currently underway (see Grubbs and Kraus, 2022, 2023a, 2023b). Second, during the preliminary data screening process, potential multicollinearity concerns arose in relation to some of the motives that were measured for playing video games. This result suggested that several gaming motives appear to share considerable conceptual overlap with one another. For example, gaming motives related to coping, escape, and fantasy were strongly correlated, as well as competition and social motives. Due to these results, simple mediation analysis appeared more fitting for testing this study's hypotheses than multiple parallel mediation in order to better tease apart the possible unique effects of each motive that was measured without encountering statistical interference from any other motives. On a similar note, a third limitation of this study was that while seven motivations for gaming were measured in this study, it is possible that other motives for playing video games could also have a role in the PTSD-IGD symptomology association, such as financial motives (see King & Wong, 2022). Lastly, participants between the ages of 18 and 20 years old were underrepresented in this study and should be a target population for future

research in the U.S. since elevated risk levels for disordered gaming behaviors were consistently associated with younger age groups in this census-matched national sample.

## **Conclusion**

“Most humans exist somewhere on that line between enslavement to destructive habits at one end and total consciousness and nonattachment at the other.”

–Maté, 2010, p. 305

For people who like to play video games, where does passion end and pathology begin? The answer is not always clear, but often the default response is when significant distress or impairment arises from that behavior. Yet, results from this research suggest an alternative approach to identifying and addressing disordered gaming in the U.S. population is to redirect the focus back to the motivations underlying a person’s involvement in the activity. Because, as demonstrated, when someone is motivated to play video games mainly as a way to cope with or avoid other issues in their life, there is a much greater potential for problematic gaming behaviors to occur, especially when this pattern becomes a long-term strategy for managing a wide range of uncomfortable emotions and stressors. Although it does seem necessary to clarify that there is nothing inherently wrong with any adult wanting to play video games (despite the gossip one may hear), and for many individuals, gaming actually appears to be quite beneficial (Granic et al., 2014). Therefore, in an effort to keep gaming behaviors steered in a healthier direction for the general public, this research suggests both gamers and the people around them should remain cognizant of the motives that may be ultimately driving a person’s participation in video games so that other ways of managing stress and discomfort are also explored and developed.

## Tables and Figures for Study 2

**Table 4.1**

*Participant Demographics*

Variable	Full Sample: <i>N</i> = 2,806	Final Sample: <i>n</i> = 898
Mean age ( <i>SD</i> )	51.59 (16.32)	47.67 (15.55)
Female	53.1%	48.3%
Education		
No high school	3.7%	3%
High school	32.6%	30.4%
Some college	19.6%	21.5%
2-year	10%	11%
4-year	20.9%	21.8%
Post-grad	13.2%	12.2%
Gaming frequency (Past year)		
Never	4%	0%
Once or twice	11.9%	19%
Monthly	5.1%	9.7%
Weekly	12.5%	24.1%
Daily or almost daily	17.2%	31.7%
More than once per day	7.6%	15.5%
Not asked	41.6%	0%
PTSD symptom severity (PCL-5)		
No symptoms (PCL-5 = 0)	6.9%	8.9%
Subclinical symptoms (PCL-5 = 1–15)	43.8%	65%
Provisional diagnosis (PCL-5 = 31–80)	13.9%	26.1%
Not asked	35.4%	0%
IGD severity (IGDT-10)		
No symptoms (IGDT-10 = 0)	32.8%	82.9%
At risk (IGDT-10 = 1–4)	5.2%	15.3%
Provisional Diagnosis (IGDT-10 = 5–9)	0.7%	1.9%
Not asked	61.3%	0%

*Note.* PTSD = Posttraumatic stress disorder; PCL-5 = PTSD Checklist (Blevins et al., 2015); IGD = Internet gaming disorder; IGDT-10 = IGD Test-10 items (Király et al., 2017).

**Table 4.2***Bivariate Correlations of Key Variables with Descriptive Statistics*

<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
1. PTSD Symptoms	-								
2. IGD Severity	<b>.39</b>	-							
3. Competition motives	<b>.22</b>	<b>.38</b>	-						
4. Coping motives	<b>.36</b>	<b>.40</b>	<b>.55</b>	-					
5. Escape motives	<b>.42</b>	<b>.41</b>	<b>.46</b>	<b>.80</b>	-				
6. Fantasy motives	<b>.33</b>	<b>.39</b>	<b>.51</b>	<b>.69</b>	<b>.77</b>	-			
7. Recreation motives	-.01	<b>.11</b>	<b>.22</b>	<b>.39</b>	<b>.33</b>	<b>.30</b>	-		
8. Skill development motives	<b>.21</b>	<b>.30</b>	<b>.57</b>	<b>.61</b>	<b>.47</b>	<b>.47</b>	<b>.33</b>	-	
9. Social motives	<b>.23</b>	<b>.36</b>	<b>.68</b>	<b>.57</b>	<b>.51</b>	<b>.64</b>	<b>.18</b>	<b>.56</b>	-

*Note.* All motives refer to playing video games. All variables were coded so higher values reflect more of the construct. Bold font signifies statistical significance.

**Table 4.3**

*Mediations of PTSD Symptoms Predicting IGD Severity via Motives for Playing Video Games*

	<b>Mediation pathways</b>	<b>B</b>	<b><math>\beta</math></b>	<b>SE</b>	<b>95% CI</b>
	Total effect: PTSD → IGD ( <i>c</i> )	<b>0.02***</b>	<b>0.38***</b>	<b>0.002</b>	<b>[0.02, 0.03]</b>
<b>Model 1</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.31***</b>	<b>0.002</b>	<b>[0.02, 0.02]</b>
	PTSD → Competition motives ( <i>a</i> <sub>1</sub> )	<b>0.01***</b>	<b>0.21***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	Competition motives → IGD ( <i>b</i> <sub>1</sub> )	<b>0.34***</b>	<b>0.31***</b>	<b>0.04</b>	<b>[0.27, 0.41]</b>
	PTSD → Competition motives → IGD ( <i>a</i> <sub>1</sub> × <i>b</i> <sub>1</sub> )	<b>0.004</b>	<b>0.06</b>	<b>0.01</b>	<b>[0.002, 0.01]</b>
<b>Model 2</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.29***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	PTSD → Coping motives ( <i>a</i> <sub>2</sub> )	<b>0.02***</b>	<b>0.31***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	Coping motives → IGD ( <i>b</i> <sub>2</sub> )	<b>0.33***</b>	<b>0.30***</b>	<b>0.04</b>	<b>[0.26, 0.40]</b>
	PTSD → Coping motives → IGD ( <i>a</i> <sub>2</sub> × <i>b</i> <sub>2</sub> )	<b>0.006</b>	<b>0.09</b>	<b>0.001</b>	<b>[0.004, 0.01]</b>
<b>Model 3</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.27***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	PTSD → Escape motives ( <i>a</i> <sub>3</sub> )	<b>0.02***</b>	<b>0.35***</b>	<b>0.002</b>	<b>[0.02, 0.03]</b>
	Escape motives → IGD ( <i>b</i> <sub>3</sub> )	<b>0.29***</b>	<b>0.31***</b>	<b>0.03</b>	<b>[0.23, 0.36]</b>
	PTSD → Escape motives → IGD ( <i>a</i> <sub>3</sub> × <i>b</i> <sub>3</sub> )	<b>0.007</b>	<b>0.11</b>	<b>0.001</b>	<b>[0.005, 0.01]</b>
<b>Model 4</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.30***</b>	<b>0.002</b>	<b>[0.02, 0.02]</b>
	PTSD → Fantasy motives ( <i>a</i> <sub>4</sub> )	<b>0.02***</b>	<b>0.24***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	Fantasy motives → IGD ( <i>b</i> <sub>4</sub> )	<b>0.30***</b>	<b>0.31***</b>	<b>0.032</b>	<b>[0.23, 0.36]</b>
	PTSD → Fantasy motives → IGD ( <i>a</i> <sub>4</sub> × <i>b</i> <sub>4</sub> )	<b>0.005</b>	<b>0.08</b>	<b>0.001</b>	<b>[0.003, 0.01]</b>
<b>Model 5</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.38***</b>	<b>0.002</b>	<b>[0.02, 0.03]</b>
	PTSD → Recreation motives ( <i>a</i> <sub>5</sub> )	-0.002	-0.03	0.002	[-0.01, 0.002]
	Recreation motives → IGD ( <i>b</i> <sub>5</sub> )	<b>0.11***</b>	<b>0.11***</b>	<b>0.03</b>	<b>[0.05, 0.18]</b>
	PTSD → Recreation motives → IGD ( <i>a</i> <sub>5</sub> × <i>b</i> <sub>5</sub> )	-0.0002	-0.003	0.0003	[-0.001, 0.01]
<b>Model 6</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.33***</b>	<b>0.002</b>	<b>[0.02, 0.02]</b>
	PTSD → Skill development (SDev) motives ( <i>a</i> <sub>6</sub> )	<b>0.02***</b>	<b>0.22***</b>	<b>0.002</b>	<b>[0.01, 0.02]</b>
	SDev motives → IGD ( <i>b</i> <sub>6</sub> )	<b>0.21***</b>	<b>0.23***</b>	<b>0.03</b>	<b>[0.16, 0.27]</b>
	PTSD → SDev motives → IGD ( <i>a</i> <sub>6</sub> × <i>b</i> <sub>6</sub> )	<b>0.003</b>	<b>0.05</b>	<b>0.001</b>	<b>[0.002, 0.01]</b>
<b>Model 7</b>	PTSD → IGD ( <i>c'</i> )	<b>0.02***</b>	<b>0.32***</b>	<b>0.002</b>	<b>[0.02, 0.02]</b>
	PTSD → Social motives ( <i>a</i> <sub>7</sub> )	<b>0.01***</b>	<b>0.19***</b>	<b>0.002</b>	<b>[0.01, 0.01]</b>
	Social motives → IGD ( <i>b</i> <sub>7</sub> )	<b>0.32***</b>	<b>0.29***</b>	<b>0.04</b>	<b>[0.25, 0.39]</b>
	PTSD → Social motives → IGD ( <i>a</i> <sub>7</sub> × <i>b</i> <sub>7</sub> )	<b>0.003</b>	<b>0.06</b>	<b>0.001</b>	<b>[0.002, 0.01]</b>

*Note.* PTSD = Posttraumatic stress disorder; IGD = Internet gaming disorder. Standard errors and 95% CIs are unstandardized; indirect effects have boot standard errors, boot 95% CIs, and were not assigned a *p*-value. Bold values indicate statistical significance. All variables were coded so higher values reflect more of the construct. → = affects.

\*\*\* = *p* < .001.



**Table 4.4***ANOVAs for Primary Variables Across Gamer Groups*

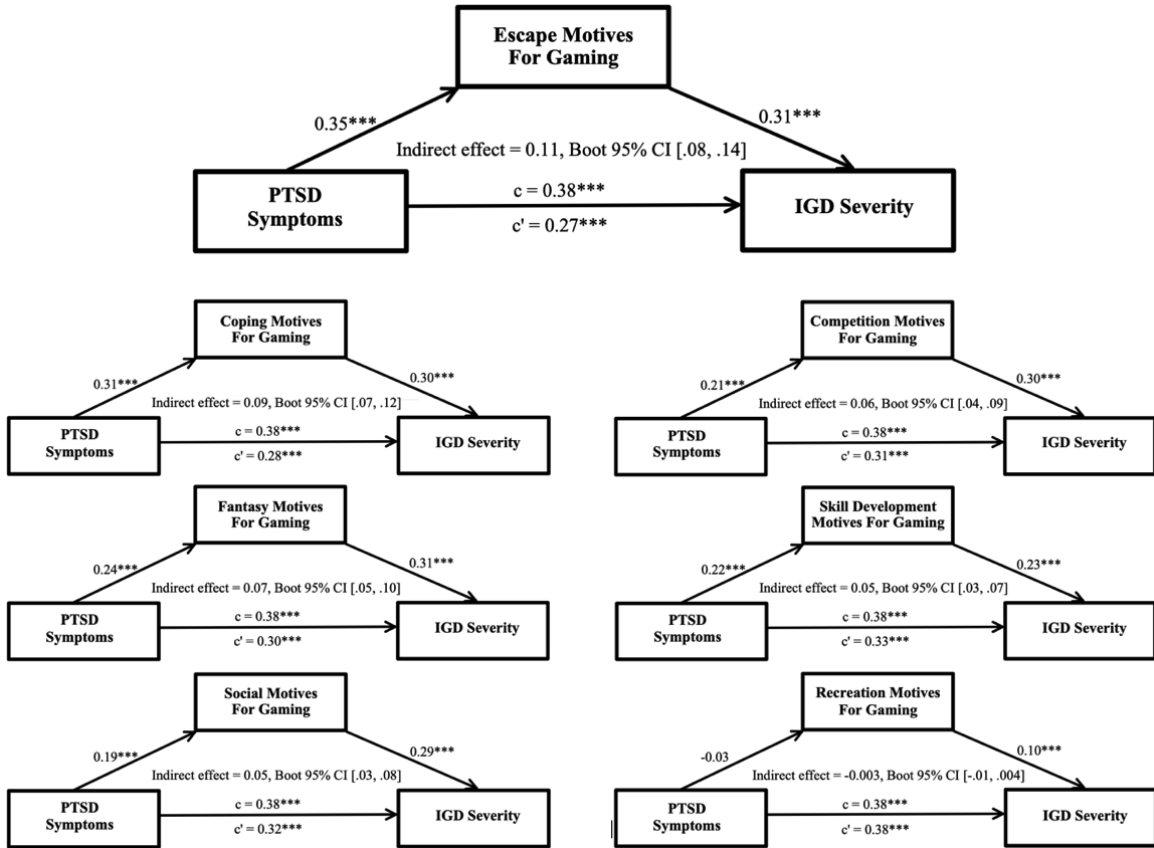
Measure	Gamer Group by IGD Severity			<i>F</i> ( <i>df1</i> , <i>df2</i> )	$\eta^2$
	0 Symptoms	1-4 Symptoms	5+ Symptoms		
	<i>n</i> = 744 <i>M</i> ( <i>SD</i> )	<i>n</i> = 137 <i>M</i> ( <i>SD</i> )	<i>n</i> = 17 <i>M</i> ( <i>SD</i> )		
PTSD Symptom Severity	16.68 (15.91)	35.27 (19.42)	48.35 (23.69)	<i>F</i> (2, 897) = 93.58***	0.17
Video Gaming Motives					
Competition	1.89 (0.91)	2.63 (1.15)	3.68 (1.19)	<i>F</i> (2, 897) = 60.19***	0.12
Coping	2.17 (0.94)	3.38 (0.88)	3.82 (1.24)	<i>F</i> (2, 897) = 117.57***	0.21
Escape	2.09 (1.07)	3.47 (1.01)	4.07 (1.13)	<i>F</i> (2, 897) = 120.95***	0.21
Fantasy	1.86 (1.05)	2.99 (1.20)	3.90 (1.37)	<i>F</i> (2, 897) = 88.85***	0.17
Recreation	3.70 (1.10)	4.08 (0.82)	4.16 (1.05)	<i>F</i> (2, 897) = 8.62***	0.02
Skill Development	2.25 (1.14)	3.20 (1.11)	3.59 (1.39)	<i>F</i> (2, 897) = 48.96***	0.10
Social	1.67 (0.91)	2.41 (1.13)	3.29 (1.38)	<i>F</i> (2, 897) = 55.12***	0.11
Gaming Frequency	4.86 (1.54)	5.33 (1.47)	4.88 (1.80)	<i>F</i> (2, 897) = 5.41**	0.01
Measure	Gamer Group by PTSD Severity			<i>F</i> ( <i>df1</i> , <i>df2</i> )	$\eta^2$
	0 Symptoms	1-30 Symptoms	31+ Symptoms		
	<i>n</i> = 80 <i>M</i> ( <i>SD</i> )	<i>n</i> = 582 <i>M</i> ( <i>SD</i> )	<i>n</i> = 234 <i>M</i> ( <i>SD</i> )		
IGD Severity	0.08 (0.38)	0.18 (0.78)	1.04 (1.71)	<i>F</i> (2, 895) = 56.05***	0.11
Video Gaming Motives					
Competition	1.91 (1.06)	1.93 (0.92)	2.35 (1.15)	<i>F</i> (2, 895) = 15.32***	0.03
Coping	1.84 (1.09)	2.25 (0.96)	2.89 (1.07)	<i>F</i> (2, 895) = 46.96***	0.10
Escape	1.68 (1.02)	2.17 (1.08)	2.99 (1.22)	<i>F</i> (2, 895) = 60.75***	0.12
Fantasy	1.69 (1.09)	1.90 (1.07)	2.62 (1.27)	<i>F</i> (2, 895) = 38.92***	0.08
Recreation	3.66 (1.30)	3.80 (1.05)	3.70 (1.05)	<i>F</i> (2, 895) = 1.19	0.003
Skill Development	2.17 (1.40)	2.29 (1.15)	2.81 (1.17)	<i>F</i> (2, 895) = 18.14***	0.04
Social	1.74 (1.17)	1.69 (0.91)	2.14 (1.14)	<i>F</i> (2, 895) = 17.20***	0.04
Gaming Frequency	5.03 (1.40)	4.92 (1.55)	4.92 (1.58)	<i>F</i> (2, 895) = 0.16	0.000

*Note.* PTSD = Posttraumatic stress disorder; IGD = Internet gaming disorder. All variables were coded so higher values reflect more of the construct.

\*\* =  $p < .01$ . \*\*\* =  $p < .001$ .

**Figure 4.1**

*Mediation Results of PTSD Symptoms Predicting IGD Severity via Gaming Motives*



*Note.* PTSD = Posttraumatic stress disorder; IGD = Internet gaming disorder. In each simple mediation model, PTSD symptom severity is the independent variable ( $X$ ), motives for playing video games are the mediators ( $M_{1-7}$ ), and IGD severity is the outcome ( $Y$ ). Standardized results are displayed. All variables were coded so higher values reflect more of the construct.  $\rightarrow$  = affects.

\*\*\* =  $p < .001$ .

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## Chapter 5: Manuscript 2 Summary and Bridge

In Study 2, we focused on examining the explanatory role of coping-related motives for video-gaming in the association between symptoms of posttraumatic stress disorder (PTSD) and Internet gaming disorder (IGD) severity, using the same nationally representative sample from Study 1. Results from this study paralleled the findings from Study 1, in that coping motives and, the conceptually overlapping, escape motives for playing modern video games best explained the connection between symptom levels of PTSD and IGD in United States (U.S.) adults. In both of these studies, past-year gamblers and gamers qualified for a provisional PTSD diagnosis at nearly double the rates of non-gamblers and non-gamers in the sample, with 1 in 5 gamblers and 1 in 4 gamers meeting the clinical PTSD diagnostic criteria. By comparison, rates of problem gambling and disordered gaming were notably lower in the sample: 1 in 10 gamblers were classified as problematic, and 1 in 50 gamers were considered disordered. While this discrepancy between rates of PTSD, problematic gambling, and IGD could be interpreted several different ways, it does indicate that people experiencing PTSD symptoms are more likely to be classified as a problem gambler than a disordered gamer.

Nevertheless, people with a history of trauma or other harmful adversities may employ a wide variety of coping behaviors that extend far beyond the realms of gambling and gaming (Hays-Grudo et al., 2021; Shaffer et al., 2004). So to examine this possibility amongst a high-risk group of U.S. adults, in Study 3, we changed the approaches of Studies 1 and 2 in two fundamental ways. First, instead of measuring PTSD symptoms, we measured the number of adverse childhood experiences (ACEs) that participants experienced before their 18<sup>th</sup> birthday to see how these often traumatizing events were related to later significant problems with gambling, video-gaming, and 11 other potentially addictive substances and behaviors (e.g., alcohol, internet

use, over-eating). The second major change for Study 3, compared to the first two studies, was that we decided to focus on U.S. college students instead of a nationwide sample of general-public adults to observe how these related pathways might differ across these populations.

## **Chapter 6: Associations Between Childhood Adversity, Risk Factors for Poor Health, and Significant Problems with Substances and Behaviors Amongst U.S. College Students**

Anthony King  
University of Nevada, Las Vegas

Ting Tong  
University of Washington

Danielle Le  
University of Nevada, Las Vegas

Donna Sim  
University of Nevada, Las Vegas

Gloria Wong-Padoongpatt  
University of Nevada, Las Vegas

### **Abstract**

Adverse childhood experiences (ACEs) are frequently associated with higher rates of mental health issues and problematic behaviors within the U.S. college population. Therefore, the primary purpose of this study was to investigate the current relationships between ACEs, six common risk factors for poor health (anxiety, depression, loneliness, negative and positive urgency, stress), and significant behavioral and substance problems in a large sample of college students ( $N = 1,993$ ). Overall, 72.3% of participants reported one or more ACEs, with 21.7% of the sample reporting at least five of these experiences. Cumulative ACE scores were positively associated with all health risk factors ( $r = .07-.38, p \leq .001$ ), and these ACE scores were most connected to student problems with alcohol, over-eating, and sex ( $r = .19-.22, p < .001$ ). Furthermore, using multinomial logistic regression, cumulative ACE scores predicted which students were more likely to report behavioral problems ( $OR = 1.08, 95\% CI [1.03, 1.14]$ ),

substance problems ( $OR = 1.16$ , 95% CI [1.07, 1.26]), and both types of problems ( $OR = 1.28$ , 95% CI [1.20, 1.36]) relative to students without these problems. Besides ACEs, though, more anxiety was the only other risk factor that was linked to all three problem types ( $OR = 1.29$ – $1.83$ , 95% CI [1.03–1.39, 1.60–2.41]). Collectively, these findings highlight the differential impact of ACEs and other important risk factors on the susceptibility of college students to particular forms of maladaptive coping and suggest potential targets for intervention and prevention efforts in these problem areas.

*Keywords:* adverse childhood experiences, college students, health risk factors, problematic coping, substance use

## Introduction

Adverse childhood experiences (ACEs) are frequently reported by United States (U.S.) college students and remain a significant risk factor for mental and physical health issues in this population (Watt et al., 2022). Past research has indicated that the impact of these early experiences can often have a long-lasting, dose-dependent relationship with the number of difficulties that a person is likely to encounter as they mature (Clark et al., 2010; Felitti et al., 1998; Merrick et al., 2018; Tan & Mao, 2023), and this pattern can persist even when these experiences fail to meet the modern clinical requirements for classification as a traumatic event (Smyth et al., 2008). In the U.S., ACE estimates from both private and public universities indicate 42–85% of all undergraduate students have experienced at least one of these events prior to their 18<sup>th</sup> birthday (Brett et al., 2018; Espeleta et al., 2018; Karatekin, 2017; Khrapatina & Berman, 2017; Smyth et al., 2008; Merians et al., 2019; Watt et al., 2022).

Despite this high rate of occurrence, though, it remains unclear to what extent ACEs are connected to significant self-reported problems with a wide range of substances (e.g., alcohol, cannabis, cocaine) and behaviors (e.g., gambling, internet use, video-gaming) in today's U.S. college population (Strathearn et al., 2019). More research is also needed to clarify the roles that other common risk factors for poor health, such as anxiety, depression, impulsivity, loneliness, and stress, have in these relationships (Espeleta et al., 2018; Watt et al., 2022). Because even before the COVID-19 pandemic happened, most college students were already reporting feeling: hopeless (51.7%), lonely (63.1%), stressed by their workloads (86.5%), and extremely anxious (60.9%) within the last 12 months (American College Health Association, 2018). So identifying how ACEs and these other health risk factors, when examined together, account for the variability across different groups of students who report significant problems with certain

substances or activities might provide universities with valuable information that they can use to better tailor their campus services to address common problem areas (Smyth et al., 2008).

Several theories, such as the developmental-learning model of addiction, propose that ACEs are often linked to later problems with substances and behaviors because these potentially harmful life events can impair a person's later abilities to respond to stress in healthy, adaptive ways (McCrory et al., 2012; Shonkoff et al., 2012), which may increase the likelihood of that individual continually seeking out mood-altering substances or behaviors in an attempt to regulate the negative effects of those experiences (Hays-Grudo et al., 2021). This idea is in line with McEwen's concept of allostatic load (1998), where too much stress (e.g., abuse) or too little stress (e.g., neglect) during development can create long-term damage to a child's critical neurobiological systems that are responsible for facilitating all of their future stress responses, such as the hypothalamic-pituitary-adrenal axis. In addition to those potential alterations, ACEs have also been shown to negatively impact the primary biological systems that support seeking rewards and affiliations, which elevates the likelihood of riskier decision-making processes, less secure social attachments, and more addiction problems occurring in both human and animal models (Strathearn et al., 2019).

Moreover, eleven years after his pioneering ACE study (Felitti et al., 1998), Felitti (2009) theorized that a primary way childhood adversity is able to translate into later mental and physical illnesses is through the accumulated consequences of maladaptive coping behaviors that are largely driven by symptoms of ACE-derived psychopathological conditions. For example, ACEs often increase symptoms of anxiety and depression (Hughes et al., 2017), making it more likely that a person will engage in habitual smoking or over-eating as one strategy to manage their individual symptoms (Felitti, 2009; Fuemmeler et al., 2009). Lending support to this theory,



one longitudinal study by Copeland and colleagues (2018) spent over a decade examining the effects of cumulative ACEs on later impairments in a sample of U.S. adolescents ( $n = 1420$ ) and found that greater exposure to harmful adversities during childhood substantially increased an individual's risk of developing a variety of potentially co-occurring mental health disorders related to anxiety, depression, impulsivity, and substance addiction. For many young people, symptoms of these disorders can make the transition from youth to adulthood much more difficult to navigate successfully, especially when these symptoms are combined with other residual effects of childhood adversity, such as poor stress management (Copeland et al., 2018). Considering this point, since a major portion of Americans take their first steps into adulthood on today's college campuses (Arnett, 2000; Kim et al., 2023a), screening for these relationships around childhood adversity and other relevant health risk factors during this time could be an appropriate and sensible way to support the general wellbeing of student populations (Smyth et al., 2008).

Adding to this, in a meta-analysis by Hughes et al. (2017) that examined 37 ACE studies with over 253,000 participants (21 out of 37 studies used a U.S. sample), it was found that, relative to individuals without a history of childhood adversity, people with four or more ACEs were: (1) two-to-three times more likely to report smoking and drinking heavily; (2) three-to-six times more likely to report risky sexual behaviors, mental illness, and problematic alcohol use; and (3) more than seven times more likely to report problematic substance use. Similarly, in another study using 9,673 U.S. adolescents, youth who reported at least four ACEs were 3.1 times more likely to experience problems with video games and 1.6 times more likely to experience problems with their phone usage than participants without any ACE exposure (Raney et al., 2023).

Furthermore, previous research has indicated a consistent connection between childhood maltreatment and problem gambling (Lane et al., 2016). In one study that used a North American community sample ( $N = 1,372$ ), Hodgins et al. (2010) found that problem gamblers reported significantly higher rates of ACEs than nonproblematic gamblers, and that childhood maltreatment predicted higher problem gambling severity levels, even when accounting for other relevant psychosocial factors. These results are consistent with Nower et al.'s revised pathways model of problem gambling (2022) that proposes a specific gambler subtype who has a history of ACEs and tends to have higher levels of anxiety and/or depression than other gamblers without these experiences, which appears to strongly motivate these individuals to participate in gambling habitually as a means to cope with their emotional vulnerabilities.

Nevertheless, an ACE-exposed person's desire to use potentially problematic coping strategies that rely on a particular substance or activity might be further amplified by other contextual factors in their life, such as their gender (Hughes et al., 2017), race or ethnicity (Elkins et al., 2018), loneliness (Özdemir et al., 2014; Tunçturk et al., 2023), and stress (Jang et al., 2022; Karatekin, 2017). Past research has also shown that impulsive behaviors associated with positive and negative urgency are robust predictors of young adults' substance use (Smith & Cyders, 2016), problematic gambling (Rogier et al., 2018; Quintero et al., 2020), problematic video-gaming (Rivero et al., 2023), compulsive shopping, and excessive phone and Internet use (Billieux et al., 2010). Taken together, these findings highlight how people with past childhood adversities might be especially inclined to seek out multiple ways of coping with their past and present stressors. While problematic substance use is generally considered to have a greater potential for harm than problematic behaviors do (Thege et al., 2015; Zou et al., 2017), it is

likely that many individuals exposed to ACEs are seeking out both mood-altering behaviors and substances to manage their day-to-day stress levels and emotional states.

### **Current Study**

To better understand the relationships between childhood adversity, common risk factors for poor health, and significant self-reported behavioral and substance problems amongst today's U.S. college population, this study examined whether there were key differences related to ACEs and other health risk factors across four previously untested groupings of college students: (1) students who reported no previous behavioral problems or substance problems, (2) students who reported previous behavioral problems but no substance problems, (3) students who reported previous substance problems but no behavioral problems, and (4) students who reported both behavioral and substance problems. Despite the expansion of ACE research over the last two decades, few studies have focused on the differential impact of these early life events, while also adjusting for other health risk factors, across these specific groups of U.S. college students in order to identify potential targets for intervention and prevention efforts in these problem areas.

Therefore, the first objective of this study was to examine the extent to which cumulative ACE scores were associated with six common health risk factors (i.e., anxiety, depression, loneliness, negative and positive urgency, and stress) and self-perceived significant problems with 13 different behaviors and substances (i.e., alcohol, cannabis, cocaine, opioids, pharmaceutical drugs, tobacco, gambling, video-gaming, internet use, shopping, over-eating, sex, and work). This study's second objective was to investigate whether there were significant differences related to specific and cumulative ACEs across the four groups of college students categorized according to their general problem type (i.e., no problems, behavioral problems, substance problems, both problems). The third and final objective of this research was to

investigate whether cumulative ACE exposure or the six other health risk factors better predicted which college students were more likely to report significant problems with behaviors, substances, or both.

## **Method**

### **Participants and Procedure**

Participants were recruited for this study from a large public university located in the southwestern region of the U.S. Recruitment was facilitated through an undergraduate psychological participant pool, where undergraduate college students self-selected to participate in an online survey study in exchange for course credit. All participant data was collected between September 8<sup>th</sup>, 2020 and April 26<sup>th</sup>, 2023. The inclusion criteria for the analytic sample in this study specified that all participants were required to meet the following standards: 18+ years old, able to communicate in English, and completed at least 90% of each primary measure in this study. These requirements resulted in a final analytic sample of 1,993 participants after removing 37 participants (1.8%) due to ineligibility.

Overall, the final sample was 64.9% female and had a mean age of 20.38 years ( $SD = 4.59$ ). Moreover, 19.2% of the participants identified as Asian American, 8.5% identified as Black or African American, 22.9% identified as Hispanic or Latin American, 22.4% identified as White or Caucasian American, and 27% identified as “Other” (e.g., Multiracial/Multiethnic, Middle Eastern, Native American). Prior to conducting this research, all components of the study’s experimental design were reviewed and approved by the Social and Behavioral Sciences’ Institutional Review Board at the University of Nevada, Las Vegas (IRB Protocol: 1652946-2).

### **Measures**

#### ***Adverse Childhood Experiences (ACEs)***

The ACE Questionnaire for Adults (California Surgeon General’s Clinical Advisory Committee, 2020) measured whether participants were exposed to 10 categories of early adversity prior to their 18<sup>th</sup> birthday (e.g., “Did you live with anyone who was depressed, mentally ill, or attempted suicide?”). This questionnaire measures 10 categories of childhood adversity: (1) physical neglect, (2) parental divorce, abandonment, or death (3) parental mental illness, (4) parental substance abuse, (5) domestic violence, (6) parental incarceration, (7) emotional abuse, (8) physical abuse, (9) emotional neglect, and (10) sexual abuse. Responses for each item were coded either 0 (*no*) or 1 (*yes*), with aggregate scores ranging from 0 (no ACEs reported) to 10 (all ACEs reported) to reflect a participant’s cumulative childhood adversity exposure. Similar ACE measures have previously shown good construct validity regarding estimating levels of ACE exposure and excellent test-retest reliability in clinical and general populations (Kim et al., 2023b; Zarse et al., 2019). For this study, the internal reliability of the 10 items on the ACE measure was acceptable (Cronbach’s  $\alpha = 0.78$ ).

### ***Impulsivity***

The 20-item Short UPPS-P Impulsive Behavior Scale (SUPPS-P; Lynam, 2013) assessed the severity levels of participants’ impulsive behaviors. This scale includes statements such as, “I tend to lose control when I am in a great mood,” with four response options ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). This instrument measures impulsivity related to five distinct domains: sensation seeking, lack of premeditation, lack of perseverance, negative urgency, and positive urgency. Scores for each subscale were independently summed and averaged; however, for this study, only the subscales for positive and negative urgency were retained since the other subscales did not appear to have consistent significant relationships across the primary variables. This scale has previously demonstrated acceptable reliability and

validity in non-clinical U.S. adult samples (Cyders et al., 2014). For this study, the internal reliability of the SUPPS-P and its subscales ranged from acceptable to good (Cronbach's  $\alpha = 0.77$ – $0.81$ ).

### ***Depression, Anxiety, and Stress***

The 14-item Depression, Anxiety, and Stress Scale (DASS-14; Wise et al., 2017) measured the severity of participants' depressive and anxiety symptoms, as well as their stress levels. Response options for this scale ranged from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*) for all subscales: (1) depression (e.g., "I felt life wasn't worthwhile"), (2) anxiety (e.g., "I found myself in situations that made me so anxious I was most relieved when they ended"), and (3) stress (e.g., "I tended to over-react to situations"). Scores for each subscale were independently summed and averaged. This assessment is a briefer version of the DASS-42 (Lovibond & Lovibond, 1995) and has shown adequate construct validity and internal reliability in adult populations (Lunsky et al., 2021). For this study, the internal reliability of the DASS-14 and its subscales ranged from acceptable to excellent (Cronbach's  $\alpha = 0.71$ – $0.91$ ).

### ***Loneliness***

The 6-item Revised UCLA Loneliness Scale (RULS-6; Wongpakaran et al., 2020) measured the extent of a participant's social connectedness (e.g., "How often do you feel that you lack companionship?"). Response options for this scale ranged from 0 (*never*) to 3 (*often*), and all responses were summed and averaged. Past research has suggested that this shortened version of the 20-item UCLA Loneliness Scale (Russell, 1996) provides a more efficient way to assess this construct in both clinical and non-clinical populations without compromising the

psychometric properties of the longer measure (Wongpakaran et al., 2020). For this study, the internal reliability of the RULS-6 was excellent (Cronbach's  $\alpha = 0.91$ ).

### ***Problematic Behaviors and/or Substance Use***

To identify participants with a history of problematic behaviors, problematic substance use, or both problematic behaviors and substance use, the following question was asked: "Have you ever personally experienced SIGNIFICANT PROBLEMS because of your usage or engagement in any of the following substances and/or behaviors? [List of options: alcohol, cannabis, cocaine, opioids, pharmaceutical drugs (legally obtained or otherwise), tobacco, gambling, video-gaming, compulsive/excessive internet use, compulsive/excessive shopping, over-eating, sex, and work.] Please mark all response options that apply." Responses for each of these items were scored either 0 (*no problem*) or 1 (*significant problem*) to indicate whether a participant reported previously experiencing significant problems with a behavior or substance. This single question was inspired by the excellent work of Kim and colleagues (2020) who examined the shared and distinct indicators of behavioral and substance-based lived experiences in Canadian adults.

### **Data Analysis**

All statistical analyses were conducted using IBM SPSS Statistics, Version 28.0. After determining the final sample, preliminary data-cleaning procedures and key assumption checks for logistic regression analysis were conducted (Harris, 2021). To complete this study's main objectives, we first examined the bivariate associations between cumulative ACE exposure and the six assessed health risk factors. Next, we calculated the bivariate associations between cumulative ACE exposure and significant problems with 13 different substances and behaviors. For the remaining analyses, we grouped participants according to the general type of significant

problem they reported experiencing previously: no behavioral or substance problems (Group 1), behavioral problems only (Group 2), substance problems only (Group 3), or both behavioral and substance problems (Group 4). This was followed by chi-square and analysis of variance (ANOVA) tests that examined the differences between these four groups of college students across the 10 ACE categories and cumulative ACE exposure.

For the multinomial logistic regression model, eight predictor variables—age, cumulative ACEs, anxiety, depression, stress, loneliness, and negative and positive urgency (*all continuous*)—were used to predict which participants were more likely to report: behavioral problems but no substance problems, substance problems but no behavioral problems, or both behavioral and substance problems relative to participants without any significant problems in the measured areas. Initially, this model was tested with two other demographic characteristics: gender and race/ethnicity; however, for a more parsimonious final model, these variables were removed because their absence did not significantly change the predictive power of this analysis. In this model, odds ratios equal to 1.0 indicated levels of the predictor variable were the same for both groups (i.e., people with the specified problem type and people without it). Odd ratios greater than 1.0 signified that increases in the predictor variable increased the likelihood of the specified problem type occurring, while values less than 1.0 signified that increases in the predictor variable led to a decreased likelihood of that problem type occurring. In this study, statistical significance was set at an alpha level of .05 or less.

## **Results**

### **Objective 1: Associations Between Cumulative ACEs, Health Risk Factors, and Problems**

Table 1 shows a correlational matrix of cumulative ACE scores and the six common risk factors for poor health. Cumulative ACE scores had significant positive associations with each of



the health risk factors used in this study, with effect sizes appearing moderate in strength for the non-impulsive risk factors ( $r = .28-.38, p < .001$ ) and small-to-moderate in strength for the two impulsivity variables: positive urgency ( $r = .07, p = .001$ ) and negative urgency ( $r = .17, p < .001$ ). Amongst these associations, cumulative ACEs displayed its strongest bivariate relationship with perceived stress levels ( $r = .38, p < .001$ ), followed by depression and loneliness ( $r = .34, p < .001$ ), and anxiety ( $r = .28, p < .001$ ). Beyond ACE scores, correlations between the other health risk factors were positive and varied from small-to-strong in strength ( $r = .15-.68, p < .001$ ), with depression and stress being the most related in this study. Furthermore, levels of depression and stress, respectively, displayed robust associations with levels of loneliness ( $r = .56-.49, p < .001$ ) and anxiety ( $r = .50-.58, p < .001$ ), as well as moderate associations with both negative urgency ( $r = .35-.29, p < .001$ ) and positive urgency ( $r = .21-.22, p < .001$ ). Negative and positive urgency also had small-to-moderate relationships with loneliness ( $r = .15-.27, p < .001$ ) and anxiety ( $r = .25-.19, p < .001$ ).

Table 2 displays the correlations between cumulative ACE scores and the 13 problem areas involving specific substances or behaviors; prevalence rates for significant problems with each substance and behavior are displayed. Cumulative ACE scores had significant positive associations with 12 out of the 13 problem areas measured in this study, with problematic video-gaming being the one and only exception to this pattern. Effect sizes between cumulative ACEs and the other problem areas ranged from small-to-moderate in strength ( $r = .08-.22, p < .001$ ). In particular, cumulative ACEs were most associated with significant problems involving alcohol ( $r = .22, p < .001$ ), over-eating ( $r = .19, p < .001$ ), and sex ( $r = .19, p < .001$ ), and they were least associated with problems involving cocaine ( $r = .08, p < .001$ ), opioids ( $r = .08, p < .001$ ), and gambling ( $r = .10, p < .001$ ) amongst these college students. Additionally, the most prevalent

problem areas in this sample were with over-eating (20.9%) and internet use (20.4%), followed by alcohol (12.2%), shopping (11.7%), video games (11.1%), sex (10.3%), and cannabis (9.7%); the least prevalent problems were with gambling (2.2%), cocaine (1%), and opioids (0.7%).

### **Objective 2: Group Differences for ACEs By Problem Type**

Table 3 shows the sample's ACE frequencies and the full results of the chi-square and ANOVA tests examining college student differences for specific and cumulative ACEs across four groups: those without any past behavioral or substance problems ( $n = 1,016$ ; 51%), those with past behavioral problems only ( $n = 595$ ; 29.9%), those with past substance problems only ( $n = 124$ ; 6.2%), and those with a history of both types of problems ( $n = 258$ ; 12.9%). In this sample, nearly three-quarters (72.3%) of all participants reported one or more ACE categories ( $M = 2.56$ ,  $SD = 2.44$ ): 14.5% experienced one ACE, 13.6% experienced two ACEs, 12.3% experienced three ACEs, 10.2% experienced four ACEs, and 21.7% experienced five or more ACEs. In addition to this, significant between-group differences were detected for all ACE categories, with the largest differences found for emotional abuse,  $\chi^2(3) = 117.53$ ,  $p < .001$ , sexual abuse,  $\chi^2(3) = 99.12$ ,  $p < .001$ , and emotional neglect,  $\chi^2(3) = 97.84$ ,  $p < .001$ .

Participants who reported both behavioral and substance problems generally demonstrated the highest rates of cumulative and specific ACEs. For the ACE category of parental incarceration, though, it was found that students who reported significant substance problems but no behavioral problems were more likely to have a parent in jail or prison than other college students. Notably, college students that reported no prior problems with behaviors or substances had the lowest levels of all ACE forms, and as these ACE levels increased—both generally and specifically—so did the problems that were reported by participants.

### **Objective 3: Cumulative ACEs and Health Risk Factors Predicting Problem Type**

Table 4 contains a summary of the results for the multinomial logistic regression. This logistic regression model was statistically significant:  $\chi^2(24) = 437.14, p < .001$ . Relative to college students without significant problems involving substances and/or behaviors, college students who reported only behavioral problems were more likely to have higher levels of ACEs ( $OR = 1.08, 95\% CI [1.03, 1.14], p = .002$ ), negative urgency ( $OR = 1.40, 95\% CI [1.16, 1.70], p < .001$ ), anxiety ( $OR = 1.29, 95\% CI [1.03, 1.60], p = .026$ ), stress ( $OR = 1.50, 95\% CI [1.16, 1.93], p = .002$ ), and loneliness ( $OR = 1.27, 95\% CI [1.09, 1.48], p = .003$ ). Moreover, using the same reference group, college students who reported only substance problems were more likely to be older in age ( $OR = 1.08, 95\% CI [1.05, 1.12], p < .001$ ) with higher levels of ACEs ( $OR = 1.16, 95\% CI [1.07, 1.26], p < .001$ ), positive urgency ( $OR = 1.47, 95\% CI [1.06, 2.06], p = .023$ ), depression ( $OR = 1.47, 95\% CI [1.03, 2.10], p = .033$ ), and anxiety ( $OR = 1.56, 95\% CI [1.08, 2.24], p = .011$ ). In the final comparison, relative to college students without significant behavioral and/or substance problems, college students who reported both problem types were more likely to be older ( $OR = 1.08, 95\% CI [1.05, 1.11], p < .001$ ) with even higher levels of ACEs ( $OR = 1.28, 95\% CI [1.20, 1.36], p < .001$ ), negative and positive urgency ( $OR = 1.51, 95\% CI [1.16, 1.97], p = .002$ ;  $OR = 1.82, 95\% CI [1.41, 2.35], p < .001$ , respectively), anxiety ( $OR = 1.83, 95\% CI [1.39, 2.41], p < .001$ ), and stress ( $OR = 1.57, 95\% CI [1.11, 2.22], p = .011$ ).

## Discussion

This study investigated the links between childhood adversity and significant problems with a variety of different behaviors and substances in a large sample of U.S. college students, while also evaluating to what extent common health risk factors were involved in these relationships. Overall, around three out of every four participants in this sample reported at least

one ACE category (72.3%), indicating the current normality of these kinds of childhood experiences amongst American undergraduate students. This prevalence rate is consistent with results from similar research involving U.S. college students (Khrapatina & Berman, 2017 [75.4%]; Merians et al., 2019 [71%]; Watt et al., 2020 [73.7%]), but it is moderately higher than the rates seen in other empirical studies using this population (Brett et al., 2018 [43.5%]; Espeleta et al., 2018 [42%]; Karatekin, 2017 [51%]). To a certain extent, though, some of these inconsistencies may be attributable to the use of multiple ACE screening tools across these different studies.

For this particular sample, the most common forms of childhood adversity reported were emotional abuse, parental mental illness, and parental substance abuse, which is the same pattern that was found by Espeleta and colleagues (2018) using a sample of 668 university students from the Midwest. Nevertheless, since these types of events frequently co-occur with one another, the average cumulative ACE score for most participants in this study was between two and three (out of a total of 10 categories). At higher levels, these cumulative ACE scores clearly elevated the levels of all six health risk factors that were measured in this study, possibly signifying how childhood adversity can have a dose-dependent effect on certain individual's mental and physical health (Felitti et al., 1998; Tan & Mao, 2023). This pattern of results is in line with Felitti's (2009) theory of how childhood adversity often leads to negative health outcomes via the mechanisms of psychopathology and chronic stress, because participants who had higher ACE scores were largely found to be more stressed, more depressed, more anxious, more lonely, and more impulsive than college students without these experiences or those who had fewer of them.

Another important result of this research was that cumulative ACE scores predicted significant problems with all the assessed behaviors and substances except for those related to

playing video games. This result is noteworthy because, amongst these participants, significant problems with video-gaming (11.1%) were more prevalent than problems with sex (10.3%) and almost as prevalent as problems with alcohol (12.2%). Yet, alcohol and sex-related problems were both linked to cumulative ACEs, while video-gaming problems were unable to demonstrate a similar connection. Other studies have previously found significant relationships between cumulative ACEs and problematic gaming behaviors (Grajewski & Dragan, 2020; Kim et al., 2023b), but that result was not replicated in this sample and could suggest there are still parts of this relationship that require further examination in different populations. While one's cumulative ACE exposure was unable to predict significant problems with gaming specifically in this study, each additional ACE that a college student reported was linked to: an 8% increase in their likelihood of reporting behavioral problems, a 16% increase in their likelihood of reporting substance problems, and a 28% increase in their likelihood of reporting both types of problems relative to students without significant problems in these areas.

Beyond the effects of cumulative ACEs, higher levels of negative urgency were linked to a greater likelihood of behavioral problems, as well as both substance and behavioral problems, but not just substance problems by themselves. On the other hand, more positive urgency was associated with more substance problems, as well as both substance and behavioral problems, but not behavioral problems alone. This pattern suggests that college students may be especially prone to behavioral issues when dealing with negative emotional states and to substance issues when dealing with intensely positive emotions. Additionally, the overall levels of depression in the sample were fairly consistent across the study's groupings of students, with students who reported substance problems but no behavioral problems having slightly higher rates of depression symptoms relative to the other groups. In contrast, anxiety was the only other

predictor variable outside of cumulative ACE scores that was shown to be significantly related to all three problem types (i.e., behaviors, substances, or both), which could indicate that symptoms of anxiety are a prime target for reducing some of the general problems that college students are likely to report in these different areas. Although, for certain problem behaviors, this study's results demonstrated that more loneliness and stress are also important risk factors to consider for clinical and university efforts directed at this population.

### **Implications**

This study sought to identify key associations between different forms of childhood adversity, common risk factors for poor health, and self-reported problems with behaviors and substances to assist U.S. colleges and universities with developing more evidence-based responses for addressing unhealthy coping strategies amongst their students. In many ways, this research underscores both the areas of commonality and distinction between general and specific problems with behaviors and substances, as well as the role that childhood adversity might have in these problematic patterns. Because if college students can be taught how to recognize the underlying similarities across different maladaptive coping strategies, it might elevate their awareness enough to prevent these behaviors from further escalation or from even occurring in the first place. After all, if someone is able to make healthy changes in one area of their life, it may help them to recognize their capacity to make additional positive changes in other areas too.

### **Limitations**

There are several limitations to this study that should be considered when interpreting these results. The first limitation of this work is that all participant data was self-reported and treated as cross-sectional, meaning the associations found in this study were considered correlational rather than causal. The second limitation of this study is that all of the data

collection occurred at a single university in the U.S., so these results may not generalize to all college campuses despite the sample's demographic heterogeneity.

Another limitation of this research is that the frequencies of the different problem types were not assessed. Therefore, it is unknown whether some participants experienced isolated problems with certain behaviors or substances, or if these problems were experienced multiple times and more closely resembled the characteristics of an addictive disorder. The fourth limitation of this study was that we did not measure any adulthood adversities or traumatic events, such as traumatic experiences related to the COVID-19 pandemic, which may also be connected to a person's mental health issues and their likelihood of using mood-altering behaviors or substances. A final limitation of this work was that we used a variable-centered approach for identifying specific risk factors for problematic behaviors and substance use instead of using a person-centered approach that would identify subgroups who share similar characteristics.

## **Conclusion**

Nowadays, a student's college experience is often accompanied by extensive exposure to a wide array of potentially habit-forming substances and behaviors—some of which can lead to significant problems for certain individuals. But, prior to this study, it was unclear how cumulative and specific types of childhood adversity were associated with distinct types of problems amongst the current U.S. college population, as well as how other common risk factors for poor health factored into these relationships. With the overall takeaway of this research being that, in many ways, a person's childhood experiences are strongly tied to—if not inseparable from—their later lived experiences and the number of problems they are likely to encounter in their adulthood years.

### Tables for Study 3

**Table 6.1**

*Bivariate Correlations of Primary Variables*

<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
1. Cumulative ACEs	–						
2. Negative urgency	<b>.17</b>	–					
3. Positive urgency	<b>.07</b>	<b>.62</b>	–				
4. Depression	<b>.34</b>	<b>.35</b>	<b>.21</b>	–			
5. Anxiety	<b>.28</b>	<b>.25</b>	<b>.19</b>	<b>.50</b>	–		
6. Stress	<b>.38</b>	<b>.29</b>	<b>.22</b>	<b>.68</b>	<b>.58</b>	–	
7. Loneliness	<b>.34</b>	<b>.27</b>	<b>.15</b>	<b>.56</b>	<b>.33</b>	<b>.49</b>	–
M	2.56	2.24	1.91	0.67	0.48	0.88	1.58
SD	2.44	0.75	0.72	0.75	0.62	0.64	0.85
Skewness	0.82	0.20	0.60	1.20	1.55	0.73	-0.20
Kurtosis	-0.12	-0.61	-0.22	0.72	2.32	0.20	-0.86
Cronbach's $\alpha$	0.78	0.91	0.71	0.82	0.91	0.77	0.81

*Note.* ACE = Adverse childhood experience. All variables were coded so that higher values reflect more of the construct. All correlations were statistically significant.



**Table 6.2***Bivariate Correlations and Prevalence Rates of Problematic Behaviors and Substance Use*

<b>Variable</b>	<b>Problem Prevalence Rate</b>	<b>Cumulative ACEs</b>
Significant problems with:		
1. Over-eating	20.9%	<b><i>r = .19, p &lt; .001</i></b>
2. Internet use	20.4%	<b><i>r = .14, p &lt; .001</i></b>
3. Alcohol	12.2%	<b><i>r = .22, p &lt; .001</i></b>
4. Shopping	11.7%	<b><i>r = .13, p &lt; .001</i></b>
5. Video-gaming	11.1%	<i>r = .03, p = .069</i>
6. Sex	10.3%	<b><i>r = .19, p &lt; .001</i></b>
7. Cannabis	9.7%	<b><i>r = .16, p &lt; .001</i></b>
8. Work	9.4%	<b><i>r = .16, p &lt; .001</i></b>
9. Tobacco	3.9%	<b><i>r = .11, p &lt; .001</i></b>
10. Prescription drugs	2.3%	<b><i>r = .16, p &lt; .001</i></b>
11. Gambling	2.2%	<b><i>r = .10, p &lt; .001</i></b>
12. Cocaine	1%	<b><i>r = .08, p &lt; .001</i></b>
13. Opioids/Opiates	0.7%	<b><i>r = .08, p &lt; .001</i></b>

*Note.* ACE = Adverse childhood experience. All variables were coded so that higher values reflect more of the construct. Bold font signifies statistical significance.

**Table 6.3***ACE Frequencies and Difference Tests by Problem Type*

<b>Variable</b>	<b>Total Sample (N = 1,993)</b>	<b>No Problems (n = 1,016)</b>	<b>Behavioral Problems Only (n = 595)</b>	<b>Substance Problems Only (n = 124)</b>	<b>Behavioral &amp; Substance Problems (n = 258)</b>	<b><math>\chi^2</math></b>
ACE categories:						
Physical neglect	10.5%	6.9%	11.3%	14.5%	20.9% <sup>a</sup>	46.51 <sup>***</sup>
Parental divorce, abandonment, or death	29%	24.5%	30.9%	34.7%	39.5% <sup>a</sup>	26.87 <sup>***</sup>
Parental mental illness	33.8%	25.9%	36.8%	39.5%	55.4% <sup>a</sup>	86.56 <sup>***</sup>
Parental substance abuse	30%	24.2%	28.9%	40.3%	50.4% <sup>a</sup>	74.52 <sup>***</sup>
Domestic violence	19.4%	14.7%	21.3%	23.4%	31.4% <sup>a</sup>	41.06 <sup>***</sup>
Parental incarceration	18.4%	14.7%	20.8%	25.8% <sup>a</sup>	23.6%	21.08 <sup>***</sup>
Emotional abuse	51.7%	40.9%	59%	55.6%	75.2% <sup>a</sup>	117.53 <sup>***</sup>
Physical abuse	27.7%	21.9%	28.9%	33.9%	44.6% <sup>a</sup>	56.25 <sup>***</sup>
Emotional neglect	22%	13.9%	27.1%	26.6%	39.9% <sup>a</sup>	97.84 <sup>***</sup>
Sexual abuse	14.1%	8.5%	14.6%	21.8%	31.8% <sup>a</sup>	99.12 <sup>***</sup>
	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>M</i> (SD)	<i>F</i>
Cumulative ACEs	2.56 (2.44)	1.96 (2.15)	2.80 (2.40)	3.16 (2.75)	4.13 (2.59)	66.34 <sup>***</sup>

*Note.* ACE = Adverse childhood experience. Percentages represent the number of participants reporting ACE category.

\*\*\* =  $p < .001$ .

<sup>a</sup> Highest group prevalence rate for ACE category.

**Table 6.4***Multinomial Logistic Regression Model*

<b>Variables</b>	<b>Behavioral Problems Odds Ratio [95% CI]</b>	<b>Substance Problems Odds Ratio [95% CI]</b>	<b>Both Types of Problems Odds Ratio [95% CI]</b>
Age	1.02 [0.99, 1.04]	<b>1.08 [1.05, 1.12]***</b>	<b>1.08 [1.05, 1.11]***</b>
Cumulative ACEs	<b>1.08 [1.03, 1.14]**</b>	<b>1.16 [1.07, 1.26]***</b>	<b>1.28 [1.20, 1.36]***</b>
Negative urgency	<b>1.40 [1.16, 1.70]***</b>	1.14 [0.81, 1.61]	<b>1.51 [1.16, 1.97]**</b>
Positive urgency	1.10 [0.91, 1.34]	<b>1.47 [1.06, 2.06]*</b>	<b>1.82 [1.41, 2.35]***</b>
Depression	0.95 [0.77, 1.17]	<b>1.47 [1.03, 2.10]*</b>	0.90 [0.68, 1.18]
Anxiety	<b>1.29 [1.03, 1.60]*</b>	<b>1.56 [1.08, 2.24]*</b>	<b>1.83 [1.39, 2.41]***</b>
Stress	<b>1.50 [1.16, 1.93]**</b>	1.09 [0.69, 1.72]	<b>1.57 [1.11, 2.22]*</b>
Loneliness	<b>1.27 [1.09, 1.48]**</b>	0.83 [0.63, 1.09]	1.23 [0.98, 1.55]
Cox & Snell $R^2$	19.7%		
Nagelkerke $R^2$	21.9%		

*Note.* ACE = Adverse childhood experience. The reference group was composed of participants without significant problems; behavior problems, substance problems, and both problem types were mutually exclusive categories. All variables were coded so that higher values reflect more of the construct. Bold font signifies statistical significance.

\* =  $p < .05$ . \*\* =  $p < .01$ . \*\*\* =  $p < .001$ .

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## Chapter 7: Manuscript 3 Summary

In Study 3, we used logistic regression analysis to examine the connections between childhood adversity, common psychosocial risk factors for poor health (including addiction), and significant problems with more than a dozen potentially habit-forming behaviors and substances within a sample of United States college students. Results from this study were largely consistent with past research on adverse childhood experiences (ACEs), showing how these early events frequently have a dose-dependent effect on an individual's later problems or difficulties (Felitti et al., 1998; Felitti, 2009). In particular, for this sample, more childhood adversity was associated with a greater risk of behavioral and substance problems in every category that was measured besides problematic video-gaming. This result could signify how higher levels of ACEs are likely to encourage some individuals to become more reliant on an array of external activities or substances to cope with the long-term effects of these events, which is a pattern that appears to lead to significant problems for many students in this collegiate population. It is possible that ACEs were not linked to problematic video-game behaviors in this sample due to the high rates of involvement that college students have in this activity compared to other older age groups (King & Wong, 2022), as well as the relative normality of childhood adversity amongst these participants. Instead of ACEs being associated with significant gaming problems for U.S. college students, it was more typical to see these events tied to other psychosocial difficulties (e.g., anxiety, stress, and loneliness) and problems with alcohol, sex, and over-eating.

## Chapter 8: Discussion and Implications

Current problems with addiction in the United States (U.S.) have grown beyond the level of any one individual, and the research contained within this dissertation has only scratched its surface. But even just a glimpse at these problems through these studies suggests that a significant portion of Americans are using their relationships with mood-altering behaviors, drugs, and/or consumer items as a consistent coping strategy for managing their emotional states. Now, to be clear, the point of this work is not to argue about whether addictive coping strategies are right or wrong, or even whether or not they are effective over time; the point is to ask why are so many Americans turning to—what Bruce Alexander (2008, p. 29) called—“overwhelming involvement” with substances, activities, and objects rather than people? Is this pattern due to some widespread disease of the human brain that can only be treated by the medical establishment (or punished out of people by the legal system), or is it more likely that these decisions are born out of an opportunistic necessity instead of an intentional desire?

In Study 1, we attempted to answer part of this latter question by testing the role of coping motives, alongside responsible gambling practices, in the relationship between symptoms of posttraumatic stress disorder (PTSD) and problem gambling (PG). With the idea being that people who reported higher symptom levels of PTSD would be more susceptible to participating in gambling as a means of coping with those symptoms, which could also elevate their risk of developing PG and potentially exacerbate their other conditions. Our results from Study 1 confirmed those relationships for a census-matched sample of non-clinical U.S. adults, with no other risk or protective factors besides coping motives demonstrating a substantive effect on those connections.

Furthermore, results from Study 2 extended this examination of coping motives and PTSD symptoms to problematic video-gaming behaviors and paralleled the findings from Study 1. These results are particularly significant to the current IGD literature because few studies have previously examined patterns of problematic video-gaming behaviors within a large, demographically representative U.S. sample. Thus, this work provides a high-quality reference point for future studies working with this population. In addition to that contribution to the larger field, this research is also at the forefront of documenting how PTSD symptoms are related to problematic video-gaming behaviors in the U.S. population and the possible ways to reduce or prevent this relationship from worsening. Future studies in this area might want to consider investigating whether specific game titles or genres are more likely to alleviate or exacerbate PTSD symptoms in certain segments of the country's population, such as veterans.

In this dissertation's final study, we narrowed our focus down to U.S. college students, due to this population's relatively high rates of addiction and mental health problems (Welsh et al., 2019). Along with that change, this study also was distinct from the previous two because, instead of PTSD symptoms, it examined potentially traumatizing adverse childhood experiences (ACEs) and their connection to later psychosocial issues (e.g., depression and loneliness) and a range of addiction problems. In line with the overall trends seen in Studies 1 and 2, the results of Study 3 demonstrated how ACEs appear to have a relationship with an array of addictive patterns in U.S. college students that was similar to the patterns we observed with PTSD symptoms, problematic gambling, and disordered video-gaming in the general population. Further indicating that if we began to look for logical reasons why some people turn to lifestyles of addiction, we often do not have to look very far to find a reasonable explanation for a person's on-going addictive attempts to cope with the discomfort of their own minds. Yet, despite many

of these efforts, even most addicted people eventually realize there are no adequate substitutes for replacing meaningful social connections.

## **Chapter 9: Conclusion**

Most modern-day approaches to addiction problems preach the importance of the biopsychosocial model in understanding and addressing these issues. But in practice, what tends to end up happening is that larger social issues influencing addictive behaviors are ignored and the more manageable biological and psychological symptoms of a single person are targeted. As a consequence of this reality, many individuals who experience significant problems from addiction in the U.S. today never truly get the help they need at home in their communities so they can find healthier long-term alternatives to their learned addictive patterns. In many ways, large-scale social solutions to this country's addiction crisis have never come to fruition because the debates around such policy ideas are usually obscured by the jargon of experts and the profit-incentives inherent within the current tactics of addressing these problems one person at a time via the medical and criminal legal systems. Which is why I ask the reader this: If our past and current methods for treating and preventing addiction have failed to translate into clear decreases in these behaviors over time, at what point do we consider another approach to this problem?



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<https://doi.org/10.1176/appi.focus.20180037>

## Curriculum Vitae

**Anthony King**

[Google Scholar](#) [ResearchGate](#) [Orcid](#)  
[anthony.king@unlv.edu](mailto:anthony.king@unlv.edu)

### Research Interests

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Biopsychosocial factors contributing to substance and behavioral addictions, with an emphasis on developing innovative, evidence-based strategies for combating these disorders in prevention and treatment programs.

### Education

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<b>Doctor of Philosophy (Ph.D.)</b>	2024
University of Nevada, Las Vegas	
Major Area: Brain & Psychological Sciences	
Specialties: Social, Community, & Quantitative Psychology	
<b>Master of Arts (M.A.)</b>	2021
University of Nevada, Las Vegas	
Major Area: Psychology	
<b>Bachelor of Arts (B.A.)</b>	2019
University of Nevada, Las Vegas (UNLV)	
Major Area: Psychology	
Minor Area: Neuroscience	

### Research Awards, Grants, & Contracts

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UNLV Foundation Board of Trustees Fellowship — \$36,000	2024–2025
International Gaming Institute of UNLV — \$5,000	2023–2024
Nevada Department of Health and Human Services — \$5,000	2023–2024
Graduate & Professional Student Association Award — \$1,207	2023
International Gaming Institute of UNLV — \$1,000	2023
Summer Doctoral Research Fellowship — \$7,500	2023
UNLV Foundation Board of Trustees Fellowship — \$36,000	2023–2024
President’s UNLV Foundation Graduate Research Fellowship Nominee	2022–2023
Outstanding Graduate Student Teacher Award Nominee	2022–2023
Student DHHS Scholarship — \$300	2023
UNLV Access Grant — \$2,000	2023
International Gaming Institute of UNLV — \$3,000	2022–2023
Nevada Department of Health and Human Services — \$3,000	2022–2023
Patricia Sastaunik Scholarship — \$2,500	2022–2023
UNLV Psychology Department Certificate of Recognition	2022
Summer Doctoral Research Fellowship — \$7,000	2022
UNLV Access Grant — \$1,000	2022
International Gaming Institute of UNLV — \$3,000	2021–2022

Nevada Department of Health and Human Services — \$3,000	2021–2022
Patricia Sastaunik Scholarship — \$2,500	2021–2022
Summer Session Scholarship — \$2,000	2021
International Gaming Institute of UNLV — \$3,000	2019–2020
Nevada Department of Health and Human Services — \$3,000	2019–2020
International Center for Responsible Gaming — \$500	2019–2020

## **Publications**

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**King, A.,** Wong-Padoongpatt, G., Tong, T., Le, D., & Sim, D. (R&R). Associations between childhood adversity, risk factors for poor health, and significant problems with substances and behaviors amongst U.S. college students. *Journal of Traumatic Stress*.

**King, A.,** Kraus, S., Wong-Padoongpatt, G., & Grubbs, J. (Under review). Can positive play deficits explain the associations between posttraumatic stress symptoms, gambling motives, and problem gambling? Results of a national U.S. sample. *Journal of Gambling Studies*.

**King, A.,** Kraus, S., Wong-Padoongpatt, G., & Grubbs, J. (Under review). Coping and escape motives mediate associations between posttraumatic stress symptoms and video game disorders in U.S. adults. *Computers in Human Behavior*.

Wong-Padoongpatt, G., **King, A.,** & Zane, N. (2024). Culturally competent assessment and treatment of substance use disorders for Asian Americans. In C. Downey & E. Chang (Eds.) *Substance Use Disorders in Underserved Ethnic and Racial Groups: Using Diversity to Help Individuals Thrive* (p. 155-176). American Psychological Association. <https://doi.org/10.1037/0000384-007>

**King, A.,** & Wong-Padoongpatt, G. (2023). Gambling. *Encyclopedia of Child and Adolescent Health within the Reference Module in Biomedical Sciences*, 1–9. <https://doi.org/10.1016/B978-0-12-818872-9.00140-0>

**King, A.,** & Wong-Padoongpatt, G. (2022). Do gamers play for money? A moderated mediation of gaming motives, relative deprivation, and upward mobility. *International Journal of Environmental Research and Public Health*, 19, 15384. <https://doi.org/10.3390/ijerph192215384>

Wong-Padoongpatt, G., Barrita, A., **King, A.,** & Strong, M. (2022). The slow violence of racism on Asian well-being during the COVID-19 pandemic. *Frontiers in Public Health*, 10, 1–15. <https://doi.org/10.3389/fpubh.2022.958999>

Wong-Padoongpatt, G., Barrita, A., & **King, A.** (2022). Everyday racism increase for Asians in the U.S. during the COVID-19 pandemic. *Asian American Journal of Psychology*. Advanced online publication. <https://doi.org/10.1037/aap0000295>

Wong-Padoongpatt, G., Barrita, A., & **King, A.** (2022). Perceived everyday discrimination explains internalized racism during the COVID-19 pandemic among Asians. *Behavioral*

*Medicine*, 48(2), 109–119. <https://doi.org/10.1080/08964289.2021.2015277>

**King, A.**, Wong-Padoongpatt, G., Barrita, A., Phung, D., & Tong, T. (2020). Risk factors of problem gaming and gambling in US emerging adult non-students: The role of loot boxes, microtransactions, and risk-taking. *Issues in Mental Health Nursing*, 41(12), 1063–1075. <https://doi.org/10.1080/01612840.2020.1803461>

Cheng, A., King, B., Barrita, A., **King, A.**, & Wong-Padoongpatt, G. (2020). Asian Americans experience microassaults during the COVID-19 pandemic. *Spectra Undergraduate Research Journal*, 1(1), 56–62. <https://doi.org/10.9741/2766-7227.1004>

## **Invited Conference Presentations & Workshops**

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**King, A.** (2023, November 30<sup>th</sup>). *Adverse Childhood Experiences and Problematic Lived Experiences with Video Gaming, Gambling, and Other Behaviors in U.S. College Students*. Semi-Final Round for the Rebel Grad Slam Graduate College competition [Data Blitz]. University of Nevada, Las Vegas.

**King, A.** (2023, November 29<sup>th</sup>). *Adverse Childhood Experiences and Problematic Lived Experiences with Video Gaming, Gambling, and Other Behaviors in U.S. College Students*. Preliminary Round for the Rebel Grad Slam Graduate College competition [Data Blitz]. University of Nevada, Las Vegas, Virtual.

Barrita, A., **King, A.**, Le, D., Chang, R., Strong, M., & Wong-Padoongpatt, G. (2023, August). Internalized racism impacting Asian Americans during the COVID-19 pandemic. In A. Barrita & G. Wong-Padoongpatt (Co-Chairs), *The Slow Violence of COVID-19 Anti-Asian Hate* [Research symposium]. 2023 Annual national meeting of the American Psychological Association, Washington D.C.

Strong, M., Barrita, A., **King, A.**, Le, D., Chang, R., & Wong-Padoongpatt, G. (2023, August). The slow violence of anti-Asian Racism during the COVID-19 pandemic. In A. Barrita & G. Wong-Padoongpatt (Co-Chairs), *The Slow Violence of COVID-19 Anti-Asian Hate* [Research symposium]. 2023 Annual national meeting of the American Psychological Association, Washington D.C.

Chang, R., Barrita, A., **King, A.**, Le, D., Strong, M., & Wong-Padoongpatt, G. (2023, August). Increase of anti-Asian racial microaggressions during the COVID-19 pandemic. In A. Barrita & G. Wong-Padoongpatt (Co-Chairs), *The Slow Violence of COVID-19 Anti-Asian Hate* [Research symposium]. 2023 Annual national meeting of the American Psychological Association, Washington D.C.

**King, A.**, Kraus, S., & Wong-Padoongpatt, G. (2023, March). *Examining the role of responsible gambling in associations between symptoms of trauma, gambling disorder, and gambling motivations: Results from a nationwide U.S. sample*. Symposium conducted at the 16<sup>th</sup> Annual Nevada State Conference on Problem Gambling (Suncoast Resort-Casino), Las Vegas, Nevada.

- King, A.,** Tong, T., Le, D., Sim, D., Paulsen, A., & Wong-Padoongpatt, G. (2022, May). *Associations between problem gambling and other problematic behavioral patterns in Nevadan college students*. Symposium conducted at the 15<sup>th</sup> Annual Nevada State Conference on Problem Gambling (Suncoast Resort-Casino), Las Vegas, Nevada.
- King, A.** (2022, April). *Problem gambling and its association with other problematic behaviors in Nevadan college students*. Department of Psychology's 2022 Research Fair. University of Nevada, Las Vegas.
- Barrita, A., **King, A.,** Flores, B., Paulsen, A., Galdamez, A., & Wong-Padoongpatt, G. (2021, February). *Racial microaggressions, mental health and substance use: A mediation analysis*. [Research symposium]. 38<sup>th</sup> Annual Winter Roundtable Conference in Psychology and Education. New York, NY, Virtual
- King, A.** (2021, January). *Are gaming and gambling disorders related? Examining the roles of microtransactions, risk-taking, and relative deprivation*. Department of Psychology's 2<sup>nd</sup>-Year Talk Colloquium. University of Nevada, Las Vegas, Virtual.
- King, A.** (2020, November). *Risk factors of problem gaming & gambling in US emerging adults*. The Rebel Grad Slam Graduate College competition [Data Blitz]. University of Nevada, Las Vegas, Virtual.
- King, A.,** & Wong-Padoongpatt, G. (2020, June). *Problem gaming and gambling behaviors of emerging adults: Research update*. Symposium conducted at the 14<sup>th</sup> Annual Nevada State Conference on Problem Gambling, Las Vegas, Nevada. Event canceled due to the COVID-19 pandemic.
- King, A.** (2020, April). *Associations between gaming and gambling behaviors of students and non-students*. Department of Psychology's 1<sup>st</sup>-Year Talk Colloquium. University of Nevada, Las Vegas, Virtual.
- King, A.,** & Wong-Padoongpatt, G. (2019, June). *Ethnic differences in problem gambling for emerging adults*. Symposium conducted at the 13<sup>th</sup> Annual Nevada State Conference on Problem Gambling (Suncoast Resort-Casino), Las Vegas, Nevada.

## **Conference Posters**

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- King, A.,** Tong, T., Le, D., Sim, D., & Wong-Padoongpatt, G. (2024, April 6). *Associations between adverse childhood experiences and significant problems with behaviors and substance use amongst UNLV students*. Graduate & Professional Student Association's Research Forum, Las Vegas, NV.
- King, A.,** Zizumbo, M., Tong, T., Le, D., Sim, D., & Wong-Padoongpatt, G. (2023, December). *Adverse Childhood Experiences and Problematic Lived Experiences with Video Gaming, Gambling, and Other Behaviors in U.S. College Students*. Undergraduate Research Symposium. University of Nevada, Las Vegas.

- King, A.,** Le, D., Barrita, A., Chang, R., Sim, D., Tong, T., & Wong-Padoongpatt, G. (2023, August 3-5). *Do gamers play for money? An analysis of gaming motives, relative deprivation and upward mobility*. 2023 Annual national meeting of the American Psychological Association, Washington D.C.
- Le, D., Sim, D., Tong, T., Chang, R., **King, A.,** Barrita, A., & Wong-Padoongpatt, G. (2023, August 3-5). *Barriers to methadone maintenance treatment: A systematic review*. 2023 Annual national meeting of the American Psychological Association, Washington D.C.
- Le, D., Lim, A., Gaudiane, G., Chang, R., **King, A.,** Barrita, A., & Wong-Padoongpatt, G. (2023, August 3-5). *A mediation of psychological distress, stigma, and methadone maintenance treatment outcome*. 2023 Annual national meeting of the American Psychological Association, Washington D.C.
- Chang, R., Barrita, A., **King, A.,** Strong, M., Le, D., Wong-Padoongpatt, G. (2023, June 25-27). *Slow violence of racism on Asian Americans during COVID-19*. Society for the Psychological Study of Social Issues (SPSSI) Conference, Denver, CO.
- Barrita, A., **King, A.,** Le, D., Chang, R., & Wong-Padoongpatt, G. (2023, May 25-28). *Drugs and racism: Mediation analysis of everyday racism, psychological distress, and the use of substances*. Association for Psychological Science Conference, Washington, D.C.
- King, A.,** Wong-Padoongpatt, G., Kraus, S., & Grubbs, J. B. (2023, May). *Examining the role of responsible gambling in associations between symptoms of trauma, gambling disorder, and gambling motivations: Results from a representative U.S. sample*. [Poster accepted]. 18th Annual International Conference on Gambling & Risk-Taking, Las Vegas, NV.
- King, A.,** Tong, T., Le, D., Sim, D., Barrita, A., Chang, R., & Wong-Padoongpatt, G. (2022, October 9). *Cumulative childhood adversity predicts disordered gambling and psychopathology in college students: Results from a large U.S. sample*. International Center for Responsible Gaming Conference, Las Vegas, NV.
- King, A.,** Tong, T., Sim, D., Strong, M., Barrita, A., Le, D., & Wong-Padoongpatt, G. (2022, June 25). *Adverse childhood experiences predict addictive behavioral patterns in U.S. college students: Video game addiction is the exception*. APA Division 50's Practice of Addiction Psychology Conference. San Diego, California.
- Barrita, A., Ferraris, J., Tong, T., **King, A.,** & Wong-Padoongpatt, G. (2022, June 24-26). *COVID-19, Microaggressions, and Internalized Racism impacting Asian Americans*. Annual national meeting of the Society for the Psychological Study of Social Issues. San Juan, Puerto Rico.
- Barrita, A., Ferraris, J., Tong, T., **King, A.,** & Wong-Padoongpatt, G. (2022, May 26-29). *Everyday Discrimination, Internalized Racism, and COVID-19: Its impact to Asians and Latinx Individuals*. Association for Psychological Science Convention. Chicago, Illinois.



- King, A.,** Tong, T., Cheung, D., Sim, D., Barrita, A., & Wong-Padoongpatt, G. (2021, August 12-14). *Risk factors of problem gaming and gambling in US emerging adult non-students*. The American Psychological Association conference. Virtual.
- King, A.,** Tong, T., Cheung, D., Sim, D., Barrita, A., & Wong-Padoongpatt, G. (2021, April 28-30). *Risk factors of problem gaming and gambling in US emerging adult non-students*. The Western Psychological Association conference. Virtual.
- Barrita, A., Vierra, K., Cabrera-Martinez, L., Tong, T., **King, A.,** Patriana, Z., & Wong-Padoongpatt, G. (2021, April 28–30). *POC coping discrimination with drugs and alcohol: A mediation study of poor mental health in racial minorities*. The Western Psychological Association conference. Virtual.
- King, A.,** Barrita, A., Tong, T., Cheung, D., Sim, D., & Wong-Padoongpatt, G. (2021, April 2-3). *The convergence of video gaming and gambling: Implications for mental health in the US*. The 23rd Annual Graduate and Professional Student Association conference. Virtual.
- King, A.,** Tong, T., Cheung, D., Barrita, A., & Wong-Padoongpatt, G. (2021, March 17–19). *The role of relative deprivation in video gaming disorders of US emerging adults*. Collaborative Perspectives on Addictions Conference. Division 50 of American Psychological Association. Virtual.
- Tong, T., **King, A.,** Cheung, D., Barrita, A., & Wong-Padoongpatt, G. (2021, March 17–19). *The role of subjective social status in substance use during emerging adulthood*. Collaborative Perspectives on Addictions Conference. Division 50 of American Psychological Association. Virtual.
- Cheung, D., **King, A.,** Tong, T., Barrita, A., & Wong-Padoongpatt, G. (2021, March 19). *The links between problematic video gaming and gambling in US college students*. Collaborative Perspectives on Addictions Conference. Division 50 of American Psychological Association. Virtual.
- King, A.,** Barrita, A., Tong, T., Cheung, D., Garcia-Leon, J., & Wong-Padoongpatt, G. (2020, October). *Risk factors of problem gaming and gambling in US emerging adult non-students: The role of loot boxes, microtransactions, and risk-taking*. Poster presented at the annual conference for the International Center for Responsible Gaming, Las Vegas, NV, Virtual.
- Chung, A., Mendez, A., Cabrera-Martinez, L., Patriana, Z., King, B., Barrita, A., **King, A.,** & Wong-Padoongpatt, G. (2020, October). *Asian Americans experience greater microassaults during the 2020 Covid-19 Pandemic*. Poster presented at the 2020 Asian American Psychological Association Conference, Virtual.
- King, A.,** Barrita, A., & Wong-Padoongpatt, G. (2020, August). *The links between problem gambling and video gaming in emerging adulthood: An examination of US students and*

*non-students*. Poster presented at the annual American Psychological Association conference, Washington, D.C., Virtual.

Barrita, A., **King, A.**, & Wong-Padoongpatt, G. (2020, August). *Discrepancy in self-esteem, the hidden weapon behind microaggressions*. Poster presented at the annual conference for the American Psychological Association, Washington, D.C., Virtual.

**King, A.**, & Wong-Padoongpatt, G. (2019, October). *Links between video game addiction and problem gambling*. Poster presented at the annual meeting of the National Center for Responsible Gaming Institute, Las Vegas, NV.

## Professional Affiliations

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Student member of the American Psychological Society	2017–Present
Student member of the American Psychological Association (APA).	2018–Present
Student member of the Society of Addiction Psychology, APA Division 50	2020–Present
Rutgers University Book Reviewer	2020–Present
<i>Journal of Gambling Studies</i> Reviewer	2019–Present
<i>Economic Horizons</i> Reviewer	2023–Present
<i>Journal of Psychiatric Research</i> Reviewer	2019–Present

## Teaching Experience

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<b>Instructor on Record</b>	Spring 2024
Undergraduate Courses: <b><u>Foundations of Social Psychology</u></b> (1 section)	
<b>Instructor on Record</b>	Fall 2023
Undergraduate Courses: <b><u>Foundations of Social Psychology</u></b> (1 section)	
<b>Instructor on Record</b>	Spring 2023
Undergraduate Courses: <b><u>Foundations of Social Psychology</u></b> (2 sections)	
<b>Instructor on Record</b>	Fall 2022
Undergraduate Courses: <b><u>Foundations of Social Psychology</u></b> (2 sections)	
<b>Instructor on Record</b>	Spring 2022
Undergraduate Courses: <b><u>General Psychology</u></b> (2 sections)	
<b>Instructor on Record</b>	Fall 2021
Undergraduate Courses: <b><u>General Psychology</u></b> (2 sections)	
<b>Instructor on Record</b>	Summer 2020
Undergraduate Courses: <b><u>General Psychology</u></b> (1 section)	
<b>Teaching Assistant</b> for Dr. Gloria Wong-Padoongpatt	2019–2021
Undergraduate Courses: <b><u>Research Methods</u></b> (6 sections)	
<b><u>Multicultural Psychology</u></b> (2 sections)	

## University & Departmental Service

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<b>Graduate Student Mentor</b>	2019–Present
UNLV Outreach Undergraduate Mentoring Program	
<u>List of Mentees:</u>	
Danielle Le—Attending USC’s Master of Social Work program	
Ting Tong—Attending University of Washington’s Master of Social Work program	

Danny Phung—Completed University of Nevada, Reno’s Master of Counseling program  
 Alexandra Mendez—Completed UNLV’s Master of Social Work program  
 Lianelys Cabrera-Martinez—Attending OSU’s Psychology Doctoral program  
 Brooklyn King—Current mentee applying to Neuroscience Doctoral programs  
 Donna Sim—Attending Northwestern University’s Master of Counseling program  
 Britney Henderson—Current mentee applying to Clinical Psychology Doctoral programs  
 Maleah Zizumbo—Current mentee applying to Clinical Psychology Doctoral programs  
 Nadiyah Pratt—Current mentee applying to Master of Social Work programs  
 Alex Segura—Current mentee applying to Master of Counseling programs

<b>Graduate Student Representative</b>	<i>2018–Present</i>
UNLV Phi Kappa Phi Honor Society	
<b>Graduate Student Representative</b>	<i>2018–Present</i>
UNLV Psi Chi Honor Society	
<b>Psi Chi and Psychology Club Experimental Graduate Liaison</b>	<i>2020–2021</i>
UNLV Experimental Psychology Department	
<b>Secretary and Treasurer</b>	<i>2020–2021</i>
UNLV Experimental Student Committee	

## References

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**Gloria Wong-Padoongpatt, Ph.D.**  
 Assistant Professor  
*Department of Psychology*  
 University of Nevada, Las Vegas  
 4505 S. Maryland Pkwy. (Mail code 5030)  
 Las Vegas, NV 89154  
[gloria.wong@unlv.edu](mailto:gloria.wong@unlv.edu)

**Shane W. Kraus, Ph.D.**  
 Assistant Professor  
*Department of Psychology*  
 University of Nevada, Las Vegas  
 4505 S. Maryland Pkwy. (Mail code 5030)  
 Las Vegas, NV 89154  
[shane.kraus@unlv.edu](mailto:shane.kraus@unlv.edu)

**Brett Abarbanel, Ph.D.**  
 Executive Director  
*International Gaming Institute*  
 University of Nevada, Las Vegas  
 4505 S. Maryland Pkwy. (Mail code 6037)  
 Las Vegas, NV 89154  
[brett.abarbanel@unlv.edu](mailto:brett.abarbanel@unlv.edu)

**Colleen M. Parks, Ph.D.**  
 Associate Professor  
*Department of Psychology*  
 University of Nevada, Las Vegas  
 4505 S. Maryland Pkwy. (Mail code 5030)  
 Las Vegas, NV 89154  
[colleen.parks@unlv.edu](mailto:colleen.parks@unlv.edu)

**Mark Padoongpatt, Ph.D.**  
 Associate Professor  
*Department of Interdisciplinary Studies*  
 University of Nevada, Las Vegas  
 4505 S. Maryland Pkwy. (Mail code 5027)  
 Las Vegas, NV 89154  
[mark.padoongpatt@unlv.edu](mailto:mark.padoongpatt@unlv.edu)

**Gabriel Allred, Ph.D.**  
 Entrepreneur and Professor  
*Department of Psychological Science*  
 University of Arkansas  
 216 Memorial Hall  
 Fayetteville, AR 72701  
[gallred@uark.edu](mailto:gallred@uark.edu)