2018

Recognizing addictive disorders through transdiagnostic assessment

Meagan M. Carr

Recognizing Addictive Disorders Through Transdiagnostic Assessment

by

Meagan M. Carr

Dissertation

Submitted to the College of Arts & Sciences

Eastern Michigan University

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Psychology

Dissertation Committee:

Karen Saules, Ph.D., Chair

David Ledgerwood, Ph.D.

Tamara Loverich, Ph.D.

Angela Staples, Ph.D.

September 21, 2018

Ypsilanti, Michigan

Dedication

I would like to dedicate this work to my family—Madeline, Erin, Jill, Ed, and my Father. Their support, in all manners—instrumental, practical, emotional, and inspirational—has made this project and everything else possible.

Acknowledgments

Abstract

Some evidence suggests high rates of comorbidity between substance and other related addictive disorders. However, few self-report instruments adopt a transdiagnostic approach, which would be best positioned to answer questions about comorbidity as well as other related phenomenon, such as discontinuation of one type of behavior and initiation of another. The current work aimed to develop a measure that screened for seven types of potentially addictive behavior: alcohol use, drug use, tobacco use, gambling, binge eating, hypersexual behavior, and excessive video game playing. Data were collected at three time-points to develop a large pool of possible items, establish the initial factor structure and reduce the total item pool to 35 items, and confirm the factor structure as well as examine support for reliability and validity. Initial results provided some support for the purported factor structure, though some problems with fit were evident. Subsequent validation with an independent sample, provided strong support for the measure, including evidence of excellent fit for the factor structure and excellent internal consistency reliability. The measure was also positively correlated with several associated constructs, including depression, anxiety, trauma, and emotion dysregulation. Differences in the magnitude of the correlation between subscales and associated constructs were also evident. Overall, the evidence supports use of the instrument as a continuous measure of addictive behaviors. Future research is warranted to understand the validity of the measure in clinical samples and examine the accuracy for detecting with sensitivity and specificity those who do and do not meet criteria for a substance or other related addictive disorder.

Table of Contents

List of Tables

List of Figures

Literature Review

Addiction Syndrome

Existing etiologic models for addiction differ in the extent to which they attempt to explain the many different forms addiction can take. The addiction syndrome model is explicit in its aim to describe and explain the entire multitude of addictive behaviors that are observed (Shaffer et al., 2004). As the name indicates, the central tenet of the model is that addiction is a syndrome or composed of a cluster of signs and symptoms with a common etiology (Kendler, Jacobson, Prescott, & Neale, 2003). Kendler et al., (2003) further state that these symptoms are inter-related and follow a distinct temporal progression. As defined by Shaffer (2004) as well as others (e.g., Widiger, 1991), syndromes are also polythetic, wherein all signs and symptoms do not need to be present to signal the presence of the syndrome. Finally, syndromal conditions have both shared and unique elements. It is notable that the model, while unique in its application, does not necessarily present new information. For example, Shaffer, LaPlante, and Nelson's (2012) description of repeated paired interactions between the object and the individual, resulting in a desirable subjective shift, describes what has been written about and defined in terms of operant conditioning more than five decades ago (e.g., Wikler, 1948). Furthermore, existing models such as the reformulated negative reinforcement model both describe this phenomenon and provide significantly more detail regarding the actual mechanisms of this process (Baker et al., 2004). Nonetheless, the addiction syndrome model is noteworthy for its comprehensive description of the stages of addiction as well as its potential application to a wide range of addictions.

The model broadly includes three major elements: the distal antecedents; the premorbid phase; and the expressions, manifestations, and sequelae of the syndrome (see Figure 1).

A   B   C
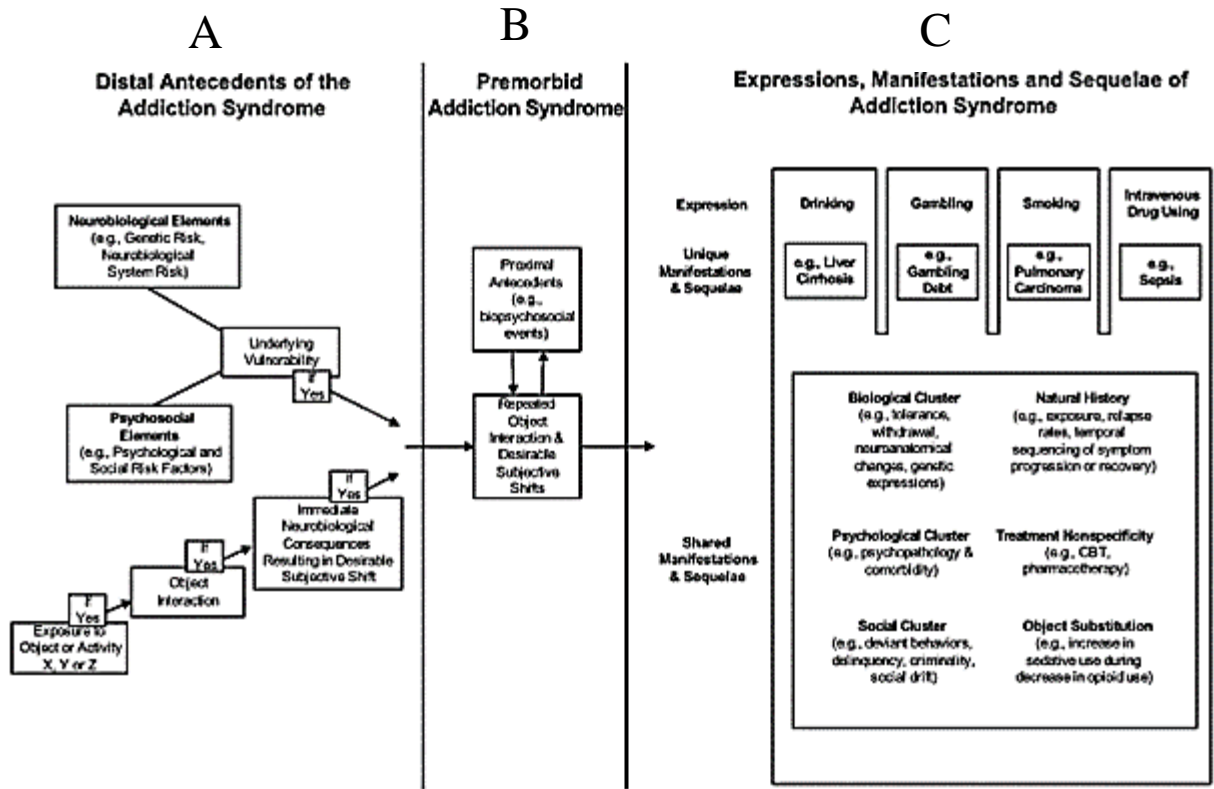
Figure 1. Model of addiction syndrome. Adapted from: "Toward a syndrome model of addiction: Multiple manifestations, common etiology" by Shaffer, LaPlante, LaBrie, Kidman, Donato, & Stanton, 2004, Harvard Review of Psychiatry, 12, p. 368 *Addiction Syndrome Model*.

The distal antecedents can be grouped into three broad categories (see part A of Figure1). The

first category, neurobiological elements, includes characteristics within the individual that are

biologically mediated and place an individual at risk for addiction (Shaffer et al., 2012). The

second category, psychosocial elements, is also thought to play a central role. Like

neurobiological factors, this is a broad category with imprecise boundaries—it includes elements

such as early exposure to substances, childhood trauma, and broader sociocultural factors. The

final component of the distal antecedents describes exposure and interactions with the object,

with the associated immediate neurobiological changes. Such changes are highly complex and

involve multiple interacting systems. Broadly, research largely demonstrates that those behaviors

and drugs of abuse share a common mechanism of action by which they activate the reward system in the brain (Grant, Schreiber, & Harvanko, 2012). This activation is often related to the release of dopamine, a neurotransmitter that increases the salience of stimuli and influences motivated behavior (Smith & Robbins, 2013). In light of this, the repeated pairings causing a desirable subjective shift can be understood as a potential mechanism by which the objects of addiction become increasingly important in an individual's life to the exclusion of other behaviors (Martin & Petry, 2005).

Importantly, the repeated pairings of the object and the associated subjective desirable shift is thought to serve as both a distal and proximal antecedent (see part B of Figure 1). In addressing the role of interacting with the object and the desirable subjective shift, Shaffer et al. (2004) state that when "the neurobiological or social consequences of these interactions produce a desirable shift that is reliable and robust, the premorbid stage of the addiction syndrome emerges" (p. xiv). To date, no empirical or theoretical work could be identified that further explains or differentiates this process during these two distinct phases. In general, the premorbid phase of addiction can be understood as describing individuals who are experiencing those repeated pairings but do not yet manifest symptoms or consequences related to the syndrome. Shaffer and other proponents of the model (e.g., Lawrence et al., 2009; Morahan-Martin, 2008) argue that although a significant number of distal risk factors have been identified and studied, little is known about the proximal setting events. In addition, a strong argument could be made that few risk factors have been identified in forms of addiction that are less widely studied. Identification of risk factors requires longitudinal research, which is lacking in certain forms of behavioral addiction, such as hypersexual disorder or internet gaming disorder.

   The final piece of the model considers the symptoms and consequences associated with addiction syndrome (see part C of Figure 1). It further divides symptoms and consequences into those that are shared across addiction forms and those that are unique to specific addiction presentations. In a later chapter in the *APA Addiction Syndrome Handbook,* Burhringer, Kraplin, and Behrendt (2012) acknowledge the difficulty in distinguishing between these related features of the disease. Frequently, symptoms include those behaviors outlined in the American Psychiatric Association's (APA) Diagnostic and Statistical Manual of Mental Disorders 5th edition (*DSM*-5; APA, 2013) and consequences include sociological, psychological, and medical factors that have been documented to occur in individuals diagnosed with the condition. It is often the consequences, observed reliably across so many different forms of addiction, that initiate discussion related to the potential commonality in these conditions. In general, the addiction syndrome model is a useful tool for conceptualizing and understanding how disparate forms of addiction may be related.

   The current work considered seven substance and other related addictive disorders (SRADs)—alcohol use disorders, drug use disorders, tobacco use disorders, gambling disorder, binge eating disorder, hypersexual disorder, and internet gaming disorder within the conceptual framework of the syndromal view of addiction. Importantly, there is not consensus that each of these presentations are best conceptualized as a form of addiction. For example, binge eating disorder is not currently considered a form of SRAD and instead is conceptualized as a feeding and eating disorder. In the course of measurement development, an important aim of the current work is to explore if these disparate conditions do in fact share some common features that discriminate well between those with and without the condition.

Behavioral Addictions

      Definition and controversies. Currently, no consensus exists delineating those behaviors that may or may not have the potential to represent behavioral addiction. A brief review of the literature reveals at least 11 behaviors that several authors (or more) have argued represent behavioral addiction. The lack of consensus unsurprisingly stems from an absence of agreed-upon diagnostic criteria. Goodman (1990) represents one of the earliest attempts to operationalize addiction processes that are common to both drugs of abuse and maladaptive behaviors. Goodman's criteria were initially based on *DSM*-III criteria of psychoactive substance dependence (see Table 1 in Appendix A). However, the criteria were expanded in several important ways. For example, Goodman writes about an increasing sense of tension immediately prior to engaging in a specified behavior. In contrast, the majority of contemporary addiction classification systems do not include this concept explicitly. The tension-reduction hypothesis was first proposed by Conger (1956), but the support related to its construct validity was largely inconsistent, and the concept has generally fallen out of favor (Young, Oei, & Knight, 1990). More recent work, however, has investigated the potential mediating role of expectancies. For example, in a study of drinking motives and expectancies, the expectation of tension reduction was associated with higher levels of alcohol use, after controlling for other salient motives such as drinking to cope (Kuntsche, Knibbe, Engels, & Gmel, 2007). In contrast, many of the other symptoms are quite similar to the conceptualization widely adopted today, including engaging in a behavior over a longer period of time than was intended; repeated efforts to reduce, control, or stop the behavior; spending a great deal of time related to the behavior; social, academic, or occupational problems related to the behavior; and tolerance. Goodman's work represents an

early exploration related to the possibility of addiction in the absence of ingestion of a psychoactive substance and bears some similarities to more recent work.

The *DSM-5*'s expansion of the substance use disorders (SUDs) to SRAD also includes an explication of criteria to define a type of behavioral addiction—gambling. Under this nosology, gambling disorder shares many common criteria with the other SUDs. This approach arguably has advantages and disadvantages. In line with the AS model, this conceptualization highlights the phenomenological similarities between gambling disorders and SUDs. The general tendency to utilize the *DSM-5* criteria as the benchmark for defining and recognizing behavioral addiction is not unique to gambling disorder. In fact, this same approach has also been utilized in studies of food addiction (Gearhardt, Corbin, & Brownell, 2016) and hypersexual disorder (Reid et al., 2012). In addition, as the *DSM-5* is one of the most widely utilized resources in both clinical and research settings, relying on these classification systems allows for more standardized language and operationalization, which generalizes research and ultimately may promote improvements in clinical care.

Despite the change in the recent edition of the *DSM*, the topic of behavioral addiction remains controversial. In a critical essay, Billieux, Schimmenti, Khazaal, Maurage, and Heeren (2015) present several well-reasoned arguments highlighting potential problems with research surrounding behavioral addictions. The authors centrally argue that much of the research related to behavioral addictions is confirmatory and atheoretical (Billieux et al., 2015). Confirmatory specifically refers to the potential for many measures to represent circular reasoning, where substance use disorder criteria are applied as criteria for a novel behavior. Subsequent endorsement of these criteria is then utilized as evidence that these conditions represent a form of addiction. The authors present a particularly extreme example in which authors developed a

measure for addiction to Argentinean Tango (Targhetta, Nalpas, & Perney, 2013). However, the authors also argue that such a confirmatory approach extends to other areas of research, such as risk factors and associated personality traits. For example, studies of risk factors in behavioral addiction extensively focus on those risk factors identified in the SUDs to the exclusion of other factors. While this is certainly true in the studies reviewed by the authors, notable exceptions are readily available. For example, research into binge eating disorder often investigates risk factors common to eating disorders as well as SUDs (Striegel-Moore et al., 2007). Nonetheless, the general commentary on confirmatory approaches is well-founded and must be considered in the interpretation of data relevant to this project and future research.

Additionally, the general trajectory of diagnostic constructs must be considered. Initial research into an area often involves cross-sectional samples with designs that confirm hypotheses, without strong alternative hypotheses. This is a necessary step in moving the field forward to more complex designs. In particular, experimental evidence may be less subject to confirmatory bias. For example, brain imaging research demonstrating similarities between drug taking and ingestion of highly palatable food does not exclude the potential for activation in other areas, unrelated to drug taking. Beyond experimental research, as continued interest and funding in specific diagnostic categories continue to grow, additional attention and resources can be allocated to exploring the interrelationships among diagnostic classes and alternative pathogenic theories. For example, in a study utilizing latent class analyses, Deleuze et al. (2015) argue that certain behaviors such as excessive eating and excessive internet use are more closely related to emotion regulation processes rather than addictive processes. With regard to the authors' assertion that much of the research into behavioral addictions is atheoretical, this seems antithetical to their previous assertion of circular reasoning. That is, the majority of research in

this area is based on existing theories of SUDs, which have robust support in a literature base

that spans many decades. It follows, then, that a significant reason that individuals adopt *DSM*-5

criteria despite possible shortcomings is that such criteria are based on countless field trials and

represent a significant consensus among many leaders in the field.

While issues of confirmatory bias and atheoretical research represent the authors'

primary arguments, additional concerns are provided. For example, the authors assert that the

research, at this time, does not support either significant functional impairment or temporal

stability. Again, the evidence in support of these claims is mixed. In particular, a majority of

authors would agree that the defining feature of conditions labeled behavioral addiction is that

these conditions are associated with very significant levels of distress and impairment (Hodgins,

Stea, & Grant, 2011; Kaplan & Krueger, 2010; Petry, 2015; Rehbein et al., 2010; Schulte et al.,

2015). There is, however, varying quality in the evidence presented. For example, a number of

authors cite seizures as possibly linked to excessive video game playing (Chuang, 2006;

Demetrovics & Griffiths, 2012; Liu & Peng, 2009; Petry, Rehbein, et al., 2014). However, a

closer examination of the evidence reveals that this claim is often based on a single study of 10

individuals, of whom 80% experienced a seizure prior to the onset of seizures related to video

game playing. With respect to temporal stability, the evidence is also equivocal. For example, in

one of the only longitudinal studies exploring a range of addictive disorders, the authors found

that the overwhelming majority of the sample reported a behavioral addiction at only a single

time-point (Konkolÿ Thege, Woodin, Hodgins, & Williams, 2015). In studies of gambling

disorder and binge eating disorder evidence of a transient course has been reported (Fairburn et

al., 2000; Slutske, 2006) as well as a more chronic course (Hudson, Hiripi, Pope, & Kessler,

2007; Hudson et al., 2006; Sartor et al., 2007). In considering hypersexual disorder or internet

gaming disorder, there is not yet enough evidence to comment on course. As such, continued attention to methodologically rigorous studies demonstrating functional impairment, as well as longitudinal research exploring course, is appropriate. The final significant argument expressed by Billieux et al. (2015), as well as others (e.g., Mihordin, 2012), concerns the proliferation of conditions termed behavioral addictions, without a substantial evidence base. This criticism is relatively subjective; however, the authors present data related to the highly significant increase in the number of publications in the last 5 years related to the construct of behavioral addiction (see Figure 2). However, in an attempt the replicate and update this finding, it became clear that the authors failed to use exact search terms, and these results instead represent any articles that have the word "behavioral" and the word "addiction" in them, not necessarily the two words together. A new search was conducted that included the following terms: (["behavioral addiction"] OR ["behavioural addiction"] OR ["Compulsive buying"] OR ["internet addiction"] OR ["binge eating disorder" AND "addiction"] OR ["gambling disorder"] OR ["pathological gambling"] OR ["Hypersexual disorder"] OR ["Compulsive sexual behavior"] OR ["Video-game addiction"] OR ["Pathological video gaming"] OR ["Tanning addiction"] OR ["Exercise Addiction"] OR ["Compulsive exercise"] OR ["binge eating" AND "substance use disorder"]). The results are presented in Figure 3. Importantly, the search does not represent and exhaustive list and instead is intended to capture a majority of research utilizing terminology common to the literature base. In general, there is a significant upward trend in publishing. However, it is also very evident that the data presented in the original figure is very likely strongly misleading.
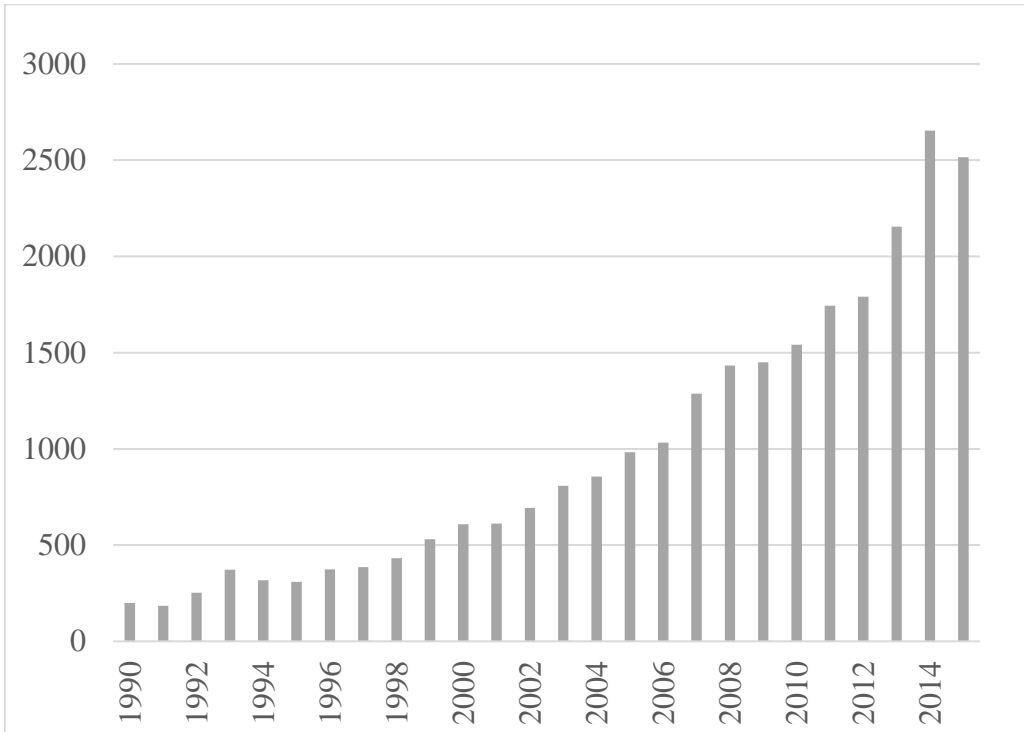
Figure 2. Billieux et al. (2015) publishing trends in behavioral addiction
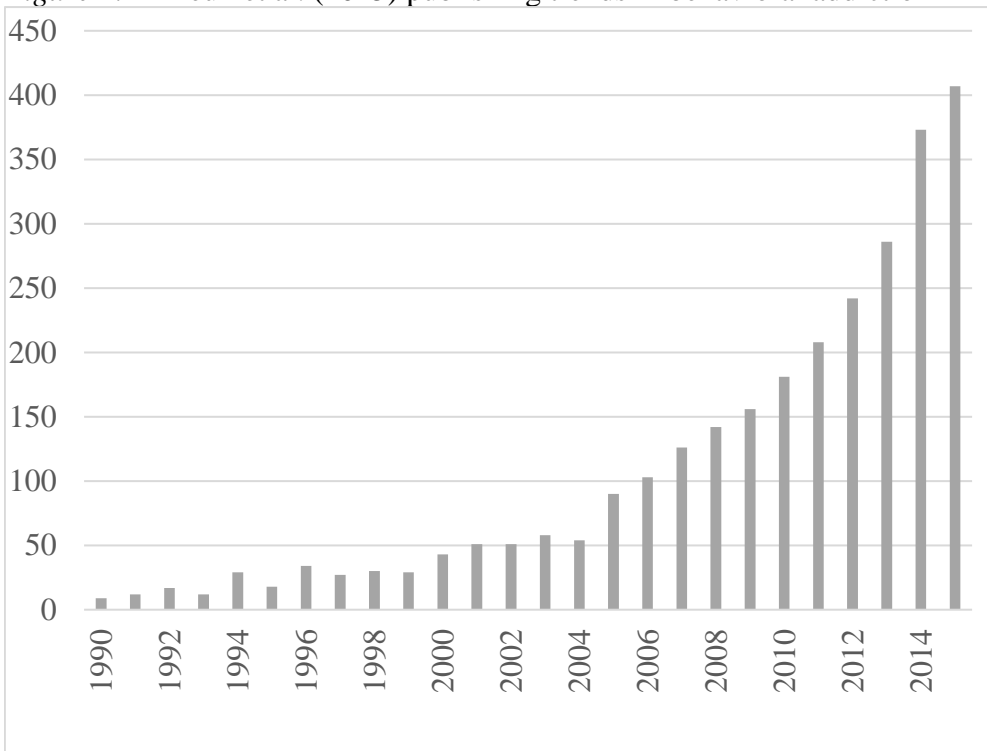
Figure 3. Corrected search for publishing trends in behavioral addiction

Identifying Addiction

Understanding the interrelationships between SUDs and the conditions understood as behavioral addiction is complex. Based on the AS model, one could examine neurobiological and psychosocial factors that put an individual at risk or one or multiple of these conditions. Additionally, researchers could investigate potential, common mechanisms of action, where ingestion of a substance and engagement in a behavior result in similar neurophysiological, psychological, and behavioral changes. Finally, one could investigate the symptoms or sequelae of the condition. In theory, evidence in any of these domains (risk factors, mechanisms of action, and expression of disease) can contribute to accurately identifying addiction within a broad context of behaviors and substances. However, identification of psychiatric conditions is principally based on symptom expression. This is pervasive in the field of psychiatry/psychology and disparate from other types of disease in which biological markers and objective laboratory tests aid in diagnosis. The relative merits of this approach have been ardently debated (Lance & Vandenberg, 2009; Phillips et al., 2012; Whitaker & Cosgrove, 2015), and there are many within the psychiatric community who would like to move towards identifying and utilizing biological markers in the process of psychiatric diagnosing (Insel et al., 2010). However, evidence related to absolute biological markers remains highly elusive (Martins-De-Souza, 2013), and the majority of research and clinical work continues to rely on ratings of symptoms, either by self-report, interview, or observer report. In line with this, the current work aims to develop a measure that assesses symptom expression by self-report. While there are limitations inherent in this approach, such as introduction of social-desirability bias (van de Mortel, 2008), advantages are also clear; assessing symptom expression is inexpensive, rapid, and has demonstrated validity

and reliability in a number of samples and settings, including studies of drug and alcohol consumption (Del Boca & Noll, 2000).

The *DSM*-5, while not an assessment tool per se, represents one of the most widely utilized resources for diagnosis based on symptom expression. As such, evidence supporting or disconfirming *DSM*-5 criteria will serve as the benchmark for the current work. In particular, items will be developed with the aim of capturing *DSM*-5 criteria for all conditions of interest. However, the field of inquiry is necessarily narrowed further for two reasons. First, as the intention of the current work is to develop a screening tool for a range of addictive disorders, the investigation of 11 criteria for seven addictive disorders would be inappropriate. Second, a literature review of 11 criteria for the seven addictive disorders is beyond the scope of the current work. As such, only a subset of criteria will be considered. A number of methods seem plausible for identifying such a subset; one could identify criteria based on an understanding of core features of addiction as identified by experts. For example, many authors argue about the centrality of tolerance and withdrawal in the addictive process (e.g., Baker et al., 2004). However, unanimity related to core constructs is likely unattainable, and this ultimately represents a subjective approach. In contrast, a review of empirical data exploring utility of each criterion to correctly identify individuals with and without an addictive disorder is more objective. Here, the work of Hasin et al. (2013) is invaluable. In preparation for the publication of the *DSM*-5, the substance-related disorders work group aggregated data from 39 studies for a pooled sample of over 34,000 people. The authors specifically focused on item-response theory (IRT) data, which explores the discriminative properties of each criterion in studies of alcohol use disorders. Table 2 presents a summary of their findings.

For the purposes of this work, two columns are of particular interest: severity and discrimination. Severity refers to the level of the criterion that is associated with transitioning from having the condition and not having the condition. Discrimination refers to the degree to which a criterion unambiguously classifies an individual with and without the condition (DeVellis, 2013). For this work, items that demonstrate a high level of discrimination and some variability with regard to severity are ideal. Based on the pooled sample, the four criteria with the highest level of discrimination and some variability with respect to severity include: (a) physical or psychological problems, (b) social and interpersonal problems, (c) neglecting major roles, and (d) activities given up. However, a majority of these criteria demonstrated moderate to high levels of severity (in rank order for the 11 criteria, these represent the fifth, ninth, tenth, and eleventh most severe criteria). As such, the criterion of using the substance in larger amounts or over longer periods of time than was intended was also included, which represents the criterion with the lowest difficulty, while still demonstrating relatively strong discrimination. These five criteria, hereafter referred to as the *DSM*-5 criteria of interest, will serve as the basis for the proposed screening tools across the seven conditions of interest.

Review of Seven Substance and Behavioral Addictions

In the section that follows seven addictive disorders will be considered: alcohol use disorders, drug use disorders, tobacco use disorders, gambling disorder, binge eating disorder, hypersexual disorder, and internet gaming disorder. In the course of the review, five areas of evidence will be considered: (a) diagnostic criteria; (b) prevalence; (c) evidence of clinically significant distress and impairment; (d) onset and course; and (e) the evidence if available, related to the five criteria of interest—using a larger amount or over a longer period of time than

was intended, physical or psychological problems, social or interpersonal problems, neglecting major roles, and giving up activities.

Alcohol use disorders. Alcohol use disorders (AUDs) have been defined differently in many of the succeeding versions of the *DSM*-5. In its first two editions, the *DSM*-5 included alcoholism as a personality disorder (Ray, Courtney, & Bacio, 2008). When the third edition was published, the nomenclature shifted to reflect the disorder as independent from personality pathology and as possessing two distinct syndromal levels—abuse and dependence. Abuse was said to occur when an individual experienced social and interpersonal consequences because of their use (Hasin et al., 2013). Alternatively, dependence occurs when physiological indicators of prolonged and heavy use are present (e.g., increased tolerance). However, significant limitations associated with this classification have been well documented, including poor ecological validity related to dependence as a more severe form of the disorder with some groups (e.g., women) as well as some abuse criteria being linked to significant and lasting symptomology (Hasin et al., 2013). Currently, alcohol use disorders are defined by 11 criteria without reference to abuse or dependence, and instead severity is classified based on the number of positive indicators (see Table 3). The most recent epidemiological data, reflecting current *DSM*-5 classification, indicate that in the United States about 14% of individuals have met criteria for an AUD in the past 12 months and a much higher percentage (29%) met criteria at some point in their lifetime (B. F. Grant et al., 2015). These estimates were substantially higher than those proposed in the National Comorbidity Study-Replication (NCS-R), likely due to the hierarchical structure of the NCS-R that allowed respondents to skip out of dependence questions if they did not answer positively to any abuse criteria. This large-scale study (N = 36,309) also investigated the relative prevalence among various ethnic and gender groups. AUDs were significant more common among men (*OR*

= 1.9) and highest among White respondents (served as reference group; all other *OR*s < .8) with

the exception of severe AUDs, which were found more often in Native American respondents

(*OR* = 2.1). With regard to women, review of earlier data from the National Epidemiological

Study of Alcohol disorders and Related Conditions (NESARC) and the more recent NESARC

waves data indicates that the gap between men and women may be narrowing (White et al.,

2015). The most recent data indicate that about 10% and 23% of women met criteria for AUD in

the past 12-months and lifetime respectively. Further examination of research reveals that for

ethnic minorities, after controlling for frequency and quantity of drinking, drinking consequences

including injury, social consequences, and legal consequences are higher among Black and

Hispanic men (Witbrodt, Mulia, Zemore, & Kerr, 2014). A similar disparity is observed for

social groups with lower levels of educational attainment (Grittner, Kuntsche, Graham, &

Bloomfield, 2012). Collectively, these data demonstrate that while the high prevalence among

White men is notable, attention must also be paid to ways in which this condition manifests

among other groups.

Due in part to the high prevalence rates, the World Health Organization (2004) estimates

that alcohol is a significant contributor to both morbidity and mortality across the word. Alcohol

is particularly associated with accidental injury and death (Macdonald et al., 2005; Zerhouni et

al., 2013). Alcohol is also associated with violence, with some estimates showing that alcohol is

possibly involved in 5-60% of violent interpersonal offenses (Giancola, 2015). A link with

violence is also observed with respect to suicide; the standardized mortality risk estimates for

suicide and AUD was 979, which can be generally interpreted as individuals with AUD are at a

nine-fold risk for dying from suicide (Wilcox, Conner, & Caine, 2004). Additionally, and after

controlling for sociodemographic characteristics, AUD depressive disorder, bipolar I disorder,

antisocial personality disorders, and borderline personality (B. F. Grant et al., 2015). In an earlier

wave of the NESARC work, authors attempted to differentiate between so-called independent

mood and anxiety disorders as compared with interdependent ones. Mood and anxiety disorders

were thought to be independent when (a) they occurred in full form before the onset of the

substance abuse or (b) the full symptoms occurred for more than 4 weeks following most recent

intoxication or withdrawal. The data demonstrated that an extremely small percentage of cases (>

1%) were substance-induced anxiety and mood disorders (B. F. Grant et al., 2004). However,

considering substance-induced mood and anxiety disorders only in the context of intoxication

and withdrawal fails to acknowledge the significant longer-term biological as well as social

outcomes potentially associated with AUD. For example, significantly reduced grey matter

density in the amygdala has been found in an AUD sample abstinent from alcohol an average of

6.7 years (Fein et al., 2006). However, Fein et al. (2006) are careful to point out that the cross-

sectional design precludes definitive interpretations related to causality.

Significant efforts have gone into characterizing both normative and nonnormative

trajectories of alcohol use, likely due to its widespread use as well as its link with substantial

disease burden. In a review of the literature, Sher, Grekin, and Williams (2005) found substantial

support for "distinct prototypical courses of alcohol involvement (e.g., a nonuser/stable low-user

course, a chronic or high-user course, a 'developmentally limited' course, and a later-onset

course)" (p. 497). Among alcohol dependent samples, age of first drink has consistently been

conceptualized as a risk factor (DeWit, Adlaf, Offord, & Ogborne, 2000; Hingson, Heeren, &

Winter, 2006). However, other influential authors have theorized that an underlying vulnerability

for alcohol problems causes early age of first drink and therefore represents an associated

correlate rather than a risk factor (McGue, Iacono, Legrand, & Elkins, 2001). In a large-scale

prospective study on adolescent health, Haberstick et al. (2014) found that onset of alcohol

dependence often began in early adolescence with the greatest risk period being in late

adolescence (Haberstick et al., 2014). Onset after the age of 27 was found to be rare. See Figure

4 for a graphical presentation. With regard to longer term course, among those with alcohol use

disorders, a chronic course is well-documented (Hasin et al., 2011), particularly for untreated

individuals (Timko, Moos, Finney, & Lesar, 2000). In light of the consistency of these findings,

onset in adolescence or young adulthood and chronic course have been conceptualized as central

features of addiction, and reviews of behavioral addiction often comment on the presence or

absence of these features.
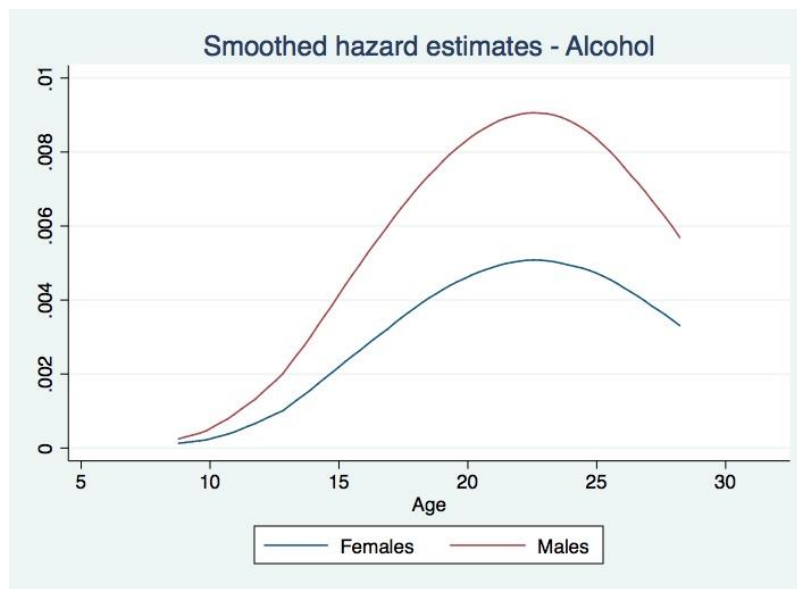
Figure 4. Onset of Alcohol Dependence. Source: Haberstick, B. C., Young, S.
E., Zeiger, J. S., Lessem, J. M., Hewitt, J. K., & Hopfer, C. J. (2014).
Prevalence and correlates of alcohol and cannabis use disorders in the United
States: Results from the national longitudinal study of adolescent health. *Drug
and Alcohol Dependence, 136*(1), 158–161.

With regard to the *DSM*-5 criteria of interest, the aggregated data set including NESARC

and other related datasets provide a great deal of salient information. In particular, community-

based prevalence for *DSM*-5 criteria are reported: 7% reported using larger amounts of alcohol or

using over a longer period of time than was intended, about 3% reported physical or

psychological problems as a result of alcohol use, about 1% reported social or interpersonal

problems as a result of alcohol use, 0.5% reported neglect in major roles, and 0.5% reported

giving up activities due to alcohol use (Hasin et al., 2013). While these data are illuminating and

provide the context for the current work, they do not provide information related to the

prevalence of the criteria within a sample of individuals diagnosed with AUD. Peer and

colleagues (2013) attempted to address this gap by aggregating data from a series of family-

based and case-control genetic studies of substance dependence. The proportion for each of the

criteria of interest were quite high: 59% reported using larger amounts or over longer periods of

time than was intended, 34% reported physical or psychological problems, 51% reported social

or interpersonal problems, 39% reported neglecting major role obligations, and 39% reported

giving up activities (Peer et al., 2013). These data will serve as the standard by which subsequent

evidence is evaluated, and overall the data support significant distress and impairment, onset in

adolescence, a chronic course, and the presence of the symptoms outlined in *DSM*-5, particularly

among clinical samples.

　　Drug use disorder. Based on *DSM*-5 nosology, drug use disorders are classified

according to the psychoactive substance that is ingested (APA, 2013). Currently, the following

drugs are included in the diagnostic system: caffeine; cannabis; hallucinogens; inhalants;

opioids; sedatives, hypnotics, or anxiolytics; stimulants; and tobacco. Diagnostic criteria are the

same as those outlined for alcohol use disorders, although relative presence of certain criteria

depends on the substance of interest. It is estimated that around 4% of individuals in the United

States met criteria for a past-year, non-tobacco-based drug use disorder, while lifetime

prevalence was around 10% (B. F. Grant et al., 2016). The majority of drug use disorders beyond

tobacco were associated with cannabis, opioids, and cocaine use. There are also data supporting

that opioid addiction represents an increasingly common condition, with extensive morbidity and

mortality. In a recent perspective in the New England Journal of Medicine, Okie (2010) writes

about the "epidemic" of opioid addiction, citing the data that demonstrates that opioid overdose

is the second leading cause of accidental death in the United States (Calcaterra, Glanz, &

Binswanger, 2013). Additionally, visits to emergency rooms for opioid abuse have doubled from

2004 to 2008 (Cai, Crane, Poneleit, & Paulozzi, 2010). Finally, admissions to substance use

disorder treatment centers for prescription pain medications have increased by 400% from 1998

to 2008 (Substance Abuse and Mental Health Administration, n.d.). A number of factors have

been identified as having contributed to this growing problem, including changes in medication

prescribing practices, changes in drug formulations, and increased access through use of the

internet (Compton & Volkow, 2006). Similar to AUD, drug use disorders are significantly more

common among men, White and Native American individuals, and those with lower educational

attainment and socioeconomic status (B. F. Grant et al., 2016). There is an additional significant

sociodemographic predictor that is specific to drug use disorders, wherein individuals who live in

the Western region of the United States are significantly more likely to meet criteria ($OR = 4.6$).

This finding is consistent with studies demonstrating that methamphetamine use is highly

prevalent in the Western and Midwest regions of the country (Rawson et al., 2004).

      Drug use disorders are associated with significant comorbidity, disability, and mortality.

The most recent wave of NESARC data indicate that individuals with a current drug use disorder

report lower mental health and poorer social role functioning, even after strictly controlling for

sociodemographic and psychiatric comorbidities (B. F. Grant et al., 2016). While controlling for

concurrent mental health conditions is important for drawing conclusions specific to drug use

disorders, the evidence suggests that comorbidities are highly prevalent among those with drug use disorders; individuals with drug use disorders are significantly more likely to also experience AUD, major depressive disorder, bipolar I, posttraumatic stress disorder (PTSD), antisocial personality disorder, dysthymia, and borderline personality disorder. The association of PTSD with drug and alcohol use disorders is an important area of research. Some have theorized that SUDs and PTSD conditions may serve to maintain symptoms of each condition in two ways. First, individuals may be motivated to reduce autonomic activity associated with PTSD by using specific substances. Second, individuals may be strongly motivated to avoid withdrawal due to its association with autonomic reactivity, which could trigger PTSD symptomology (Jacobsen, Southwick, & Kosten, 2001; Reed, Anthony, & Breslau, 2007). The rates of SUDs in samples of individuals experiencing PTSD range from 19% to 35% (Reynolds et al., 2005). The significant burden is also clearly evident in standardized mortality ratios (SMRs) related to completed suicide. SMR is the ratio between observed deaths in a study population relative to expected deaths among the standard population. When the ratio of observed, expected deaths is greater than 1.0, there is said to be excess death in the study population. In particular, the SMR for suicide among those with opioid use disorder is 1,351, intravenous drug use is 1,373, and mixed drug use is 1,685, indicating that individuals with drug use disorders are substantially more likely to die from suicide, relative to those who do not meet criteria for any drug use disorder. Other associated factors related to drug use disorders include unemployment or underemployment and increased financial insecurity (Henkel, 2011); substantially increased risk for infectious diseases, such as Hepatitis C and human immunodeficiency virus (Chandler, Fletcher, & Volkow, 2009); homelessness (Coumans & Spreen, 2003); accidental injury and motor vehicle accidents; and chronic health problems, such as cardiovascular disease (Degenhardt & Hall, 2012). Drug use

disorders are also implicated as a substantial contributor to the growing rates of incarceration in

the United States (Chandler et al., 2009). It is estimated that up to one half of prison inmates

meet criteria for a drug use disorder (Chandler et al., 2009). Similar to AUD, the overall disease

burden is thought to be significantly greater among members of socially marginalized groups or

those groups who disproportionately experience social inequity (Room, 2005). This brief review

highlights some of the significant diagnostic and secondary outcomes that are similar between

drug use disorders and alcohol use disorders. Some secondary outcomes are specific to drug use

though, such as increased risk for infectious diseases or increased stigma, and accordingly,

attention must be paid to the way that this impacts clinical presentation.

　　　　Unsurprisingly, there are many phenomenological similarities between drug use disorders

and AUD. Drug use disorders are also likely to begin in young adulthood, with recent evidence

demonstrating a mean age of onset around 23.9 years of age (B. F. Grant et al., 2016). The

course of drug use is similarly chronic (Dutra et al., 2008). Similar to the Hasin et al. (2015)

paper, researchers have investigated the prevalence of each of the *DSM*-5 criterion in order to

study the factor structure and the overall factor loadings for the criteria. Separate analyses for

drug classes were conducted and are summarized in Table 4 in the Appendix (Saha et al., 2012).

Across drug classes, among individuals diagnosed with a drug use disorder, people are most

routinely reporting social and interpersonal problems. However, minimal research has been

published related to the ways in which the development and course of drug use disorders impact

family or other close relationships. The exception involves research exploring adolescent drug

use, which is tied to significant parental distress (Butler & Bauld, 2005). Across drug classes,

some of the lowest rates of endorsement involve giving up activities because of drug use. This is

also reflected in item response theory (IRT) analyses demonstrating that that this criterion is

most often observed in severe forms of the disorders, wherein multiple criteria and/or greater symptom severity are endorsed (Saha et al., 2012). Overall, the data demonstrate significant similarity to patterns observed in alcohol use disorders, which is mirrored in the conceptualization, treatment, and research related to these conditions.

     Tobacco use disorder. Tobacco use disorders were first introduced into the *DSM* in the third edition. As with other forms of substance abuse, the criteria have undergone significant revision. Currently, the *DSM*-5 defines tobacco use disorders using the same criteria for alcohol use disorders and other drug use disorders (APA, 2013). This has been somewhat controversial. In a review of the dependence criteria explicated in *DSM*-IV, Baker, Breslau, Covey, and Shiffman(2012) argue that while the *DSM*-5 criteria have adequate reliability, their validity is questionable. Henricks et al. (2008) explored the utility of the abuse criteria as well as the dependence criteria and found that both sets of indicators controlled for a significant amount of the variance in smoking characteristics, but the overall size of this effect was small. In response to these and other criticisms, the *DSM*-5 task force reviewed the research; however, the work group ultimately chose to continue to align the criteria with other substance abuse criteria, citing a single large study utilizing an Israeli sample showing predictive validity of the *DSM*-5 criteria (Shmulewitz et al., 2013). In addition, aggregate data pulled by the *DSM*-5 work group revealed a unidimensional factor structure for tobacco use disorder (Hasin et al., 2013). In general, the utility of *DSM*-based criteria appears less clear than what is observed with other conditions. An alternative and widely used measure is the Fagerstrom Test for Nicotine Dependence (Heatherton et al., 1991), which assesses heaviness of smoking (i.e., tolerance), difficulty abstaining when required, smoking upon waking and early in the day (i.e., to combat

withdrawal), and smoking even when physically ill. However, large-scale studies such as

NESARC predominantly utilize a *DSM*-based framework.

Tobacco use is extremely prevalent, with estimates finding that about 45 million

Americans smoke tobacco (Schwartz & Benowitz, 2010). To date, the point prevalence of

tobacco use disorders based on the third wave of NESARC data is not yet published. However,

Wave II estimated that about 13% of a nationally representative sample met criteria for nicotine

dependence in the past year (Falk, Yi, & Hiller-Sturmhöfel, 2006). This is likely a conservative

estimate, as only the dependence criteria were investigated, and at that time three criteria (of

seven) were required as compared with the two criteria (of eleven) that are required under *DSM*-

5. Based on the work of Falk et al. (2006), nicotine dependence appears to occur at relatively

equivalent levels between men and women. The equivalent rates of nicotine dependence stand in

contrast to earlier epidemiologic research that demonstrated that men were significantly more

likely to smoke and/or meet criteria for nicotine dependence (Agaku, King, & Dube, 2012). The

decline in the gender disparity is likely related to a number of factors (Greenfield, Back, Lawson,

& Brady, 2010), including the role of marketing cigarettes specifically to women, which has

been strongly implicated (Carpenter, Wayne, & Connolly, 2005). In addition, the high rates of

depression and anxiety among women has also been linked to the relatively modest declines in

female smokers as compared with other groups (Centers for Disease Control and Prevention,

2011). In particular, multiple studies have demonstrated that women are more likely to engage in

smoking to reduce negative affect (Greenfield et al., 2010). Finally, significant sociocultural

factors contribute to body dissatisfaction in women may contribute to smoking initiation and

maintenance (Pomerleau & Saules, 2007). Importantly, research has also demonstrated that after

controlling for amount, women are significantly more likely to experience negative health

consequences related to smoking and experience them sooner, including cardiovascular disease

and lung cancer (Greenfield et al., 2010). In racial and ethnic groups, the highest prevalence is

observed for American Indians/Alaskan natives, although prevalence is also high among White

individuals. There is evidence for tobacco use disorders, as compared with SUDs, being more

common among individuals 65 and older (Lin et al., 2011). More so than many other addictions,

tobacco has been causally linked to a number of significant negative outcomes, particularly

related to physical health. It is estimated that smoking causes one in five deaths in the United

States. Furthermore, the likelihood of a lifelong smoker experiencing premature death reaches

almost 50% (Schwartz & Benowitz, 2010). Morbidities are most often pulmonary or cardiac in

nature, and they are associated with substantial disease burden (Benowitz, 2009). In addition to

physical health problems, there is robust research demonstrating a high prevalence of smoking

among individuals experiencing mental illness (Lasser et al., 2000; Prochaska, 2010). A large

body of literature has attempted to investigate the direction of this relationship, and it is largely

beyond the scope of this work. However, tobacco use disorders have been implicated as a

significant contributing factor to the decreased life expectancies observed for individuals with

mental health problems (Prochaska, 2010). Other clinical correlates observed in substance or

behavioral addictions (e.g., suicide risk, interpersonal violence, and financial problems due to

addiction) either have not yet been widely investigated or are not as strongly associated with

tobacco use disorder.

Based on the literature reviewed, there is strong evidence supporting continued use

despite physical and psychological problems. However, a significant gap in the literature exists

related to identifying the prevalence of the *DSM*-5 criteria in either general studies or studies

with individuals with tobacco use disorders. In a summary statement, the *DSM*-5 states,

> Giving up important social, occupational, or recreational activities can occur when an
>
> individual forgoes an activity because it occurs in tobacco restricted areas. Use of tobacco
>
> rarely results in failure to fulfill major role obligations… but persistent social and
>
> interpersonal problems… or use that is physically hazardous occur at an in determinant
>
> frequency. (APA, 2013, p. 573).

Additionally, evidence related to the criteria of interest beyond physical and psychological

problems (i.e., using a larger amount or over a longer period of time than was intended, social or

interpersonal problems, neglecting major roles, and giving up activities) is somewhat lacking.

While escalation of smoking habits is well documented, this is understood as related to tolerance

and withdrawal rather than an inability to follow through with one's intention. Other criteria such

as social and interpersonal problems can be loosely derived from emerging evidence related to

stigma and tobacco use. Experts often agree that stigma likely does not serve to help reduce

smoking but increases distress on the part of smokers (Bell et al., 2010; Stuber, Galea, & Link,

2009). However, other authors disagree and assert that increased stigma related to smoking may

be helpful in reducing the overall prevalence of tobacco use disorders (Bayer & Stuber, 2006).

There are also strong criticisms related to the *DSM*-5 operationalization of tobacco use disorder,

such that it may be missing important elements of smoking and dependence. Baker et al. (2012)

factor analyzed the Wisconsin Inventory of Smoking Dependence Motives (Piper et al., 2004)

and found four principal factors: the extent to which smoking is heavy, occurs with awareness or

intentionality (automaticity), is perceived to be independent of cognitive control, and is

associated with strong, frequent urges. The current *DSM*-5 criteria only capture urges (cravings)

and moderately capture heavy use, though the criterion related to using larger amounts or over

longer periods of times requires that a person have not intended to do so. Altogether, the

evidence supports tobacco use disorder as a condition associated with significant disease burden, although its phenomenological similarities to the other SUDs with respect to the criteria of interest are less clear. There are other significant phenomenological similarities between tobacco use disorders and the other SUDs, such as craving, tolerance, and withdrawal. However, the prevalence and evidence related to these criteria are beyond the scope of the current work.

   Gambling. Gambling disorder represents the only form of behavioral addiction currently included in the SRAD section in the newest edition of the *DSM* (APA, 2013). Defined as persistent and recurrent maladaptive gambling behavior that disrupts personal, familial, or vocational pursuits(APA, 2013), gambling disorder has broad support in the literature as having etiologic and phenomenological similarities to SUDs (Ledgerwood & Patel, 2012). Twelve-month prevalence estimates vary by country and study, with some research showing a prevalence rate as low as 2% in Norway, and other research demonstrating much higher rates, such as 5% in Hong Kong (Hodgins et al., 2011). In the United States, evidence from the NCS-R finds that lifetime problem gambling is observed in about 2% of individuals, whereas pathological gambling (defined as the full syndrome under *DSM*-IV) was rare at only 0.6% (Kessler et al., 2008). However, there have been changes to the criteria since this publication; most notably the threshold for diagnosing the disorder was lowered from endorsing five to only four criteria (see Table 5). Importantly, research by Petry, Blanco, Jin, and Grant (2014) has found that the sensitivity and specificity are almost unchanged based on the lower threshold published in the *DSM*-5. Despite the broad heterogeneity in prevalence rates, higher incidence among males is highly consistent (Abbott & Volberg, 1996; Kessler et al., 2008). The research related to relative prevalence in ethnic minorities is more equivocal, with some epidemiological research demonstrating that the incidence is higher among non-Hispanic, White males (Kessler et al.,

2008) and others identifying being an ethnic minority or immigrant as a possible risk factor for developing gambling disorder (Johansson et al., 2009).

Though the incidence of gambling disorder is lower than what is observed for other disorders, such as SUDs (B. F. Grant et al., 2015, 2016), the economic and social burden associated with the disease is substantial. Gambling disorder is associated with financial problems, legal issues, interpersonal conflict, psychiatric problems, and suicide (Ledgerwood & Patel, 2012). Psychiatric comorbidity is one of the most robust findings. A recent meta-analysis synthesized evidence from 11 studies and found that the average estimate for comorbid nicotine dependence was about 60%, for SUDs was 58%, for mood disorders was 38%, and anxiety disorders was 37% (Lorains, Cowlishaw, & Thomas, 2011, p. 490). Additionally, there is research supporting high levels of suicidal ideation and behaviors among those in treatment or seeking treatment for gambling (Kausch, 2003; Ledgerwood & Petry, 2004; Ledgerwood, Steinberg, Wu, & Potenza, 2005). In a recent large-scale population study, the odds of a suicide attempt were significantly related to gambling disorder; however, the incremental predictive validity disappeared when comorbid conditions were added to the model. The only exception was depression, where gambling disorder predicted suicide attempts over and above a lifetime depression diagnosis (Newman & Thompson, 2003). More research is needed to understand this link and if it represents and unique and serious association for those who require or actually engage in gambling disorder treatment. With respect to the role of legal involvement, the decision was made to drop this as an indicator of the disorder in the newest edition of the *DSM-5*, due to adding little to diagnostic accuracy (Petry, Blanco, Auriacombe, et al., 2014). However, this criterion is endorsed by around 40% of individuals in treatment samples who report engaging in illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling

(Ledgerwood, Weinstock, Morasco, & Petry, 2007; Petry, Blanco, Stinchfield, & Volberg, 2012). Legal involvement is also observed in research demonstrating that gambling disorder is associated with greater levels of child abuse and neglect (Shaw et al., 2007). While this represents one of the most severe and accordingly rare associations between gambling and interpersonal problems, there is broad evidence demonstrating higher rates of divorce and separation as well as higher levels of conflict and distress among family members of individuals with gambling disorder (Kalischuk et al., 2006; Shaw et al., 2007). Despite the high level of comorbidity and significant deleterious symptoms associated with gambling, treatment for the condition is not very common, with recent evidence estimating that 10% or fewer of individuals with gambling disorder seek treatment in two national population surveys (Suurvali, Cordingley, Hodgins, & Cunningham, 2009). However, among individuals who take the step to call gambling helplines, treatment initiation is much higher with studies showing estimates of 67% and 55%, respectively, follow-up on a referral from a gambling helpline (Ledgerwood et al., 2013; Weinstock et al., 2011).

In addition to the substantial comorbidity with substance abuse, researchers have identified many phenomenological similarities between gambling and other forms of addiction. In general, the onset in young adulthood and course of gambling disorder is thought to be similar to SUDs (J. E. Grant, Potenza, Weinstein, & Gorelick, 2010). Some researchers have argued that natural recovery is more common in gambling disorder and accordingly the course is relatively less chronic (Slutske, 2006). However, other studies have demonstrated a more fluctuating course, with periods of both increased symptoms and abstinence being observed (Sartor et al., 2007). With regard to the *DSM*-5 criteria of interest (using a larger amount or over a longer period of time than was intended, physical or psychological problems, social or interpersonal

problems, neglecting major roles, and giving up activities), significantly more research is needed. To date, *DSM*-IV criteria are the most widely studied, and while these criteria involve a number of important constructs, such as chasing bets, lying to others about gambling, and financial problems, many of these constructs are unrelated to the specific criteria of interest. However, a single indicator related to loss of a relationship or school, job, or career opportunity taps into the social or interpersonal consequences as well as neglecting major roles. Stinchfield, Govoni, and Frisch (2005) investigated the prevalence of *DSM*-IV indicators in a moderately sized sample of community members and individuals in treatment for gambling. The authors found that loss of a relationship or school, job, or career opportunity was endorsed by 59% of the treatment sample and about 6% of the community sample. Another study that aggregated probability samples, based on geographic proximity to casinos, exclusively assessed for relationship problems and found that about 16% of the general sample and 100% of the high-severity pathological gambling group endorsed this item (Toce-Gerstein, Gerstein, & Volberg, 2003). Finally, in another study comparing *DSM*-IV criteria and *DSM*-5 criteria in a sample of individuals calling a gambling helpline, the authors discuss relative prevalence of *DSM*-IV indicators by number of *DSM*-5 symptoms endorsed, though the general prevalence for *DSM*-5 indicators are not reported (Weinstock et al., 2013). The authors found that 49% of callers reported jeopardizing an important relationship or job opportunity because of gambling. No other information related to the indicators identified for this work is currently available. This gap in the literature is surprising given that gambling disorder is currently characterized as a substance-related or other addictive disorder, but it is likely that future research will fill this gap. In particular, there were a significant number of studies exploring the prevalence rates of various *DSM*-IV indicators of gambling in community and clinical samples. However, *DSM*-IV indicators of gambling disorder

do not include using a larger amount or over a longer period of time than was intended, physical or psychological problems, and giving up activities. Overall, the research demonstrates that onset and comorbidity represent factors that strongly support the addiction conceptualization, and while there are other phenomenological similarities including evidence of tolerance, withdrawal, craving, and preoccupation (Petry et al., 2012), it is beyond the scope of this work. Instead, the current work addressed the gap related to the *DSM*-5 criteria of interest by exploring the endorsement of using a larger amount or over a longer period of time than was intended, physical or psychological problems, social or interpersonal problems, neglecting major roles, and giving up activities among individuals who screen positively for a possible gambling disorder.

Binge eating. Binge eating disorder (BED) is a clinical presentation characterized by eating large amounts of food within a discrete time period with a concurrent sense of loss of control (APA, 2013). Loss of control is further operationalized by five associated features, which include eating alone because of embarrassment; eating until uncomfortably full; or feeling disgusted with oneself, depressed, or very guilty afterwards (see Table 6). The available evidence demonstrates that approximately 3.5% of women and 2.0% of men report a lifetime history of BED, when assessed using *DSM*-IV TR criteria (Hudson, Hiripi, Pope, & Kessler, 2007). Additional research demonstrates that the changes to the frequency and duration criterion brought about by the new *DSM*-5 will result in only marginal increases in the overall lifetime prevalence (Hudson et al., 2012; Stice, Marti, & Rohde, 2012).

Regarding gender, while men appear to meet criteria for binge eating disorder less frequently than women, the disparity is significantly smaller than what is observed with other forms of eating disorders (Reichborn-Kjennerud et al., 2003). Further research has demonstrated that men are generally as likely as women to report eating large amounts, but they are

significantly less likely to report loss of control (Ivezaj et al., 2010; Weltzin et al., 2005). When men do meet full criteria (i.e., endorse loss of control), their clinical presentation including levels of distress and impairment is highly similar to what is observed in female samples (Striegel-Moore, Bedrosian, Wang, & Schwartz, 2012). Researchers have also begun to investigate the ways in which prevalence rates and clinical presentation may or may not differ among ethnic minorities; however, there is conflicting evidence. For example, some studies demonstrate that Caucasian women are more likely to experience clinical levels of BED symptoms (Napolitano & Himes, 2011; Sorbara & Geliebter, 2002), others find comparable rates between Caucasian and African American women (Alegria et al., 2007; Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000), and still others discuss the possibility of finding the greatest rates of binge eating in ethnic minority samples (Reslan & Saules, 2013), especially in light of the high rates of obesity observed in some ethnic minority groups (Grilo, White, Barnes, & Masheb, 2012; Smolak & Striegel Moore, 2001).

Like other eating disorders, as well as other forms of behavioral addiction, BED is associated with numerous negative outcomes. For example, BED is associated with greater levels of functional impairment, emotional distress, and suicidality as compared with non-eating disorder patients, with large effect sizes observed (Stice et al., 2013). Psychiatric comorbidity is also extremely high among BED patients with the NCS-R, which studied only select conditions, finding that about 79% of individuals with BED had a lifetime history of at least one comorbidity; 20% had one comorbid disorder, 10% had two, and 49% had three or more comorbid conditions (Hudson et al., 2007). Increased rates of major depressive disorder in BED samples have specifically been implicated (Araujo, Santos, & Nardi, 2010). Furthermore, the presence of current psychiatric comorbidity is associated

with greater eating disorder-related psychopathology and associated distress (Grilo et al.,

2013). In addition to these psychiatric comorbidities, BED is very highly associated with

obesity and poorer physical functioning; individuals with a history of or current BED were

significantly more likely to be both overweight and morbidly obese (Hudson et al., 2007).

The elevated levels of obesity are linked with other important consequences, including

poorer overall health and sleep problems (Johnson, Spitzer, & Williams, 2001), greater

amounts of missed work and lower levels of work productivity (Striegel-Moore et al.,

2012), greater numbers of physical health problems, lower levels of health-related quality of

life, and more impairments in mobility (Perez & Warren, 2012). However, additional

research demonstrated that even after controlling for body mass index, individuals who

meet criteria for BED are still at increased risk for dyslipidemia, type 2 diabetes, and

experiencing more than two components of metabolic syndrome (Hudson et al., 2010;

Mitchell, 2016).

 With respect to the current project, binge eating is unique in that it *is* currently included

in the diagnostic system; however, it is conceptualized as most related to other forms of eating

pathology and is not grouped with the SRAD. BED does share many common features with other

eating disorders, including overvaluation of weight and shape (Grilo et al., 2009; Hrabosky,

Masheb, White, & Grilo, 2007). Additionally, the signal symptom of binge eating is common to

bulimia in addition to BED (APA, 2013). However, there is also evidence in the literature

supporting the conceptualization of BED as a form of addiction. BED is thought to follow a

similar chronic course (Hudson et al., 2007; Pope et al., 2006) as well as have onset in

adolescence or young adulthood (Brewerton et al., 2014; Hudson et al., 2007). Like gambling,

however, there is some evidence supporting a less chronic course (Fairburn et al., 2000) as well

as a significantly chronic course (Hudson et al., 2007). Accordingly, more long-term studies are

needed to answer this question. With regard to the *DSM*-5 criteria of interest, Meule and

Gearhardt (2014) conducted a recent review exploring the presence or absence of support for

DSM-5 SRAD criteria in studies of food addiction and/or binge eating. The authors were

particularly interested in food addiction, a construct related to BED, but included BED literature

whenever available. Meule and Gearhardt (2014) did not find evidence of failure to fulfill major

role obligations or giving up activities due to excessive engagement in the behavior in

nonclinical samples. In contrast, they found significant support for social and interpersonal

problems and food being consumed in larger amounts or over longer periods of time than was

intended. Finally, regarding psychological and physical problems, some research establishes a

link prospectively between binge eating and obesity (Micali et al., 2015). However, and

surprisingly, many other studies fail to replicate this relationship (e.g., Stice, Presnell, Shaw, &

Rohde, 2005). As obesity is caused by excessive energy intake over long periods of time

(Mozaffarian et al., 2011), it is likely that more longer term studies are needed to unequivocally

establish this relationship. With regard to psychological problems, the order effects remain

largely unknown. However, a recent study found that eating disorders broadly, including BED,

predicted obesity as well as onset of mood, anxiety, and other risk behaviors (Micali et al.,

2015). While the prevalence of SRAD-like criterion has yet to be established, there is some

related evidence based on cross-sectional studies of individuals with food addiction. Food

addiction is explicitly operationalized based on the SRAD criteria, and recent work found that

among those who met criteria for food addiction: 19% reported consuming food in larger

amounts or over longer periods of time than was intended, 19% reported continued addictive

eating despite problems in social relationships, 24% reported continued addictive eating despite

physical or psychological problems, 22% reported failure to fulfill major role obligations, and

12% reported giving up important activities because of addictive eating (Gearhardt et al., 2016).

Overall, this brief review demonstrates that the BED literature base could benefit from

prevalence estimates of SUD criteria among binge eaters as well as prospective studies to

establish the trajectory of both conditions.

Hypersexual disorder. Hypersexual disorder, also called sexual addiction, compulsive

sexual behavior, impulsive-compulsive sexual behavior, hyperphilia, and paraphilia-related

disorder, is not currently included in the APA's diagnostic classification system (Campbell &

Stein, 2015). In contrast, the condition will be recognized and diagnosable based on the World

Health Organization's International Classification of Diseases-11 (Krueger, 2016). The decision

to exclude hypersexual disorder in the *DSM*-5 followed significant debate related to the

operationalization and conceptualization of this condition over many successive editions of the

DSM. In particular, while a form of this condition was included in *DSM*-III, subsequent versions

chose to remove it, citing a lack of empirical evidence (Campbell & Stein, 2015). The lack of

evidence is also frequently cited in more recent debates related to the status of the condition

(Hartmann, 2013; Piquet-Pessôa, Ferreira, Melca, & Fontenelle, 2014). In the course of

considering hypersexual disorder for inclusion in the *DSM*-5, specific criteria were proposed and

tested (see Table 7). In a field trial, the criteria demonstrated good reliability and validity (Reid

et al., 2012), although large-scale data are not yet available. Accordingly, reliable estimates of

the prevalence of hypersexual disorder in either clinical or community samples is lacking. Wave

II of the NESARC data collection included a single question: "Have you ever gotten into sexual

relationships quickly or without thinking of the consequences?", which was endorsed by about

19% of men and 11% of women (Erez, Pilver, & Potenza, 2014). However, there are clear

differences between positively endorsing this question and meeting proposed definitions of

hypersexual disorder. There are several studies of hypersexual prevalence among specific or at-

risk populations. For example, in a sample of 1,298 male pornography users, 14% reported

significant distress over pornography use and interest in pursuing treatment (Kraus, Martino, &

Potenza, 2016). Another large study of US university students found that 3% of men and 1% of

women met criteria for compulsive sexual behavior as defined in the Minnesota Impulsive

Disorders Interview (Odlaug et al., 2013). Despite the lack of consensus related to the overall

prevalence, there is strong evidence supporting a higher prevalence among men. In a review of

the literature, Kafka (2010) estimates that hypersexual disorder is five times more common

among men than women. Data are not yet available on other sociodemographic predictors of

hypersexual disorder. Overall, the data indicate that consensus related to the diagnosis of

hypersexual disorder is elusive, and reliable estimates of the prevalence of the condition are not

yet known.

Despite the limitations in the literature base, there is some clear evidence indicating significant

disease burden and negative correlates associated with hypersexual behavior, even when it is

defined disparately across studies and samples. In a large study ($N = 2,450$) of Swedish citizens,

high rates of sexual behavior among men, as defined as being at or above the 90th percentile,

were associated with less satisfaction with sexual experiences, greater interpersonal problems,

higher rates of sexually transmitted diseases, and higher rates of professional-help seeking for

sexuality-related problems (Långström & Hanson, 2006). Among women, higher rates of sexual

behavior (90th percentile or above) were associated with relationship instability and higher rates

of sexually transmitted diseases (Långström & Hanson, 2006). Significant mental health

comorbidity has also been observed, though studies contributing to this finding are small and/or

predominantly represent treatment samples. For example, in a sample of 36 individuals with

hypersexual disorder, 64% reported a history of SUDs, 39% reported a history of major

depression or dysthymia, and 14% reported a history of obsessive-compulsive disorder (Black,

Kehrberg, Flumerfelt, & Schlosser, 1997). A noteworthy exception to the small sample size

includes a study by Schultz et al. (2014). Using meta-analytic techniques, the authors found a

significant positive association between hypersexual disorder and depression. Studies also

demonstrate higher rates among of hypersexual behavior among those with a substance use

disorder or other addictive disorders. For example, in a treatment sample of individuals with

SUDs, the authors found that 25% of the sample screened positive for hypersexual behavior

(Stavro et al., 2013). There is additional research demonstrating a higher prevalence among those

with gambling problems. In a sample of 96 individuals with gambling disorder, around 9%

reported a lifetime history of hypersexual behavior (J. E. Grant & Kim, 2003). In a sample with

problem gamblers (a less severe form of the condition), even higher prevalence rates (20%) for

hypersexual behavior were observed (J. E. Grant & Steinberg, 2005). In sum, the evidence

demonstrates that hypersexual disorder may be associated with significant mental and physical

problems (i.e., sexually transmitted infections), although the research related to these findings

primarily focuses on treatment samples, which may represent a more severe form of the disorder.

　　　　With regard to the similarities between SUDs and hypersexual disorder, data to answer

these questions are largely lacking. The onset and course may represent an important similarity,

although more research is needed. In the *DSM*-5 field trial, 54% of individuals who met

provisional criteria for hypersexual disorder reported problems related to sexual behavior

beginning prior to adulthood. Additionally, a progressive course was reported by 82% of

respondents, although data related to chronicity are not yet available (Reid et al., 2012). In

contrast with some other forms of behavioral addiction, neglect of major roles related to work

impairments have been reported, though studies are, again, quite small (Coleman, Miner,

Ohlerking, & Raymond, 2001; Muench et al., 2007). For example, Muench et al. (2007)

developed a scale to assess the consequences of hypersexual behavior, which can provide some

preliminary evidence related to the prevalence of the *DSM*-5 criteria of interest. Specifically, a

sample of 34 gay and bisexual men engaged in treatment for hypersexual behavior indicated the

frequency of 21 different consequences of hypersexual behavior, on a scale of 0-*never* to 4-

always. While missing work or school and problems with physical health were endorsed at low

rates ($M = .86$ and 1.06 respectively), other items were reported more frequently; the average

rated frequency for feeling guilty or ashamed was 2.54. The average rated frequency for losing

interest in other activities and hobbies was 2.11. The prevalence of engaging in sexual behavior

with greater frequency or over longer amounts of time than was intended was not assessed in this

study. Overall, the data indicate that work in this area is emerging and more research will be

needed to determine if the criteria identified in the NESARC data as being highly discriminative

perform similarly for individuals reporting hypersexual behavior.

Internet gaming disorder. Internet gaming disorder is included in Section III of the

DSM-5, or conditions requiring further study. Inclusion in Section III involves the explication of

proposed criteria (see Table 8). Importantly, papers published by the *DSM*-5 work group

members (e.g., Petry, Rehbein, et al., 2014) state that the disorder is intended to capture both

online and offline gaming, although this is not clearly stated in the actual text of the *DSM*-5. As

the research typically collapses across types of gaming, this review will include both. However,

there is some evidence that specific types of internet-based games, such as massively multiplayer

online role-play games and first-person shooter games, may be particularly associated with

internet gaming disorder (Mentzoni et al., 2011; Rehbein, Kuhn, Rumpf, & Petry, 2015). There

is significant heterogeneity with respect to prevalence estimates based on epidemiological data,

ranging from as low as 0.2% (Festl, Scharkow, & Quandt, 2013) to as high as 13% (Pápay et al.,

2013). The heterogeneity is likely due to several factors. First, samples are frequently drawn

from different countries, where disparate levels of internet gaming disorder seem plausible.

Second, prior to *DSM*-5, and perhaps going forward (Griffiths et al., 2016), minimal consensus

exists related to the appropriate diagnostic criteria. As such, different instruments produce widely

disparate prevalence rates, which adds to observed heterogeneity. Finally, the prevalence rates

vary significantly by age of participants, with adolescents and children showing significantly

higher rates than adults (Festl et al., 2013). To date, the only epidemiological study conducted in

the United States studied children and used an adapted from of the *DSM*-IV checklist for

pathological gambling. The authors found that among 8-18 year-olds, around 9% met criteria for

the disorder (Gentile, 2009). With respect to sociodemographic predictors or correlates, the

evidence related to most predictors is lacking. However, and in line with the evidence related to

hypersexual disorder, gambling disorder, alcohol use disorder, and drug use disorder, internet

gaming disorder is significantly more common among men than women (Gentile, 2009;

Mentzoni et al., 2011; Wolfling, Thalemann, & Grusser-Sinopoli, 2008). This brief review

highlights the state of the literature as emerging. Currently, some strong epidemiological

evidence exists indicating that individuals in many different countries experience symptoms

broadly characterized as video game addiction. However, significant information remains

unknown. It is possible that the new proposed criteria for the *DSM*-5 may serve an important

function to standardize and move this area of research forward, although more time is needed to

make such a determination.

Internet gaming disorder is robustly associated with depression and is also often found to be

related to general psychological distress, sleep insufficiency, and psychiatric comorbidity

(Rehbein et al., 2015). In the largest epidemiological study available to date ($N = 15,168$),

individuals who met criteria for video game dependence also demonstrated lower school

achievement, increased truancy, reduced sleep time, limited leisure activities, and increased

thoughts of committing suicide (Rehbein et al., 2010). With regard to suicidal ideation, the

authors found that among those with minimal or low use of video games, the prevalence rate of

suicidal thoughts was about 2%, while the prevalence rate for the video game dependent group

was 12%. Notably, analyses that controlled for possible confounds (e.g., higher rates of

depression) were not employed in this study. Additionally, some authors have argued that

internet gaming disorder may put individuals at risk for seizures (Chuang, 2006; Griffiths, Kuss,

& King, 2012). However, the research in this area is limited to small case studies and such an

assertion has yet to be supported in methodologically rigorous investigations, though this link is

cited in the literature extensively. There is also some evidence indicating that internet gaming

addiction is associated with poorer social skills (Griffiths, 2011; Kheradmand et al., 2012). Liu

and Peng (2009) found that preferring virtual reality settings to real-world social settings

significantly predicted psychological dependence on gaming, which in turn predicted higher rates

of physical (e.g., fatigue), social, and academic or occupational problems. At this time, a

majority of the research investigating associated features is cross sectional. A notable exception

is the work of Gentile et al. (2011), which appears to be the only longitudinal study conducted to

date. Using longitudinal growth curve analyses, poor social skills and impulsivity were identified

as risk factors for pathological gaming. Additionally, anxiety, depression, and poor academic

achievement were identified as consequences. While the evidence is still evolving, research

supports the potential importance of investigating this clinical presentation, including its association with depression, suicidal ideation, and poor academic achievement. In considering the similarities between internet gaming addiction and SUDs, the state of the literature is most similar to hypersexual disorder. For example, the onset of the condition has not yet been systematically studied. However, it is notable that the condition is significantly more common in children and adolescents than adults. The skewed age range, however, further compounds gaps in the literature as very few studies include adult samples. In addition, very little is known about course. In the only longitudinal study published to date, the authors found that a significant proportion (83%) of participants who met criteria at Time one met criteria two years later (Gentile et al., 2011). With regard to *DSM-5* criteria, there is some evidence indicating the prevalence of specific criteria, though measurement issues limit the relevance for the current work. In particular, the epidemiological study conducted by Gentile (2009) provides prevalence rates, but the correspondence between SRAD criteria and the pathological gaming criteria used in the study is low. For example, when considering the criterion of interpersonal problems, the study primarily focused on stealing, or requesting money in order to fund video gaming. A single more general item assessed having ever lied to others about amount played, and it was endorsed by 14% of the general sample. Among those who met criteria for pathological gaming, 17% of boys and 10% of girls endorsed the item. Failure to fulfill role obligations is conceptually related to items asking about skipping homework, skipping household chores, or poor performance at school related to video game play. In the Gentile (2009) sample, skipped homework, skipped household chores or poor academic performance was endorsed by a sizeable minority in the general sample (23%, 33%, and 20% respectively). It is evident that these items function differently than the related items for SUDs. In particular, failure to fulfill

major role obligations is a criterion with a high level of difficulty, such that individuals in the general sample were very unlikely to endorse this item (Hasin et al., 2013). This discrepancy is likely related to a number of factors. First, it highlights the significant impact of item wording. In comparison to asking about skipping household chores, alcohol items, which are generally aimed at adults, discuss functional problems at work. Of course, it is possible that this discrepancy reflects an actual difference in the conditions, such that video gaming is more likely to disrupt role functioning. However, the sum of the evidence at this point does not support such an assertion. A second contributing factor involves response format, where items in the video game study indicated lifetime prevalence of the criterion ever being true. In contrast, alcohol measures often specify a time period or in lifetime-interviews qualify that it must be more than once, around the same time as other symptoms. More research is needed to understand the discriminative function of this criterion and the role of item wording as well as response format. Using larger amounts or use over a longer period of time was also endorsed by a large proportion of the community sample (21%). With regard to giving up activities, at this time, the evidence does not include estimates related to the prevalence of this criterion. However, the criterion appears face valid for the condition, and it is included in the *DSM*-5 conceptualization, which may facilitate future research related to this. The final criterion of interest involves continued play despite physical or psychological problems. While Gentile's work demonstrates that depression and anxiety may be consequences of the condition, it is not yet clear if individuals who meet criteria would endorse continued play despite video games *causing* these problems. Ultimately, there is evidence supporting similarities between internet gaming disorder and SUDs, but the evidence related to the specific criteria of interest is less robust.

Assessing SRAD

Based on a syndromal model of addiction, the conditions of interest are related in

important ways. The above review highlights that there are high rates of comorbidity between

many of these conditions, common age of onset and course, and sometimes shared associated

correlates or functional impairments. For example, elevated rates of depression are found in the

seven addictive disorders reviewed. However, a significant amount of information remains

unknown. For example, comprehensive comorbidity estimates for a range of addictive disorders

are not yet available. Furthermore, it is not yet clear if the presence of behavioral addictions

significantly impacts treatment for SUDs. It is also unknown if individuals recovering from one

form of an addictive disorder are at risk for developing another form of addiction, though

elevated rates of smoking initiation following substance abstinence have been observed (Friend

& Pagano, 2004; Ledley, Marx, & Heimberg, 2010). In addition, there is research demonstrating

that individuals who undergo gastric bypass surgery are at increased risk for new onset SUDs

(Ivezaj, Saules, & Schuh, 2014). While there are likely multiple contributing factors to current

gaps in the literature base, a lack of transdiagnostic scales is notable. In fact, a thorough literature

review revealed only four such measures published in peer reviewed journals—the Shorter

PROMIS Questionnaire: (SPQ; Christo et al., 2003); the Composite Measure of Problem

Behaviors (CMPB; Kingston, Clarke, Ritchie, & Remington, 2011), the Compulsive Behaviors

Questionnaire (CBQ; Conason et al., 2013), and the Behavioral Addiction Measure (Konkolÿ

Thege et al., 2015).

The SPQ represents one of the most comprehensive measures, with strong psychometric

validation (see Appendix B). The questionnaire consists of 16 scales, each containing 10 items.

Items are statements related to the behavior of interest and respondents indicate the degree to

which the statement is characteristic of them 1 = *not like me* to 6 = *like me.* The authors

demonstrated strong internal consistency (*a mean = .89*), fair test re-test reliability in a small

subsample over an average period of 18.9 days (*r mean = .80),* and strong to moderate

convergent and divergent validity for specific scales, including alcohol, drugs, prescribed drugs,

gambling, food bingeing, and food starving (*r range* = .73-.90). Convergent validity was based

on correlation with existing well-validated measures in a clinical sample (see Table 9). The

highest correlations were observed for the alcohol scale, which was correlated with existing well

validated measures such as the CAGE (Mayfield, McLeod, & Hall, 1974), Short Michigan

Alcohol Screening Test (SMAST; Selzer, Vinokur, & van Rooijen, 1975), and Severity of

Alcohol Dependence Questionnaire (Stockwell et al., 1979). High correlations were also

observed for the food binging scale with other related scales, including Eating Disorder

Interview (Fairburn & Cooper, 1993) and Bulimic Investigatory Test, Edinburgh (Henderson &

Freeman, 1987). A lower than expected correlation (*r* = .50) was observed between the gambling

scale with the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987), which the authors

argue is related to the SPQ investigating a broader range of risk-taking ventures such as selling

and trading stocks. The authors also conducted discriminant analyses, which can be understood

as reverse multiple analysis of variance procedures. In particular, the authors utilized known

diagnostic groups and total score on relevant subscales to calculate discriminant functions for

individuals diagnosed with an alcohol use disorder and drug use disorder. They also explored the

scales' performance when discriminating between individuals diagnosed with an eating disorder

and those diagnosed with an alcohol use disorder. The scales' performance related to

discriminating between alcohol and drug use samples was modest at best (*canonical correlation*

alcohol = .45), while the discrimination for alcohol and eating disorders was stronger (*canonical*

correlation eating disorders = .72). The poorer discrimination for alcohol is likely related to

features beyond that of the scale. In particular, a high number of individuals diagnosed in the

drug use disorder sample also drank alcohol, which can weaken discrimination. In line with this,

the level of discrimination based on existing well-validated measures of alcohol use disorders

was also low (*range* = .41-.45). The authors also standardized the measure and established cut-

points using the 90th percentile in the nonclinical sample. The cut-scores reliably predicted group

membership, though results again varied by scale of interest. The alcohol scale performed the

most poorly with 78% of the clinical sample correctly identified using the cut-score, while the

gambling cut-score correctly identified 100% of the sample. In all, the published data represent

strong psychometric support for the measure.

The CMPB also asks participants to rate how characteristic each specified behavior is of

them, using a 6-point scale ranging from 1 = *very like me* to 6 = *very unlike me*, for 10 problem

behaviors, including self-harm, restrictive eating, binge eating, alcohol misuse, drug misuse,

smoking, sexual promiscuity, excessive internet use, excessive exercise, and aggression (see

Appendix B). The items were purportedly derived from existing well-validated inventories that

assessed the problem behavior in isolation. However, no published information could be

identified that describes the specific scales from which all the items were generated, but a

subsample of measures is provided in the text. The average internal consistency was a = .87, and

all coefficients were all above the recommended minimum of .7 (*range* = .73-.90). In addition,

the composite score demonstrated good to excellent test-retest reliability across time (2 weeks to

14 months). Regarding validity, the authors correlated scores on the 10 subscales with existing

validated measures of related constructs and found moderate to highly significant correlations

(*range* = .50-.83). Notably, the correlation between the binge eating subscale of the CMPB and

the existing measure, which was not identified in the published work, was the lowest observed

correlation (*r* = .50). Regarding the total scale, it was positively correlated (*r* = .40) with the total

score on the UPPS-P Impulsivity scale (Cyders et al., 2007) and negatively correlated with the

Satisfaction With Life scale (*r* = -.27; Diener at al. 1985). The authors argue that construct

validity for the measure was additionally supported by the finding of significant differences

between the means of a self-identified clinical group and a self-identified non-clinical group.

While this is an appropriate starting place, there are significant limitations associated with this

method, and future studies should consider establishing norms for clinical groups or utilizing

area under the curve analyses to set cutpoints. Finally, the authors subjected the scale to

confirmatory factor analysis with a mixed sample primarily composed of students (25% of whom

reported current or previous experiences with therapy). The results did not support a single

higher order factor for all ten subscales. Subsequent analysis revealed good model fit for a single

higher order factor for 8 of the 10 subscales, excluding restrictive eating and excessive exercise

(*CFI = .95, RMSEA = .043*). It is again notable that the binge eating subscale demonstrated the

lowest loading onto the higher order factor (β = .22).

      The Compulsive Behaviors Questionnaire (CBQ; Conason et al., 2013) was initially

developed for a study exploring new onset of SUDs in a bariatric surgery sample. In order to test

this hypothesis, the authors longitudinally followed (up to 24 months) 155 bariatric surgery

patients and assessed for alcohol use, recreational drug use, cigarette smoking, shopping,

gambling, sexual activity, internet use, and exercise in the past month. Notably, the authors did

not assess for binge eating symptoms as the surgical procedures were largely thought to

eliminate the possibility of binge eating, at least initially (Dymek, Le Grange, Neven, & Alverdy,

2001). For each identified behavior, the individual reports the frequency of the behavior, the

frequency of others complaining about the behavior, and the frequency with which the individual

self-identifies the behavior as problematic. Ratings on a 10-point Likert scale were provided (0 =

not at all; 10 = *all of the time*). The authors did not complete any exploratory or confirmatory

factor analyses. Furthermore, in the available published studies (i.e., Conason et al., 2013), it

appears that only the alcohol use frequency score was utilized in analysis. Consequently, there is

not yet enough evidence to determine either the internal consistency, test-rest reliability,

construct validity, or factor structure of this measure.

The Behavioral Addictions Questionnaire (Konkolÿ Thege et al., 2015) assesses for the

severity of six problem behaviors: gambling, exercising, sexual behavior, shopping, online

chatting, video gaming, and eating. In particular, participants from a national longitudinal study

in Canada first responded to six or seven stem questions that asked, "Are there activities that you

engage in where your over-involvement has caused significant problems for you in the past 12

months? Check off any that apply" (Konkolÿ Thege et al., 2015, p. 4). For those behaviors that

individuals endorsed as problematic, the Behavioral Addictions Questionnaire was then

provided. The instrument is a 21-item scale adapted from the Problem and Pathological

Gambling Measure (Williams & Volberg, 2010). The items assess three different domains:

psychosocial problems caused by the behavior, impaired control, and other addiction related

characteristics (five items; e.g., craving and preoccupation). The majority of items (13 out of 21)

assess for psychosocial problems associated with the behavior, including interpersonal problems

or financial difficulties. Like the CBQ, few psychometric properties beyond the internal

consistency (a_{range} = .72-.92) have been published to date. Furthermore, the measure has yet to be

empirically validated through sequential exploratory and confirmatory factor analyses.

This review highlights that there are few factor-supported, psychometrically validated instruments available for assessing a range of addictive disorders. Of the available tools, the SPQ possesses the strongest evidence base, with moderate to strong internal consistency, test-retest reliability, and construct validity in the form of convergent and divergent validity. Nonetheless, the current aimed to address several important limitations. The most significant change addressed the length; the SPQ consists of 160 items, precluding its use in settings focused on rapid assessment. Such settings could include primary care offices, college counseling centers, and research endeavors. In contrast, the proposed measure is intended to include 35 items, which represents about one-fifth of the length of the SPQ. In the following discussion, the utility and limitations of screening measures will be briefly considered.

Utility of Screening

Item reduction can substantially impact reliability, as well as validity, though a strong literature base supports the utility of screening for a variety of psychological and physical conditions. The U.S. Preventative Services Task Force (USPSTF) represents a large national panel of experts who present recommendations to Congress related to reducing overall morbidity and mortality in the United States. The task force also regularly provides recommendation statements regarding screening in primary care settings. Two major areas of recommendation are screening for AUD and depressive disorders.

The USPSTF recommends screening all adults age 18 and older for a range of alcohol behaviors, including risky drinking, alcohol abuse, and alcohol dependence. The overall grade of the evidence related to the recommendation was considered a B, indicating moderately good support for this practice. A primary source of evidence included a meta-analysis of 23 studies and six systematic reviews, which demonstrated that screening for AUD and subsequent

behavioral counseling was associated with improved drinking and utilization outcomes (Jonas et al., 2012). The USPSTF also reviewed available screening instruments and posits that the Alcohol Identification Test (AUDIT; Saunders et al., 1993), the Alcohol Identification Test-Consumption Items (AUDIT-C Bush, 1998), and a single item related to binge drinking demonstrated the best sensitivity and specificity. While a review of each of these tools is unnecessary, a summary of the evidence related to the AUDIT-C, which represents an extremely brief screening tool may be illustrative. The AUDIT-C has demonstrated strong sensitivity and specificity in a variety of samples (Gordon et al., 2001; Jonas et al., 2012; Moyer, 2013; Philpot et al., 2003). In addition, the widespread use of the AUDIT-C indicates that this screening tool is highly acceptable in a range of settings, including primary care clinics (Moyer, 2013) and emergency room departments (Nordqvist, Johansson, & Bendtsen, 2004). The sensitivity and specificity were good to excellent in across diverse samples. For example, in a female sample, strong psychometric properties were supported. (Bradley et al., 2003). Moreover, in an investigation with three different racial and ethnic groups (African Americans, Hispanic individuals, and Caucasians), the measure demonstrated comparable sensitivity and specificity across groups (Frank et al., 2008). Despite a generally large literature base, USPSTF cited insufficient data regarding the important question of whether screening for alcohol problems generally reduces morbidity, mortality, health care utilization, sick days, legal issues, employment stability, or quality of life in the United States. In particular, the current literature base does not include studies that randomize individuals to screening versus no screening. There is, however, strong evidence supporting brief interventions following positive screens. Across 23 studies and among adults, alcohol consumption following brief intervention was reduced by 3.6 drinks per week. In addition, there was a 12% reduction in heavy drinking episodes and an 11%

increase in the individuals achieving recommended drinking limits by 12 months (Jonas et al., 2012). This is in line with the current work, which ultimately aimed to create a screening tool that serves to alert healthcare professional to the possible need for further assessment and/or treatment.

The task force also recommends screening both adults and adolescents for depression (U.S. Preventive Task Force, 2002). Like AUD, depression represents a highly prevalent disorder with significant personal, social, and economic burden (Greenberg et al., 2003; Moussavi et al., 2007). While a review of the tools and evidence base for depression screening is beyond the scope of the current work, there is strong evidence supporting the utility of brief screens (Gilbody, Richards, Brealey, & Hewitt, 2007), though extremely brief screens with only 1-2 items generally perform poorly (Mitchell & Coyne, 2007). The USPSTF also reviewed available clinical trials for depression screening and treatment. Based on 14 available clinical trials, the findings were mixed. Screening and feedback generally demonstrated small, but statistically significant improvements, though several studies demonstrated a nonsignificant effect. In contrast, several trials demonstrated large effects for coordinated care, where screening results serve as an impetus to help refer the patient to mental health treatment (U.S. Preventive Task Force, 2002). This is unsurprising given the chronic nature of depression, and it highlights the necessity of pairing screening with other steps (i.e., further assessment and personalized referrals), particularly in clinical settings.

Although the above review highlights the potential for screening tools to serve an important function in a variety of settings, such tools must be carefully designed. As the SPQ has demonstrated the strongest psychometric properties, the design for the current work was principally be contextualized with respect to this work. Regarding the reduction of items, this

was accomplished in several ways. First, specific criteria that have been empirically

demonstrated to show excellent discrimination served as the basis of the measure (see

Identifying Addiction section for review). Second, some scales included in the SPQ have limited

support in the literature as constructs associated with clinically significant distress and

impairment, while other scales are not generally conceptualized as an addiction. For example, the

evidence base for compulsive helping lacks large-scale cross-sectional studies, epidemiological

studies, treatment studies, and more. In addition, in the two decades since the SPQ was

published, research has demonstrated that food restriction and excessive exercise are less

strongly related to substance-related and other addictive disorders and more closely related to

eating pathology. This includes factor analysis for the CMPB as well as other research (Bamber,

Cockerill, & Carroll, 2000; Barbarich-Marsteller, Foltin, & Walsh, 2011). For example, Bamber

et al. (2000) found that excessive exercise in the absence of eating disorder psychopathology was

not significantly related to poor psychosocial functioning or clinically significant distress and

impairment. In addition, dissertation research revealed that individuals with high levels of work

addiction or exercise addiction demonstrated significantly different personality profiles than

observed among those with other forms of addiction (Sejud, 2013). In particular, impulsivity was

negatively associated with both of these potential conditions. As such, the subscales for the

current work were limited to those in which there is at least moderate support for

conceptualization the behavior as an addiction.

While a significant number of scales from the SPQ was excluded, the current work also

aimed to add or expand scales. In particular, the sex scale on the SPQ does not mention

excessive pornography viewing, which may represent a clinically significant variant of this

presentation (Grubbs, Volk, Exline, & Pargament, 2015). In addition, there is growing research

related to potential addiction to video games, which was not captured in the SPQ. The final

changes were related to new item development, with an aim of using updated and unambiguous

language. The 2003 validation of the SPQ maintained the language from the original scale

developed in 1982. As such, the items are based on popular vernacular from almost four decades

ago, which may be less relevant and/or inappropriate today. For example, the item "I have

preferred to graze like a cow throughout the day rather than ever allow myself to get hungry',

has the potential to be insensitive to respondents" emotional and psychological experiences of weight

stigma.

The above review highlights the importance of assessing for a wide range of SRAD, in

order to better understand important and unknown questions; a brief screening measure could

help to assess how these conditions are related and prevalence estimates for individuals

presenting to a variety of settings—a gap in the literature that has been identified for more than

10 years (J. E. Grant, Levine, Kim, & Potenza, 2005; Potenza, 2006). Though a very large

number of behaviors have been offered as potential addictions, a thorough literature review

revealed seven substance-related or other addictive behaviors with at least moderate support in

the literature, including AUD, drug use disorder, tobacco use disorder, gambling disorder, BED,

hypersexual disorder, and internet gaming disorder. The central aim of the current work was to

utilize rigorous analytic techniques to develop a measure that is both reliable and valid, which

could represent an important contribution to the literature.

Methods

Study Overview

Figure 5 illustrates the steps involved in the development of the Recognizing Addictive

Disorders (RAD) scale. Step 1, emphasized the necessity of a priori identification of the purpose

and scope of the measure. Steps 2 and 3 involved specifying the response format and item generation. Following review and reduction by study team members, experts reviewed the proposed items and non-experts rated each item's clarity, comprehensibility, and relevance. The resulting items were subjected to psychometric testing in two waves. The first wave of data collection provided as data for the exploratory factor analysis (EFA; step 4). Participants completed a survey with 244 items. Step five involved reviewing the results of the EFA with the goal of substantially reducing the number of items. In Wave 2 (step 6) participants completed the RAD scale, which included 38 items. In this step, the data were tested utilizing confirmatory factor analysis (CFA). Additional analyses explored reliability and validity of the scale. The figure also illustrates that standardization or developing norms are an important part of scale development. While this step was beyond the scope of the proposed work, this represents an important future direction, particularly in clinical samples. Importantly, data collection is underway in a substance abuse treatment center and a bariatric surgery center.
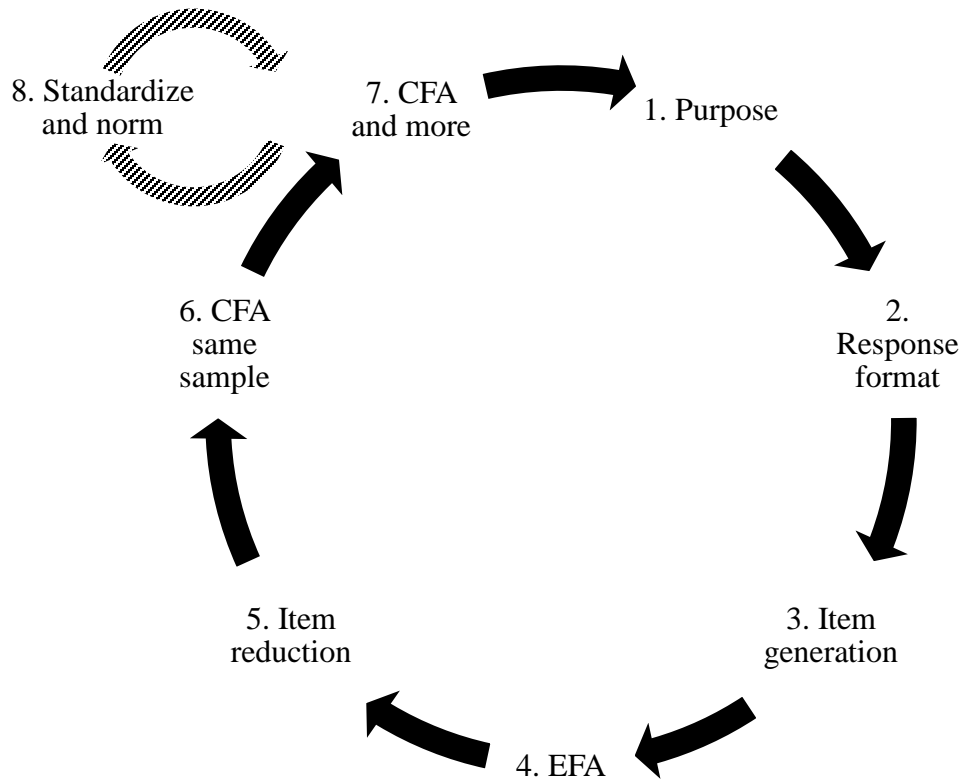
Figure 5. Study Design Overview. Adapted from: Spruyt, K., & Gozal, D. (2011). Development of pediatric sleep questionnaires as diagnostic or epidemiological tools: A brief review of dos and don'ts. *Sleep Medicine Reviews*, *15*(1), 7–17. doi:10.1016/j.smrv.2010.06.003

Response format and item generation

The response format was based on simulation studies when available, recommendations in the literature, and what is currently used in the field. Based on the simulation work by Lozano, Garcia-Cueto, and Muniz (2008), the RAD scale included a 7-point Likert-type response: 1 = *Does not describe me at all*, 4 = *Describes me somewhat*, 7 = *Describes me very well*. Participants were told to think about the previous three months when responding, and although there is no standard timeframe within the field, the choice of three months aligns with other measures in the field, such as the Questionnaire on Eating and Weight Patterns 5 (Yanovski, Marcus, Wadden, & Walsh, 2014).

Item generation occurred prior to data collection, and it was completed by a group of students and a faculty member with interest and/or expertise in the areas of eating pathology and addiction. The process of item generation was guided by the five criteria of interest from the Diagnostics and Statistical Manual for Mental Disorders-5th edition (*DSM*-5; APA, 2013), with a goal of generating a very large item pool. DeVellis (2013) recommends developing at least three to four times the number of items that will ultimately be included in the final scale, which was accomplished during item development.

Attention was also paid to readability. Recommendations for reading level of health materials vary, with some suggesting that reading levels between sixth and eighth grade are appropriate (Badarudeen & Sabharwal, 2010). Data from Wave III of the NESARC study demonstrated that individuals with a drug use disorder were significantly more likely to have lower levels of education as compared with those without a drug use disorder (B. F. Grant et al., 2016); though, the same data set revealed no significant educational differences for individuals diagnosed with an AUD (B. F. Grant et al., 2015).

One of the most widely utilized formulas is the Flesch-Kincaid (Kincaid, Jr, Rogers, & Chissom, 1975), which produces an estimate of reading grade level, using the average number of words per sentence and the average number of syllables per word (Friedman & Hoffman-Goetz, 2006) multiplied by a specific constant. Though reading levels below sixth grade for each item would have been ideal in the current context, pilot work revealed significant difficulty related to this, and the difficulties did not always relate to comprehension. For example, if the same item was tested across several different behaviors that were polysyllabic (e.g., pornography) items could have significantly higher reading level estimates. In addition, adding familiar and important words such as "sometimes" also increased the rated grade level. To assess standard

practice in the field, reading level of the Patient Health Questionnaire, a widely utilized

screening tool, was investigated. Nelson, Cho, Berk, Holland, and Roth (2009) reported that the

reading level for the instrument was around the ninth grade. Ultimately, the decision was made

to require all of the individual items to be below eighth grade reading level and to review items

with the intent of eliminating uncommon language and unnecessarily long descriptions. The

reading level of the total scale was also assessed.

Next, items were submitted to non-expert review to determine the clarity and

comprehensibility of items. As proposed, the items were first submitted to the Eastern Michigan

University subject pool. However, a review of the results indicated problems with data validity.

The decision was made to change recruitment for initial item review to Amazon's Mechanical

Turk (MTurk). For MTurk users, the directions stated:

> "The following questions may be included on a new questionnaire we would like to
>
> make. The questionnaire will be about excessive behaviors, such as drinking and binge
>
> eating. We want to know from you if you think the items are clear and easy to
>
> understand. Please rate honestly and read every question. Your input will impact the
>
> questionnaire we develop."

The MTurk platform includes a large online labor force who complete tasks, typically for

relatively nominal fees. Use of MTurk samples in published research has increased substantially

(Buhrmester, Kwang, & Gosling, 2011). Based prior work (Behrend, Sharek, Meade, & Wiebe,

2011; Buhrmester et al., 2011; Goodman, Cryder, & Cheema, 2013), it was anticipated that

certain groups would be more highly represented (i.e., Asian or Asian Americans), while some

groups (i.e., African Americans) would be underrepresented. Accordingly, recruitment across

Waves was first opened to individuals of any racial or ethnic background. After a minimum of

300 participants were collected, participant requirements were changed to require that individuals identify as a member of a racial or ethnic minority group in order to complete the survey. The overall goal was to increase the representativeness of the sample.

For Wave II, measures used to assess construct validity were broken-up to reduce participant burden. In each block, participants were exposed to the RAD screener and a selection of other measures. For Wave II, recruitment continued until a minimum of 200 participants completed each of the three blocks.

Measures

During Wave I, the measures were limited to demographics and item evaluation. During Wave II, additional measures described below were added to investigate construct validity.

Adverse Childhood Experience (ACE) questionnaire. The current version of the ACE questionnaire is a 10-item scale assessing for adverse events, including emotional, physical, or sexual abuse; parental mental health or substance abuse problems; and psychosocial stress (e.g., parental divorce or family member sent to prison). Responses are binary, and the number of positive items (e.g., exposure to a specific traumatic event) is summed. The original measure was developed by Felitti et al. (1998), and the items were broadly based on well-developed measures. For example, psychological abuse, physical abuse, and domestic violence are assessed using language from the Conflicts Tactic Scale (Straus, Gelles, & Smith, 1990). Additionally, the question about depression was adapted from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981). In the original format, response choices varied by item, with questions sometimes assessing frequency and other items assessing severity. In their initial validation paper, the developers found that the odds of engaging in health risk behaviors or demonstrating other significant health risk factors (e.g., smoking or severe obesity) were

significantly more likely when one or more adverse experiences was endorsed. In addition, the

developers found that individuals who endorsed for four or more ACE events were at a

significant risk for a wide range of negative outcomes: 2.2 times the risk of being a current

smoker, 1.6 times the risk of severe obesity, 4.6 times the risk of past year depression, and 12.2

times the risk of reporting a lifetime suicide attempt. Additionally, a comprehensive study of

over 17,000 individuals enrolled in a health maintenance organization revealed that ACE scores

were significantly related to a number of constructs of interest, after controlling for age, sex, age,

race, and education. See Table 10 for a summary. Psychometric properties of the measure are not

widely reported, though test-retest reliability was poor for some events (range = .51- .69; Dube et

al., 2004). Test-retest reliability was lowest for an emotional abuse item referring to feeling

physically threatened, and it was highest for sexual abuse items. No other psychometric

information could be identified in the literature.

As an exploratory element of the study, an additional unpublished scale was included that

assess for protective or positive events in childhood (PACES). Developed by the same authors of

the ACE, the PACES mirror the format, with 10 dichotomous items asking about events that

happened before the age of 18, such as being part of a team or having a loving, supportive adult

in one's life. The psychometric properties of the scale are unknown. A copy of the measure is

located in Appendix B.

Patient Health Questionnaire (PHQ). The PHQ (Spitzer, Kroenke, & Williams, 1999)

is a 26-item self-report measure that screens for the five most common disorders encountered in

primary care settings: somatoform disorder, depressive disorders, anxiety disorders, alcohol use

disorder, and eating disorders. The measure was adapted from the Primary Care Evaluation of

Mental Disorders (PRIME-MD), which includes both a self-report and clinician administered

components. The psychometric properties of the overall measure are strong, with good

sensitivity (.75) and specificity (.90) and moderate inter-rater agreement (k = .65). In the current

study, only the questions related to depression (PHQ-9) and generalized anxiety (GAD-7) were

used (see Appendix B).

Relative to other sections of the PHQ, the greatest support and research interest has

focused on the PHQ-9 (Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001). The

items are based on the nine diagnostic criteria listed in the *DSM*-IV TR for major depressive

disorder, which are assessed over the past two weeks using a 4-point Likert scale: 0 = *Not at all*,

1 = *Several days*, 2 = *More than half the days*, and 3 = *Nearly every day*. Scores on the PHQ-9

range from 0 to 27, with specific cut-points for mild (5-9), moderate (10-14), moderately severe

(15-19), and severe (20-27) depression. Sample items include, "Over the last 2 weeks, how often

have you been bothered by feeling little interest or pleasure in doing things?" In order to meet

screening criteria for a diagnosis of major depressive disorder, a client must endorse five or more

symptoms as occurring "more than half the days." In addition, one of the symptoms must include

either depressed mood or anhedonia. Alternatively, a diagnosis of other depressive disorder is

made if a client endorses three or more symptoms as occurring "more than half the days," and

one of the symptoms is depressed mood or anhedonia. Convergent validity has been

demonstrated through studies showing strong or moderate correlations between the PHQ-9 and

other widely used measures of depression, including the Beck Depression Inventory (r =.73) and

General Health Questionnaire-12 (r =.54). In a sample of 6,000 primary care and obstetric

clients, a cutoff score of ten or more was shown to have good sensitivity (.88) and specificity

(.88) for major depressive disorder (Kroenke et al., 2001).

The GAD-7 includes seven items and a response format that conforms to the PHQ-9 (0 = *Not at all*, 1 = *Several days*, 2 = *More than half the days*, and 3 = *Nearly every day).* Items are based on *DSM*-IV TR criteria for generalized anxiety disorder (GAD). Sample items include, "Over the last 2 weeks, how often have you been bothered by feeling nervous, anxious, or on edge?" A provisional diagnosis of GAD is made if five or more symptoms are endorsed as occurring nearly every day. In a large sample (N = 2,740) of adult patients, the GAD-7 demonstrated excellent internal consistency (Cronbach a = .92) and good test-retest reliability (ICC = .83; Spitzer, Kroenke, Williams, & Löwe, 2006). The developers also provided strong evidence of construct validity; using a cutpoint of 10, the GAD-7 shows good sensitivity (89%) and fair specificity (82%), which is within the expected range for screening measures. In addition, the GAD-7 was strongly associated with the average number of disability days, number of physician visits, and reports of functional impairment. A similar relationship was observed on the Medical Outcomes Study Short-Form General Health Survey (SF-20; Stewart, Hays, & Ware, 1988; Ware, Sherbourne, & Davies, 1992). Standardized data showed a significant decrease in reports of wellness in a variety of domains, with moderate to large effects sizes observed for individuals with moderate (10-14 points) and severe (≥ 15 points) scores on the GAD-7. Additional research with a sample of more than 5,000 participants demonstrated support for the unitary factorial structure as well as measurement invariance across gender and age ranges (Löwe et al., 2008).

Behavioral Inhibition and Activation (BIS/BAS scale). The BIS/BAS scale was first developed by Carver and White (1994) based on theoretical work by Gray (1981, 1987, 1990). Gray argued that personality is comprised of two dimensions—an inhibitory system that is sensitive to punishment, non-reward, and novelty as well as an approach system that is sensitive

to reward and escape from punishment. In general, greater levels of the behavioral inhibition

system (BIS) are thought to be associated with anxiety and tendency to avoid novel

environments. In contrast, greater levels of the behavioral activation system (BAS) are thought to

be associated with impulsive behaviors, including addiction. Carver and White developed a 20-

item measure based on these theories and tested the factor structure. The authors found that BIS

items were unidimensional, while BAS items were related to three factors: reward

responsiveness, drive, and fun seeking. The authors also supported initial construct validity as

the BIS scale correlated highly with the Manifest Anxiety Scale (Bendig, 1956). In addition, the

fun subscale of the BAS was highly correlated with two subscales of the Tridimensional

Personality Questionnaire related to extroversion and novelty seeking (Cloninger, 1991). The

scale has been used to explore differences in clinical presentations, particularly among substance

abuse and eating disorders. Loxton and Dawe (Loxton & Dawe, 2001) found that heightened

BAS scores strongly predicted alcohol misuse, while heightened BIS and BAS scores were

associated with dysfunctional eating. This study is notably limited by measurement constraints,

as dysfunctional eating was assessed using the Drive For Thinness scale (Garner, Olmstead, &

Polivy, 1983), which does not assess specific types of disordered eating (e.g., restrictive and

binge eating). Kane, Loxton, Staiger, and Dawe (2004) addressed some of these issues with a

small sample of women with either bulimia alone or bulimia as well as substance abuse. The

authors found that the BIS/BAS scale was predictive of impulsivity in a laboratory paradigm. In

both the self-reported BAS scores and the behavioral impulsivity paradigm, women with bulimia

alone were more impulsive than controls, while women with bulimia and substance abuse were

more impulsive than controls and bulimia only patients. Despite some support and widespread

use, multiple studies have failed to replicate the original factor structure (Campbell-Sills,

Liverant, & Brown, 2004; Demianczyk, Jenkins, Henson, & Conner, 2014; Heym, Ferguson, &

Lawrence, 2008). In one of the most methodologically rigorous and thorough investigations to

date, Morean et al. (2014) found that a briefer 13-item scale demonstrated a stable 4-factor

structure that mirrored the factors proposed by Carver and White (see Table 11). The shortened

measure demonstrated scalar invariance across sexes, age groups, and race (White and non-

White). Evidence related to internal consistency for the factors was more modest, with the lowest

coefficient alpha for reward responsivity ($a = .60$). Finally, the fun subscale was found to predict

lifetime number of drinks and both the inhibition scale and the fun scale were found to predict

smoking, after controlling for a number of sociodemographic factors. Based on the strong

psychometric evaluation, the refined version of the measure (BIS/BAS-13) was used. (Appendix

B includes a copy of the measure.)

Shortened UPPS-P scale. Despite the strong validation work by Morean et al. (2014),

the BIS/BAS—13 has yet to be trialed in other published research. In addition, the scale has not

been tested with a wide range of addictive disorders. In contrast, the predictive validity of a

newly developed shortened form of the UPPS-P (Urgency, lack of Premeditation, lack of

Perseverance, Sensation seeking, and Positive urgency) was tested with respect to alcohol

misuse, binge eating, gambling, risky sexual behavior, and self-harm (Cyders, Littlefield, Coffey,

& Karyadi, 2014). The original UPPS-P (59 items) was developed by factor analyzing self-report

measures of impulsivity, and CFAs revealed five distinct subtraits: negative urgency, i.e., the

tendency to act rashly in the face of negative affect; positive urgency, i.e., the tendency to act

rashly in the face of positive affect; sensation seeking, i.e., enjoyment of novel and stimulating

experiences; lack of premeditation, i.e., the tendency to act without thinking generally; and lack

of perseverance, i.e., difficulty continuing to engage with a task that is boring and/or difficult

(Cyders et al., 2007). Of these traits, negative urgency is the most widely studied. In particular,

cross-sectional research has linked negative urgency with alcohol misuse (Dick et al., 2010;

Kaiser, Milich, Lynam, & Charnigo, 2012), drug use (Kaiser et al., 2012), smoking (Conner et

al., 2009), bulimia symptoms (Fischer et al., 2012), food addiction (Murphy, Stojek, &

MacKillop, 2014), and more. For example, a recent prospective cohort study found that negative

urgency predicted onset of both binge eating and problematic gambling (Farstad et al., 2015). It

has also been found to predict onset of heavy drinking in college students, over and above known

risk factors (Stojek & Fischer, 2013). Moreover, lack of perseverance is also associated with

binge eating and obesity (Meule et al., 2014; Murphy et al., 2014). The UPPS-P demonstrated

metric invariance across sexes, but measurement invariance has not been established with racial

and ethnic groups. The shortened UPPS-P was developed by retaining four indicators for each

facet of impulsivity. Items were retained based on the corrected item-total correlation, with those

items that were most strongly related to the latent construct retained. The response format of the

20-item scale is Likert type, with participants rating the extent to which they agree with the

statements (1 = *Strongly agree* to 4 = *Strongly disagree*). In the validation paper, the CFA

demonstrated the same factor structure as observed in the original measure; a model including

five correlated latent facets of impulsivity fit the data well. Internal consistency was good across

scales (*range a* = .74-.85). Different facets of the scale were significantly associated with various

risk behaviors, though positive urgency was not significantly associated with any risk behaviors,

and self-harm was not significantly associated with any of the facets (Cyders et al., 2014). The

lack of association between positive urgency and risk behaviors is inconsistent with other reports

(Cyders et al., 2007; Zapolski, Cyders, & Smith, 2009). Additionally, previous studies have

found a strong association between impulsivity facets and self-injury, particularly negative

urgency (Dir, Karyadi, & Cyders, 2013). Overall, the psychometric properties of the shortened

measures are somewhat less strong than the original measure, but the reduction of 39 items made

the shortened form a more appropriate fit for the current work (see Appendix B for a copy).

Composite Measure of Problem Behaviors (CMPB). The psychometric properties of

the CMPB (Kingston et al., 2011) were reviewed above as related to existing transdiagnostic

scales. In general, the findings for the validity in either a nonclinical or clinical sample is mixed.

The internal consistency of the full scale was good ($a = .87$), and the internal consistency of the

subscales were all above the recommended minimum of .7 (*range* = .73-.90). Test-retest

reliability was high for most scales, with the exception of excessive internet use and aggression.

The evidence related to construct validity is the least well developed, with a t-test demonstrating

significant differences on the mean of each subscale between a non-clinical and clinical sample,

as distinguished by an item asking about previous experiences in therapy. (See Appendix B for a

copy.)

Brief Difficulties in Emotion Regulation (DERS-16). The original DERS was first

developed by Gratz and Roemer (2004), and it assesses problems related to emotion regulation,

which includes several related skills: being aware of emotions, accurately labeling emotion,

making decisions based on emotional information, and modulating emotions (Gratz & Roemer,

2004). Higher scores on the DERS—indicating greater difficulties—are associated with

increased alcohol problems (Weiss, Forkus, Contractor, & Schick, 2018) and gambling disorder

(Rogier & Velotti, 2018). It has also been shown to mediate the relationship between early

childhood adverse events and maladaptive behaviors such as alcohol misuse, risky sex, physical

aggression, and impulsive spending (Espeleta et al., 2018). The shortened version reduced the

total number of items from 34 to 16. Items were retained based on the corrected item-total

correlation as well as inter-item correlation, with items that were less strongly related to the overall score (i.e., $r \geq .50$) or very highly correlated ($r \geq .90$) being eliminated. Validation work with a sample of women undergoing treatment for deliberate self-harm found that the measure was highly correlated with the original measure as well as associated constructs, such as anxiety, depression, stress, and self-harm frequency (Bjureberg et al., 2016). These results were replicated and extended with two non-clinical samples by demonstrating significant positive associations with emotion-related constructs: negative affect intensity, emotion amplification, emotional suppression, affect lability, and lower levels of mindfulness. The authors also found emotion regulation problems were related to diverse impulsive behaviors, including drinking and self-harm (Bjureberg et al., 2016). Across samples internal consistency was excellent (Cronbach $a = .92$ or greater). Given the significant association with diverse maladaptive behaviors and the strong psychometric properties, the DERS-16 was used to explore potential evidence in support of construct validity for RAD.

Data Analysis

Prior to factor analysis, the data were screened related to the underlying assumptions of the EFA, though these assumptions are heavily relaxed in the application of EFA as compared with CFA (Brown, 2006). Per Tabachnick and Fidell (2001), data screening involves multiple steps and in the case of EFA includes: ensuring adequate sample size, examining missing data, and identifying univariate outliers. The issue of appropriate sample size in both EFA and CFA is complex and related to the ratio of indicators and factors, strength of the relationship between indicators and factors, the estimation method, and more. Most recommendations in the field are based on Monte Carlo or simulation studies (Brown, 2006). Although other methods have been suggested (e.g., Sattora-Saris), such methods are not yet widely adopted. In a Monte Carlo

simulation, Li (2016) investigated the rejection rates for the null model (acceptable rejection rate is between 2.5T% and 7.5%) when alpha is set to .05 and varied the sample size, the number of ordinal categories, and relative level of non-normality. If a moderately non-normal distribution is assumed, the rejection rate with a sample of 200 with 6 ordinal categories was 6.4%. In a sample of 500 with the same distribution and ordinal response format, the rejection rate was 4.0%. The data also demonstrated that the rejection rate was too high when only slightly non-normal distribution was observed for both samples of 200 and 500. In such cases, maximum likelihood may be a more appropriate estimator, but sample size requirements may be different. Min (2008) used maximum likelihood estimation and found that estimates were more often misspecified in sample sizes less than 200. Tanaka (1987) drew similar conclusions related to the robustness of estimations in samples of at least 200. However, the author also found that issues of non-normality in the data further constrained the smallest possible sample size. Based on these data, a minimum sample size of 300 cases was recruited, which is also recommended by Tabachnick and Fidell (2001). While 500 cases may have been optimal if robust weighted least square estimation was used, a sample of 300 was solidly above the sample size of 200 that demonstrated a high rate of type I errors.

With regard to missing data, a small amount of missing data was generally permissible, as analyses rely on correlation and covariance matrices for all procedures, rather than raw data. These matrices can be calculated even when data are missing, and as such, analyses may proceed without imputing data. In addition, Brown (2006) writes that using multiple imputation in this context may result in an overly fitted model and create factors that are an artifact of the multiple imputation procedures. As such, no imputation procedures were used in the current analyses. Univariate outliers were not observed because the range was restricted to an ordinal scale.

Exploratory factor analysis. Exploratory factor analysis (EFA), confirmatory factor

analysis (CFA), and structural equational modeling (SEM) share a common vocabulary and

conventions of notation that are important for interpretation. For the purposes of this work, an

indicator refers to an item, which is understood as being an observed variable (i.e., scores in

response to survey items). In contrast, a latent variable is unobservable, always continuous, and

reflects the hypothetical construct of interest. Importantly, latent constructs are understood to

cause observed variables. For example, the latent construct of gambling is understood to cause an

individual's response to the items related to gambling. In the context of factor analysis, latent

constructs are often referred to as factors. Errors or residuals refer to any variance in the

observed variable that is not explained by the latent factor (Kline, 2010). In the application of

these techniques, the common factor model, first described by Thurstone (1947), underlies all

procedures and interpretations. The common factor model states that an indicator represents a

linear combination of two things: one, a common factor that explains some of the variance for

this item as well as the related items, and two, a unique factor that is composed of both error and

any latent factors that control for the variance in outcomes for that item alone. The goal of EFA

is to evaluate the dimensionality of a set of multiple indicators by uncovering the smallest

number of interpretable factors that explain the correlations and covariances among a given set

of indicators (Brown, 2006). Exploratory factor analysis was an appropriate first step in

measurement development, in order to determine if the items shared common factor(s) and the

overall strength of the relationship between items and factors. Exploratory factor analysis was

utilized to determine factor structure and eliminate poorly performing items.

Brown (2006) describes five steps for EFA: factor extraction, factor rotation, factor

selection, interpretation, and completing CFA on the same sample. There are multiple estimating

methods available for factor extraction. Due to concerns about violations of normality

assumptions, several other estimation methods were tested, such as minimizing residuals and

weighted least squares.

Rotations were used to aid in interpretation of potential factors. Importantly, rotations do

not change model fit in any way. Instead, they make results more interpretable by producing

solutions that maximize high correlations and minimize low correlations (Tabachnick, 2001).

Oblique rotations were used, which allow for the factors to be correlated. Oblique rotations may

be more easily generalized to CFA, as leaving the factors uncorrelated in a multidimensional

scale often results in poor fit (Brown, 2006). The rotation can be further specified with respect to

technique, which are often related to the type of software utilized. With oblique rotations, results

are based on pattern matrices, where factor loadings will reflect the unique relationship between

the factor and the item, and it does not include any variance in the item explained by other

factors. A general rule of thumb has been proposed by Comrey and Lee (1992) that suggests

factor loadings higher than .71 are excellent, .63 are very good, .55 are good, .45 are fair, and .32

or lower are poor. In general, highly loading items were preferable, though the theoretical

impetus for the project was also considered. For this step, the goal was to retain a single item for

each *DSM*-5 indicator (i.e., using a larger amount or over a longer period of time than was

intended, physical or psychological problems, social or interpersonal problems, neglecting major

roles, and giving up activities) that loaded highly onto one factor, though problems arose in the

application of this approach.

In addition, eigenvalues, parallel analysis, and Velicer's minimum average partial method

(Velicer, 1976) were used to identify the appropriate number of factors. Parallel analysis utilizes

software to create a correlation matrix from randomly generated data with the same number of

observations and variables. It is assumed that only those factors with eigenvalues greater than the

eigenvalues produced by the random data should be retained ("How To Do Parallel Analysis For

Pca Or Factor Analysis In Stata?," 2018). Velicer's minimum average partial (MAP) method was

developed in the context of principal component analysis. For this method, components are

extracted, and the squared partial correlation is calculated (the amount of variance explained by

that component). Components continue to be extracted, and the subsequent squared partial

correlation is calculated. At first, the amount of variance will become smaller with each

subsequent component extraction as the amount of common variance explained decreases.

However, additional factors will be extracted that will explain unique variance and at that point

the average partial correlation will increase. The MAP criterion reports the number of factors

needed to achieve the *minimum* (or smallest) partial correlation associated with common

variance (Velicer, 1976). Note that while the scree plots were examined as proposed, this

method was not used to determine the number of factors to be retained due to the ambiguity it

introduces, which is a shortcoming described in the broader literature (Courtney, 2013).

Following the extraction, rotation, factor selection, and interpretation, CFA on the same sample

was performed.

Confirmatory factor analysis. CFA constrains the data to fit the hypothesized model,

and fit indices were utilized to determine how well the hypothetical model explained the

observed data (Brown, 2006). With regard to fit indices, and for this work, the χ^2, Tucker Lewis

index (TLI), comparative fit index (CFI), and root mean square error of approximation

(RMSEA) were examined. Notably, χ^2 results were interpreted in the same way as logistic

regression, with a nonsignificant χ^2 indicating a good fit. However, χ^2 can be problematic in

large samples, where trivial differences between the observed covariance matrix and the

estimated population covariance matrix can result in a statistically significant difference

(Tabachnick, 2001). However, Kline (2010) argues that in samples with 200-300 people, a

significant χ^2 can in fact indicate problems with model specification. This is an area of

significant equivocality in the literature that is mirrored in discussions related to the other fit

indices. TLI is an incremental fit index, and such indices can be understood as analogous to R^2.

TLI also accommodates for model complexity (Hu & Bentler, 1999). Another relevant

incremental fit index is CFI, which is very similar to χ^2 but relies on a noncentral distribution and

noncentrality parameters. In contrast to incremental fit indices that compare the model to the

worst possible model (i.e., nothing is related), absolute fit indices compare the model to the best

possible or saturated model. RMSEA is an absolute fit index that is also based on a noncentral

distribution and compensates for model complexity.

     With any of the above fit indices, interpreting what represents a good and poor fitting

model is an area of significant debate. Some of the most widely cited rules of thumb were

developed by Hu and Bentler (1999). The authors suggest that values above .95 for TLI and CFI

and values below .06 for RMSEA indicate good fit. Kline cautions against using these guidelines

as definitive cutoffs for both good and poor model fit; he argues that the guidelines are based on

simulation studies that cannot accommodate for all types of data and all types of models. For this

work, a more liberal cutoff for the values was considered sufficient to move on the next step of

conducting a CFA on another sample. The decision to allow for more liberal values was both

practical and supported in the literature for RMSEA (Maccallum, Browne, & Sugawara, 1996).

As such, RMSEA values below .10 and TLI and CFI values above .90 were considered sufficient

to move onto the next step as long as appropriate steps were taken to try to improve the model

fit.

The assumptions necessary for CFA are extremely similar to those outlined for EFA, and a similar procedure was adapted, including obtaining an adequate sample size, examining missing data, and assessing singularity. The CFA produced several parameters, including factor loadings, unique variance, and factor variance (Brown, 2006). Factor loadings represent the strength of the relationship between the item and factor, while controlling for the correlation associated with other factors in the model. Unique variance is any variability in the indicator that is not explained by the latent factors included in the model. Factor variance represents the dispersion of the sample, similar to variance with single indicators showing the amount of variability from the mean. In addition to factor variances, factor covariances can be estimated to depict the strength of the relationship between two latent factors. When the second order factor model was specified, all factors were correlated. Similar to multiple regression, both standardized and unstandardized solutions may be calculated (Brown, 2006). Bifactor modeling was also used, which assumes that a single latent factor influences all the indicators and other latent factors influence specific items, but the relationship between the general latent factor and the indicators is not mediated by the more specific latent factor. See Figure 6 in Appendix C for pictorial representation of the proposed models.

Assessing reliability and validity. For Wave II of data collection, participants completed the proposed RAD measure as well as several related measures. The goals of this step included testing the data to determine if it conformed to the specified factor structure as well as assessing reliability and validity. A reliable scale produces scores that represent the true state of the variable being assessed (DeVellis, 2013, p. 39). In the current work, internal consistency, which is a form of reliability, was assessed. Internal consistency describes the relative homogeneity of items contained within a scale. To test internal consistency both coefficient alpha (a) and

coefficient omega (ω) were assessed. Coefficient alpha calculates the ratio of communal variance (i.e., caused by the true score on latent factors) and the non-communal variance (within item variance that is caused by error). This ratio is multiplied by a constant to standardize the values, where the range for coefficient alpha is 0-1.0. Importantly the calculations involved in coefficient alpha assume tau-equivalency, or that the covariance of all items with the latent factor are equivalent. In contrast, coefficient ω utilizes the congeneric model and does not rest on such an assumption. As such, both values for each set of items loading onto a latent factor were reported. Though outside of the scope of the proposed work, other important forms of reliability, including temporal stability represent important future directions.

Validity refers to the degree to which the underlying latent construct is the cause of the item scores, and it conceptually reflects whether or not the measure is assessing what it purports to measure (DeVellis, 2013, pp. 83–103). Like reliability, there are multiple constructs related to validity that can be assessed independently to characterize the validity of a measure. Broadly, there are three forms of validity: content validity, criterion-related validity, and construct validity. Content validity is related to sampling adequacy and refers to the degree to which a scale adequately samples from the universe of possible items. This is conceptually very difficult to prove, but review by experts related to the items increased confidence related to content validity. In the current work, experts reviewed all items prior to testing, and ratings of the item's clarity, comprehensibility, and relevance was also gathered. The degree to which the raters characterize the items as highly relevant is related to content validity. Criterion and construct validity can be particularly difficult to disambiguate from one another. Criterion-related validity describes an empirical association between the measure of interest and a related and well-validated measure (DeVellis, 2013). In contrast, construct validity more broadly refers to the

degree to which the underlying latent construct is the cause of item scores, and accordingly,

interpretations based on these scores are valid. Some conceptualizations of construct validity

subsume both criterion-validity and content validity as evidence related to construct validity.

Additional evidence of construct validity may be derived from evidence of concurrent validity,

measurement invariance across demographic groups, and incremental validity. For this work,

construct validity was assessed by exploring the linear relationship (i.e., Pearson correlation)

between scores on the proposed measure and other related measures: ACES, PACES, PHQ,

BIS/BAS-13, Shortened UPPS-P scale, CMPB, and the DERS-16. It was hypothesized that when

the proposed measure was scored using a continuous scale, there would be moderate, positive

correlations with the PHQ-9, GAD-7, ACES, and DERS-16, and there would be a moderate

negative correlation with the PACES. It was hypothesized that the continuous scoring of the

proposed measure would correlate positively and moderately to strongly and positively with the

BAS items and the Shortened UPPS-P, respectively. The evidence related to a strong negative

correlation between impulsive behaviors and BIS is more equivocal (Voigt et al., 2009). As such,

no hypotheses were offered related to the BIS. The measure was, however, expected to strongly

correlate with the CMPB. Support for incremental validity was tested by examining if the new

screener predicted the frequency and quantity of the seven behaviors of interest over and above

an existing measure (CMPB).

Results

Item Development

Based on the five criteria of interest from the Diagnostics and Statistical Manual for Mental Disorders-5th edition (*DSM*-5; APA, 2013), items were generated. The resulting list was subjected to reading level analysis, which revealed that some items scored above the recommended reading level of sixth grade. In response, some items were dropped, some new items were developed, and some items were re-worded. Overall, the changes resulted in a reduced average reading level across all behavioral subscales. In totality, the reading level of items was scored at a 5.7[th] grade level. Note that the Flescher-Kinkaid Reading formula calculates reading level as an interval level variable. Next, experts reviewed the items for content analysis. This study was approved by the Eastern Michigan University Human Subjects Committee (see Appendix D).

During early phases of expert review, multiple raters expressed concern about their lack of ability to discriminate between items intended to reflect activities given up versus neglecting major roles. Members of the oversight committee met, and it was agreed that a different *DSM*-5 criterion should be included. Craving was chosen as the fifth *DSM*-5 criterion based on strong support for construct validity in the behavioral addiction literature (Grant et al., 2010). Importantly, craving is often conceptualized as preoccupation in the case of behavioral addictions. Stinchfield (2005) found that preoccupation demonstrated strong levels of discrimination within a community sample as compared with a sample of treatment-seeking gamblers. Additionally, preoccupation was endorsed by over 90% of their treatment-seeking sample. All items related to activities given up were eliminated and 37 craving items were added. Experts were asked to indicate the *DSM*-5 criterion that they believed each item intended to

assess. All items with at least 75% agreement were retained. Table 12 includes items that were

eliminated due to poor agreement. Items intended to assess neglecting major roles or problems in

interpersonal relationships were most frequently the source of disagreement between experts. In

total, 23 items were eliminated.

Next, items were read and rated for comprehensibility and clarity, first using the Eastern

Michigan University subject pool system. However, responses showed almost no variability,

with a significant portion of the sample rating all items as incomprehensible. Several attempts

were made to increase the validity of responses, including shortening the required task by

randomizing students to one of two blocks, thereby requiring only half of the items to be rated.

In addition, the directions were re-worded and re-formatted to increase understanding. Issues

with possible response bias continued. For example, in the reformatted survey (half the items and

edited directions) 20% of the sample rated 50% or more of the items as 1 = *very unclear*. The

decision was made to complete comprehensibility ratings using the Amazon's Mechanical Turk

(MTurk) platform.

MTurk respondents were randomly assigned to one of two blocks, which exposed them to

50% of the possible items. The 20% lowest performing items were dropped; the 20% benchmark

was chosen as this allowed for excluding unclear items, while still maintaining a total item pool

well-above the recommendations (DeVellis, 2013). Review of the lowest rated items revealed

that the highest proportion of items were related to binge eating behaviors. The decision was

made to generate another pool of items to be tested for this behavior. The newly developed items

were rated better and were included in Wave I of data collection, while the 20% of the lowest

performing items were excluded altogether. The resulting list included 189 items.

Wave I Results

During Wave I of data collection, participants completed demographics, information about family history, and the original 189 Recognizing Addictive Disorders (RAD) items. Note that recruitment occurred in two phases, with the second phase only including individuals who identified as being a part of a minority group. See Table 13 for a summary of demographic characteristics.

The sample demonstrated adequate diversity, with about 30% identifying as non-White. However, the purposive sampling strategy was less successful at recruiting African American participants. Adjustments were made before Wave II of recruitment to better address this issue of representation/generalizability. The sample was approximately 54% female. As expected, college educated individuals were over represented in this sample as compared with a community sample, though a range of income levels is clear. The participants were largely engaged in full-time work.

The first analysis step of Wave I included cleaning the data. Cases that did not pass internal validity checks were excluded ($n = 50$). Participants who missed 10% or more of the original RAD items were excluded ($n = 64$). Initial attempts at exploratory factor analysis (EFA) revealed problems with convergence. Determining a definitive cause of lack of convergence is usually not possible (Brown, 2006). In this case, it was hypothesized that the large number of indicators as compared with the number of participants was likely the most significant contributing factor. The decision was made to eliminate items with very low levels of endorsement, as skew can negatively impact EFA (Brown, 2006). Items with fewer than 5% of the sample rating the item 5 or higher on the response scale (1 = *Does not describe me at all* to 7 = *Describes me very well)* were eliminated. Although this represents an arbitrary cutoff, similar

procedures are observed in the measurement development literature (Cicero, Neis, Klaunig, & Trask, 2017). The resulting item pool included 132 items. Several estimation methods were tried during factor extraction, including maximum likelihood, weighted least squares, and minimizing residuals. Note that the *robust* weighted least squares estimation method was not possible with the observed sample size. Additionally, multiple rotations were sampled to best understand the composition of possible factors.

For the total item pool, parallel analysis and the minimum average partial-correlation (MAP) criterion suggested eight factors, while the eigenvalues suggested 12 factors. Factor extraction using weighted least squares provided the clearest results. Most rotations revealed a pattern of pornography items loading onto two different factors, although cross-loading was still apparent. Proportionally, the eighth factor explained only 2% of the variance, while each of the remaining seven factors explained between 6% and 15% of the variance. Table 42 in Appendix E includes the factor loadings, the communalities, and the unique variance associated with each item using the seven-factor structure. The table demonstrates that most items loaded highly onto a single factor. The decision was made to retain a seven-factor structure for item reduction.

The next step involved performing an EFA for each of the factors identified during the total item EFA. Factor analysis was performed again as the goal was to retain the items that loaded the most highly onto their specific factor and any variance in the item explained by a factor other than their primary factor was minimized.

A total of 29 alcohol items were considered. See Table 14 for descriptive statistics related to the items. Parallel analysis suggested three factors, the MAP criterion suggested five factors, while retaining factors with eigenvalues over one suggested two factors. EFA forcing five factors did not converge. A review of the rotated factor matrix using three factors revealed that there

was an artificial factor because an item was accidentally repeated. The two identical items were deleted. Parallel analysis continued to suggest three factors, while only one factor had an eigenvalue over 1 following the removal of the repeating items. The new rotated factor matrix did not reveal any obvious patterns, though Factor 2 was the largest factor that explained the most variance and included a variety of *DSM*-5 indicators. Factor 1 generally included items related to using larger amounts or over longer periods of time than was intended, while Factor 3 represented a mix of craving and health related items. See Figure 7 for a figural representation of the three-factor solution. The total variance explained by a three-factor solution was 72%. An EFA forcing one factor was also evaluated. Using a one-factor solution, 67% of the variance in the items was explained. Given the support for both a three-factor and one-factor solution, two methods of retaining items were tried. First, five items were retained that corresponded to each of the *DSM*-5 criteria based on the strength of the loading irrespective of whether it loaded most strongly onto Factors 1, 2, or 3. Next, the one-factor solution was used, and the 5 items that corresponded to each of the *DSM*-5 criteria and loaded the most highly onto the single factor were retained. Fit indices indicated that the second method resulted in explaining the highest proportion of variance. Table 15 includes a list of the items and the associated factor loadings for a single factor solution for the alcohol items.
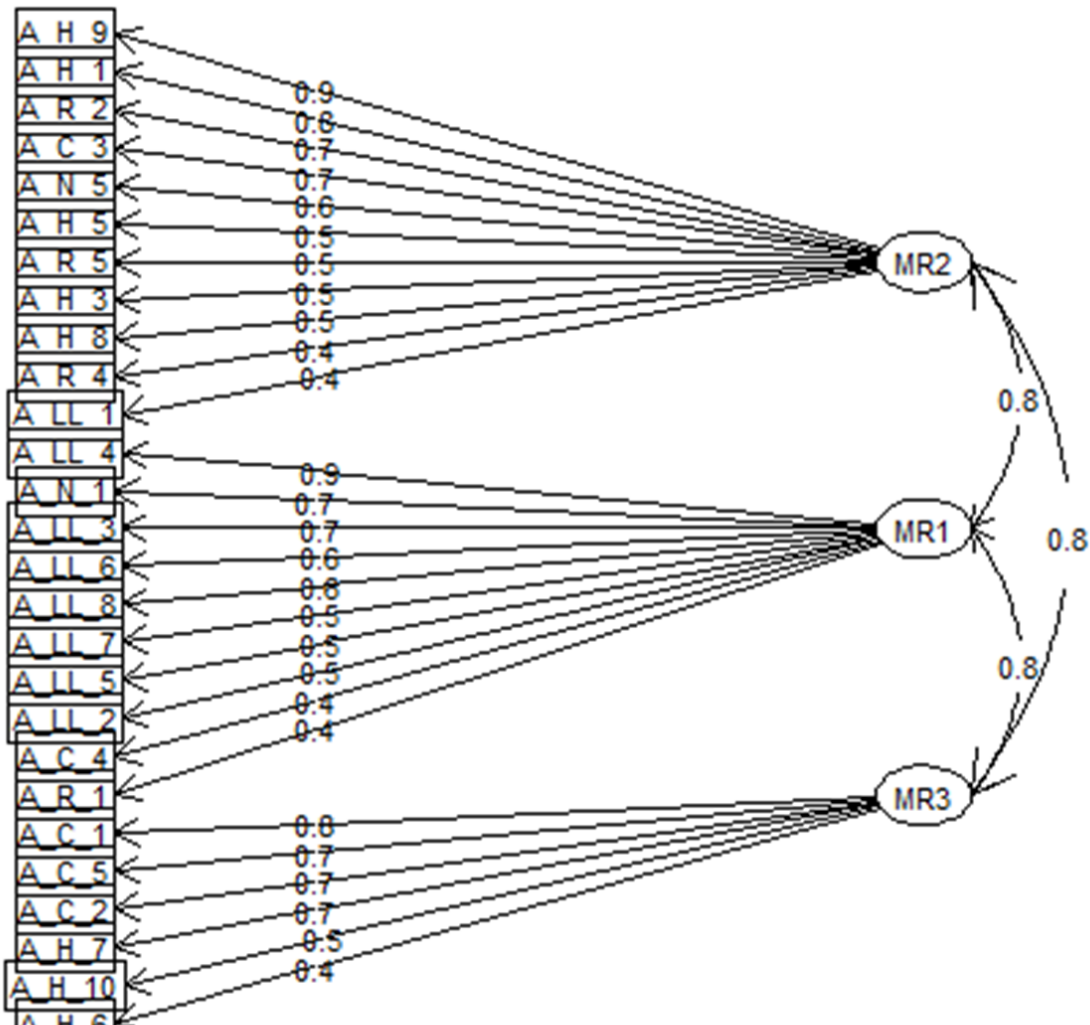
Figure 7. EFA results for total alcohol item pool using three-factor solution**.**

For the drug items, 11 items were reviewed. See Table 16 for descriptive information for

items. These items demonstrated some of the most significant skew and strong endorsement of

items was rarely observed in this sample. When the drug items were subjected to EFA, parallel

analysis suggested three factors and the MAP criterion and eigenvalues suggested a one-factor

solution. Using a three-factor structure, there was no single factor that accounted for a large

amount of the variance for most of the items. Using a promax rotation, the factors appeared to

include: one factor entirely composed of drug craving items; another factor that could represent

higher severity drug items, including experiencing health problems, neglecting things at work

and school, and being unable to form close relationships; and a third factor that included using more than planned as well as having others not approve of use. The three latent drug factors were highly correlated (.72 and above), and together the factors explained 78% of the variance. Using a single factor solution as suggested by the MAP criterion and the eigenvalues, a total of 70% of the variance was explained. When a single factor solution was forced, at least one item representing each of the *DSM*-5criteria showed "excellent" factor loadings for the latent drug factor based on the guidelines by Comrey and Lee (2013; > .71 or greater). Based on this and the overarching aim of parsimony, the decision was made to retain the items associated with each of the *DSM*-5 criteria that loaded most highly when a single factor solution was forced. Table 17 includes a list of the items and the associated factor loadings for the drug subscale. Due to a sorting error, in some cases, items were retained despite the presence of another potential item with a higher factor loading. For example, the factor loading for the drug craving item that was retained was .75. However, there was another drug craving item with a factor loading of .90. The correct method would have retained the drug craving item with the highest factor loading. Despite the error, all items loaded strongly onto the single latent drug factor, which supports that the validity of the scale was maintained.

For smoking, 27 items were considered. See Table 18 for a summary of the descriptive statistics for the items. For the smoking items, both parallel analysis and eigenvalues suggested two factors, while the MAP criterion suggested three. When a two-factor and three-factor solutions were used, a Heywood case occurred, wherein a communality over 1 was observed. In these cases, it is not recommended to interpret the solution (Brown, 2006). When a one-factor solution was attempted, all smoking items loaded highly (i.e., > .71; Comrey & Lee, 2013), with the exception of a single smoking craving item. The proportion of the variance explained by a

single latent smoking factor was .73. Given the uninterpretable fit of a two and three-factor

solution, a single factor solution was retained and items corresponding to each of the *DSM*-5

indicators that loaded the most strongly onto the latent smoking factor were retained. See Table

19 for a list of the items and the associated factor loadings for a single factor solution for

smoking.

For gambling, 12 items were considered. See Table 20 for a summary of the descriptive

statistics. Like the items related to drug use, these items were more rarely endorsed, which is

reflected in the skew statistics, the range for some items, and the small initial item pool. In

particular, retaining items based on a minimum of at least 5% of the sample responding five or

greater significantly reduced the potential item pool for gambling. For the gambling items,

parallel analysis suggested two factors, while eigenvalues and the MAP criterion suggested one.

When a two-factor solution was used, a Heywood case occurred, wherein a communality over 1

was observed. In these cases, it is not recommended to interpret the solution (Brown, 2006).

When a one-factor solution was specified, all items loaded highly (i.e., > .71; Comrey & Lee,

2013), with the exception of two health-related items. See Table 21 for a summary of the factor

loadings using a single factor solution for gambling items.

For the binge eating items, 23 items were reviewed. See Table 22 for descriptive

information. Parallel analysis, the MAP criterion, and the eigenvalues suggested a two-factor

solution. A review of the two-factor solution using the minimum residual extraction method and

oblimin rotation revealed a clear pattern of relationship and neglect items largely clustering on a

second factor. See Figure 8 for a graphical representation. With this solution, the first factor

explained 50% of the variance, while the second factor explained 20% of the variance. In order

to be consistent with other subscales, a single factor solution was also tested. With a single-factor

solution, at least one item representing each of the five *DSM*-5 criteria loaded highly on the

single latent binge eating factor (i.e., factor loading > .71). As such, the single factor solution that

was consistent with other subscales was used Table 23.
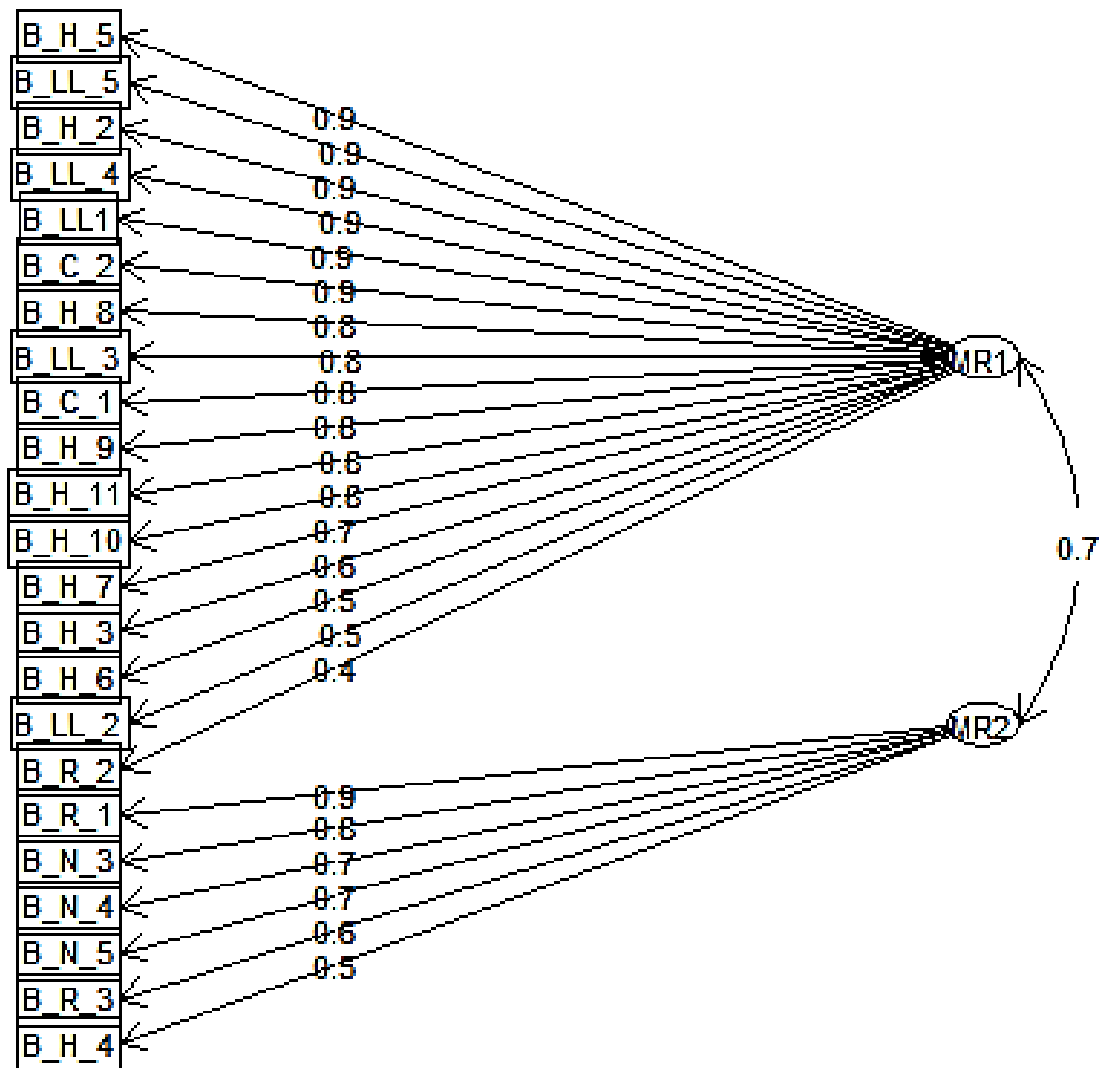
Figure 8. EFA results for total binge eating item pool using two-factor solution

Twelve items were reviewed for the hypersexuality subscale. Table 24 reviews the

descriptive statistics for the items. Both eigenvalues and the MAP criterion indicated that a two-

factor solution was a good fit, while parallel analysis suggested a three-factor solution. When a

three-factor solution was specified, as suggested by parallel analysis, the rotated pattern matrix

revealed cross-loadings, but it did not show items clearly loading most highly on three separate

factors. The lack of a valid third factor was further supported by the respective proportion of

variance explained; the first factor explained 36% of the variance, the second factor explained

27% of the variance, and the third factor explained 4% of the variance. Using an oblimin rotation

and a two-factor solution, a clear pattern emerged where the first factor included items related to

wanting or thinking about sex. The item that loaded the most highly on factor one stated, "When

it comes to sex/porn, I almost always want more." In contrast, the second factor was

characterized by having problems as a consequence of sexual activity. The item that loaded the

most highly onto Factor 2 stated, "My sex or porn habits can cause some problems at work or

home." See Table 24 for the three-factor solution for pornography/sexual items. In order to be

consistent with other subscales, a single factor solution was also tried. With a single-factor

solution, at least one item representing each of the five *DSM*-5 criteria loaded highly on the

single-factor (i.e., factor loading > .71). As such, the single factor solution that was consistent

with other subscales was used. Table 25 includes a list of the items and the factor loadings using

a single factor solution.

Seventeen items were reviewed for the video game subscale. Table 26 reviews the

descriptive statistics for the video game items. Both parallel analysis and the MAP criterion

indicated that a two-factor solution was a good fit, while the eigenvalues were consistent with a

one-factor solution. A two-factor solution was evaluated with several different rotations used to

aid interpretation. None of the rotations revealed a clear second latent factor related to video

games. However, across several different rotations it was clear that two relationship items cross-

loaded onto a second factor at the fair or weak level, respectively. However, when a one-factor

solution was tried, the two items loaded onto the single latent video-game factor strongly (.76 or greater). As with earlier subscales, a unidimensional factor structure was retained, including a single item related to each *DSM*-5 criterion. Table 27 includes a summary of the factor loadings for a unidimensional solution.

Following EFA, items were subjected to confirmatory factor analysis (CFA), first using the same sample. CFA was completed in R using the lavaan package (Rosseel, 2012). Due to the skewed nature of the data, attempts were made to use robust weighted least squares estimation. However, the model would not converge. As such, maximum likelihood was used. First, a measurement model was fitted using seven factors, and each factor included one item for each of the five *DSM*-5 criteria. This model was consistent with the theoretical impetus of the project and hereafter is referred to as the theoretical model. Table 28 includes the fit statistics for this model as well as the other models that were evaluated. Overall, the fit indices indicated poor to acceptable fit for the theoretical model. Alternative models were specified and evaluated based on examining the residuals. Across the seven factors, neglect items were consistently loading the least strongly as compared with the other criteria. A model (Model 2) was specified that dropped neglect across all seven factors and the corresponding measurement model had 20 items. This model showed some very minimal improvements in fit. Notably, formal model comparison was not undertaken at this stage, as most models were non-nested and therefore did not accommodate chi-square difference testing or other similar procedures. During the EFA process, when a two-factor solution was specified, rotated factor matrices often revealed a pattern of internalizing symptoms clustering together and externalizing symptoms clustering together. Model 3 is considered the internalizing model and is based on those *DSM*-5 criteria consistent with internal distress, and the model drops the items more closely related to externalization (i.e., relationship

problems and neglecting roles). Of the available measurement models, descriptively this model demonstrated the best fit, though fit was still below acceptable standards. Model 4 is considered the empirical model, as it retains five items for each factor irrespective of the *DSM*-5 criteria. As shown in Table 29 and Table 30, the empirical model most often retained items related to engaging in the behavior over longer periods of time or consuming more than planned, health problems, and craving. In comparison, items related to neglect and relationship problems were less likely to be retained. The resulting model again demonstrated mild improvement from the theoretical model, and the indices continued to demonstrate largely poor fit. Additional models were evaluated that included dropping the hypersexual factor or dropping the excessive video gaming factor. Again, improvements were minimal. Model 7 retained all seven factors but fixed certain covariances to 0 for those factors that were shown to be weakly correlated ($\leq .3$). These constraints did not appear to improve model fit. Given the relatively poor fit, independent CFAs for each factor were conducted to better understand possible contributions to misfit.

For the independent factor CFAs, two measurement models were tested for each factor: one that was consistent with the theoretical model and one that was consistent with the internalizing model. Table 31 shows the CFA results for each measurement model type for all seven behaviors analyzed independently. As with the full measurement model CFAs, formal model comparison was not possible. However, based on the general guidelines related to fit indices, the internalizing model was a better model for smoking and gambling. For smoking, the internalizing items were retained for Wave II. For gambling, while the fit statistics indicated mildly better fit for the internalizing model, this is inconsistent with the published literature. Further, gambling items represented the most highly skewed items with very few respondents rating items as "Somewhat likely" or higher. Based on the limited data available within this

sample and the available literature, the decision was made to retain items that could allow for

either measurement model framework. The resulting list included eight items. The Wave II data

were used to better inform which items should ultimately be retained. For the hypersexual items,

a sorting error was made that incorrectly retained items for the theoretical model. As a result,

initial results indicated that retaining internalizing items may have been a better approach. Under

the internalizing model, most fit statistics were in the acceptable range, with the exception of the

χ^2 and RMSEA values. Based on the information available at that time, the internalizing items

were retained for the hypersexuality items. For all other behaviors, items were retained based on

the theoretical model. Given the observation of acceptable fit across all seven factors, the

decision was made to move forward with Wave II of data collection.

Wave II CFA results

The Wave II sample demonstrated adequate diversity with about 37% of the sample

identifying as non-White, including 14% of the sample identifying as African American/Black

and 10% identifying as Asian (Table 32). See Table 33 for a sample of these studies and the

RAD sample listed as a comparison.

The first analysis step of Wave II included cleaning the data. Cases that did not pass

internal validity checks were excluded ($n = 60$). Table 35 includes the descriptive statistics for

the items in Wave II. Analyses for Wave II were completed using MPlus 7.0 (Muthen & Muthen,

2017). First, an EFA was performed to understand the relationships between the eight gambling

items and the latent gambling factor, with a goal of reducing to five items in order to align with

the other subscales. The data supported a unidimensional factor structure based on the

eigenvalues, and the fit indices for a one-factor solution were excellent. Further, the two-factor

solution produced factors that were very highly correlated ($r = .957$). Factor loadings were

examined to determine which items to retain prior to conducting CFA. All items loaded onto a

single factor solution at .95 or above. Items were retained based on the theoretical model, with

one item representing each of the *DSM*-5 criteria being retained. The resulting scale included 35

items and seven subscales. Five subscales included items based on the theoretical model, and 2

subscales (Smoking and Hypersexuality) included items based on the internalizing model. A

measurement model was specified to include one higher order factor of addiction and seven

latent factors defined by five observed indicators. Robust weighted least squares estimation was

used due to the skewed nature of the data. Figure 9 shows the schematic representation of the

measurement model and the associated factor loadings (i.e., standardized solution). The ovals

represent the latent factors and the rectangles represent the observed indicators. Note that the

items are not numbered, but factor loadings represent each item in order. For example, the factor

loading for the first rectangle for the alcohol factor is .922; this means that the factor loading for

the first item in the alcohol subscale is .922. Appendix F includes a list of the item and the factor

loadings. The data showed an excellent fit with the specified model, with the exception of the χ^2

value, $\chi^2 (553) = 760.827$, $p < .001$, CFI $= .997$, TLI $= .997$, RMSEA $= .030$. Overall, results

strongly support the specified measurement model.
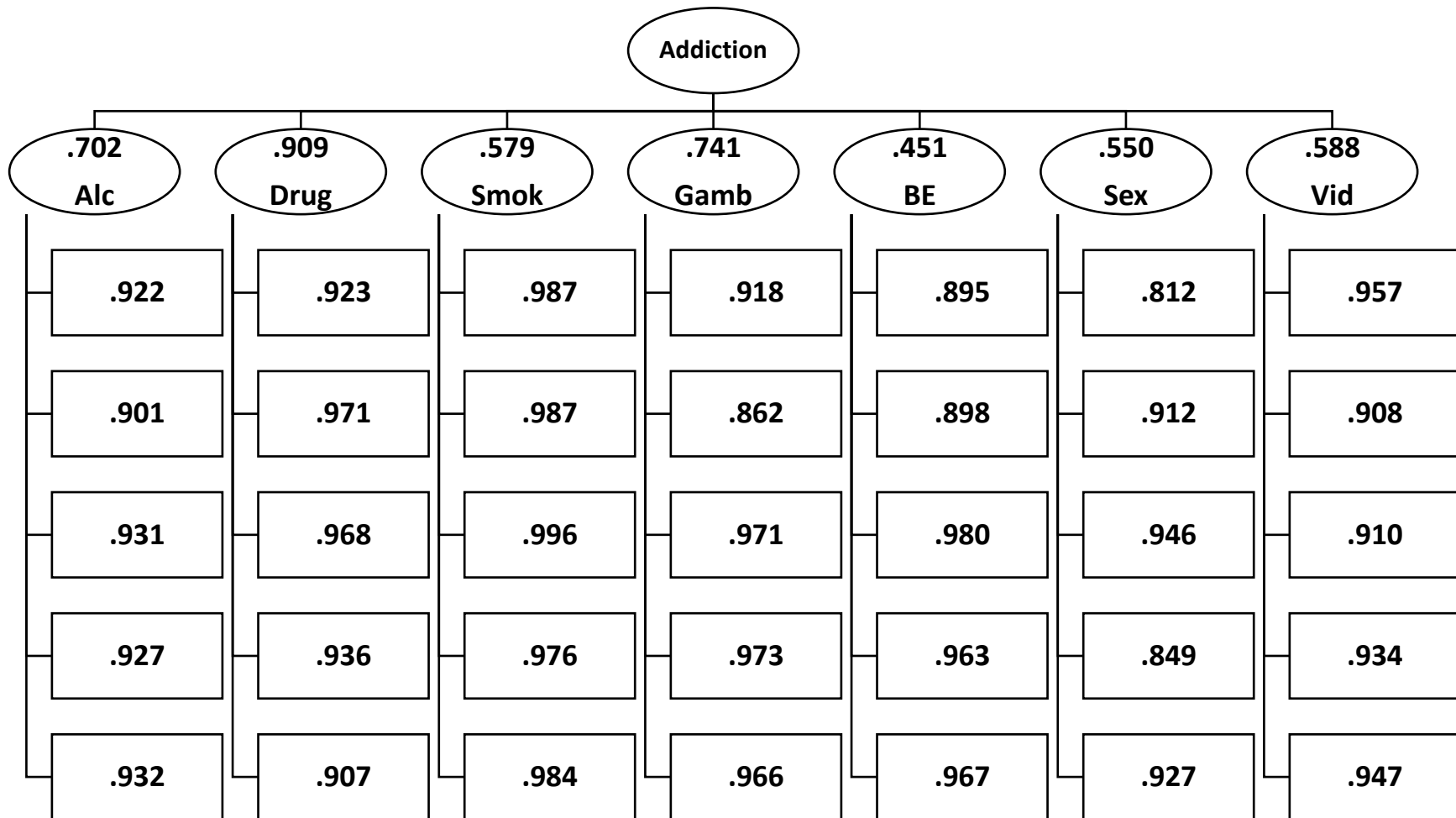
Figure 9. Measurement model for Wave II with factor loadings

Wave II Reliability and Validity Results

Reliability. For the total scale, Cronbach's $\alpha = .915$. Additional forms of reliability that do not assume tau equivalency were also tested. In the current sample, $\omega_t = .99$, which represents the sum of squared loadings on all of the factors. In the current sample, $\omega_h = .80$, which represents the sum of the squared loadings onto the general factor (i.e., the general addiction factor). This form of reliability can also be understood as an informal test of the plausibility of a hierarchical model for the data. As with earlier analyses, a hierarchical measurement model and a non-hierarchical model were non-nested, and as such, formal model comparison was not possible. Descriptively, the fit statistics were nearly identical for the two model types. For the subscales, Cronbach's α is strong, with values ranging from .899 to .984.

Validity. For this work, construct validity was assessed by exploring the linear relationship (i.e., Pearson correlation) between scores on the proposed measure and other related measures: Patient Health Questionnaire depression scale (PHQ-9); and Patient Health Questionnaire anxiety scale (GAD-7); Shortened UPPS-P scale; Behavioral Inhibition and Activation Scale shortened version (BIS/BAS-13); Adverse Childhood Experience questionnaire, with the additional protective questions (PACES); Brief Difficulties in Emotion Regulation scale (DERS-16); and the Composite Measure of Problem Behaviors (CMPB) scale. The guidelines by Cohen (1992) were used to characterize relationships between variables: $\geq .10$ small, $\geq .3$ medium, and $\geq .5$ large. Table 35 includes a summary of the correlations between the RAD scales and depression and anxiety as measured by the PHQ-9 and the GAD-7 respectively. There was a large, positive linear relationship between total RAD score and depression. Depression was also significantly, positively correlated with all RAD subscales. There was a medium effect size for the positive relationship between anxiety and total RAD score, and anxiety was

significantly correlated with RAD alcohol, binge eating, hypersexuality, and video game subscales.

Table 36 includes a summary of the linear relationship between the RAD scales and multiple dimensions of impulsivity, as measured by the Shortened UPPS-P. The RAD Total score was most strongly related to the negative urgency and lack of premeditation subscales; RAD total score was significantly related to positive urgency, but the effect size was small. RAD total score was not significantly related sensation seeking. For subscales, negative urgency was the most strongly, positively related to the majority of subscales. The remaining facets of impulsivity showed some significant relationships with specific behaviors (see Table 36 for more details). The relationship between RAD and the subscales of the BIS/BAS was inconsistent (see Table 38). Two of the subscales of the BIS/BAS (Drive and Fun Seeking) were not significantly correlated with RAD total score or RAD subscales. Inhibition was significantly, negatively related to RAD total score, the alcohol subscale, and the binge eating subscale. Effect sizes were small. Reward seeking demonstrated a similar pattern and was negatively correlated with RAD total score, the alcohol subscale, the binge eating subscale, and the hypersexuality subscale.

Table 38 includes correlation coefficients for RAD total score, RAD subscales, childhood adverse events, and positive childhood events. All effects were in the expected direction, and the correlations ranged from small to medium. Adverse childhood events were most strongly related to smoking in the positive direction, and positive events were the most negatively correlated with the alcohol subscale. There was a medium size effect for the inverse relationship between positive and negative childhood events.

Table 39 includes correlations for RAD total Score, RAD subscales, and the Difficulties with Emotion Regulation, Short Version (DERS-16). Note that the emotional clarity, goal

directed, emotion regulation strategies, and emotional acceptance subscales of the DERS-16 assess problems in these domains or a lack of the associated skill/construct. RAD total score and RAD subscales were related to higher levels of emotion dysregulation as measured by the total score. The magnitude of correlations between the RAD total score and most DERS-16 subscales were moderate in size. The impulsivity subscale was related to most RAD subscales, and the effect sizes were in the moderate range. An exception regarding impulsivity included the video game subscale, which demonstrated a non-significant relationship. For both perceived difficulty using/accessing emotion regulation strategies and problems with emotional acceptance, small magnitude, significant correlations were observed with all RAD subscales.

For the purposes of exploring construct validity, questions were developed to assess the quantity and frequency of each behavior of interest. Table 40 includes a summary of the questions. Table 41 illustrates how the disparate forms of addiction necessitate assessing quantity ideographically. For example, alcohol is assessing by inquiring about the number of standard drinks during a typical drinking occasion. In contrast, several of behaviors, such as drug use, hypersexual behavior, and video game playing, are assessed by asking the participant to estimate the total number of hours spent engaged in the activity. For all behaviors a composite variable was created that multiplied the frequency times the quantity. This represented the dependent variables, and hierarchical linear regression was used to understand the incremental validity of RAD measure when controlling for scores on the CMPB.

Table 41 includes the results of the hierarchical regression. In some cases, RAD significantly predicted the quantity and frequency of the behavior over and above the CMPB, including the smoking, video game, and hypersexuality subscales. However, in some cases the CMPB was more successful in accurately predicting the quantity and frequency of the behavior,

including predicting alcohol use and binge eating. With respect to drug taking, neither the CMPB

nor the RAD significantly predicted the behavior. Finally, the CMPB does not include a

gambling subscale, but RAD significantly predicted the behavior.

Discussion

We aimed to develop a questionnaire that measures symptoms related to seven addictive behaviors: alcohol use, drug, use, tobacco use, gambling, binge eating, hypersexual behavior, and video game playing. Few instruments adopt a transdiagnostic approach, which limits understanding of comorbidity among these behaviors. We collected data at three time-points to develop items, establish factor structure and reduce total item pool to 35 items, and confirm factor structure as well as examine support for reliability and construct validity. Overall, the project was generally successful in achieving aims. See Table 43 in Appendix F for final items. However, special attention must be paid to future directions, including validating the measure in more diverse samples as well as understanding associations with gold-standard measures of substance use disorders (SUDs) and behavioral addictions (where available).

During item development, a very large pool of items was written. In addition to asking about one of the seven behaviors of interest, each item was written to assess one of the five symptoms outlined in the Diagnostics and Statistical Manual of Mental Disorders-5th edition (*DSM*-5; APA, 2013). The five symptoms—using a larger amount or over a longer period of time than was intended, continued use or engagement despite making a physical or psychological problem worse, relationship problems, neglecting responsibilities related to major roles, and craving—were chosen out of 11 possible symptoms, based on support for strong discriminative properties in epidemiological samples (Hasin et al., 2013). Items were also adjusted to maintain a total reading level below the sixth grade. Items were rejected if greater than 25% of expert ratings disagreed about the behavior and *DSM*-5 symptom that was being assessed. Items were also discarded if non-expert ratings fell in the bottom 20% for clarity and comprehensibility. The resulting list included a total of 189 items.

Wave I of data collection involved 248 valid cases of responses to the 189 Recognizing

Addiction Disorders (RAD) items. Attempts at exploratory factor analysis (EFA) were

unsuccessful, likely due to the relatively small sample size as compared with items. A total of 57

items were discarded due to very low level of endorsement. Attempts at EFA with the remaining

132 items were successful. The results did not show complete correspondence with the intended

factor structure. That is, items were written to assess seven behaviors, but eight factors emerged.

This was likely due to two factors emerging for the items related to hypersexual behavior.

However, a seven-factor solution was a good fit to the data and items loaded onto their

respective behaviors strongly, with relatively few examples of significant cross-loading.

Wave I also included independent EFAs for each behavior of interest. Across all seven

behaviors, the suggested number of factors to be retained consistently differed based on the

method used. The methods included parallel analysis, the MAP criterion, and retaining factors

with eigenvalues over 1. All three methods arrived at the same solution in only one case: a two-

factor solution for the total pool of smoking items. These discrepancies served to further

underscore experts' description of EFA as an art form, or at minimum subjective (Brown, 2006;

Streiner, 1994; Worthington & Whittaker, 2006). Importantly, all methods suggested the

appropriate number of factors to explain the greatest variance for the total pool of items for each

behavior. In most cases, the total item pool exceeded the number of items to be retained in the

final scale by a factor of three or four. As such, a more parsimonious solution was often

appropriate. To test this approach, a single factor solution was tried for all seven behaviors. In all

cases, a single factor solution provided at least one item for each *DSM*-5 symptom that loaded

strongly onto a single factor solution. This aligned with the theoretical impetus and, in the

absence of strong consensus between methodologies for retaining factors, was considered an appropriate approach.

In line with the iterative procedures for scale development, an independent confirmatory factor analysis (CFA) was also conducted on the Wave I sample using the total items retained through EFA analysis. With ordinal data, simulation studies find that estimation using robust weighted least squares is generally more appropriate than robust maximum likelihood for CFA procedures (Li, 2016). However, parameters using this estimation method were unable to be computed. As such, maximum likelihood was used, and the resulting estimates revealed significant problems with fit. Given that EFA procedures for the total model suggested eight factors, with very minimal variance explained by the eighth factor, under-retaining factors were not thought to be a primary source of poor fit. Instead, it was hypothesized that retaining items according to the a priori *DSM*-5 symptom-based scheme significantly contributed to poor fit.

Six alternative models were tested. Inferential testing comparing fit between models was not possible because the models were non-nested. Descriptively, fit indices indicated minimal improvements across the alternatives. One model that offered modest improvements with respect to the root mean square error of approximation and Tucker Lewis index included symptoms that could be largely characterized as internalizing. Internalizing symptoms are distressing to the individual who experiences them, but the symptoms do not include overtly negative social behavior (O'Neil, Conner, & Kendall, 2011). Generally, mood and anxiety disorders are understood as internalizing disorders (Kotov, Gamez, Schmidt, & Watson, 2010), and SUDs and conduct disorders are considered externalizing disorders (Kotov et al., 2010). However, internalizing symptoms often occur in individuals with SUDs (O'Neil et al., 2011). In the current work, internalizing symptoms were thought to include using a larger amount or over a longer

period of time than was intended, making a physical or psychological problem worse, and craving, while externalizing symptoms included relationship problems and neglecting major roles.

The role of internalizing symptoms in addictive behaviors was further supported by the standardized factor loadings for Wave I. Factor loadings were often the strongest for internalizing symptoms and weaker for the externalizing symptoms. However, symptom severity represents an important confound that precludes the predominance of internalizing symptoms for these problems. Specifically, epidemiological data indicate that higher levels of item difficulty (i.e., severity) for the criteria of relationship problems and neglecting of major roles (Hasin et al., 2013). For the current sample, lower levels of endorsement for these higher severity items could weaken the association between the item and the behavior of interest. However, retaining only low-severity internalizing items has limitations, as lower item difficulty can also be associated with lower levels of discrimination between those who do and do not have the condition (DeVellis, 2013). Generally, a range of item difficulty is preferable (DeVellis, 2013). Additional alternative models were considered, including an empirical model that retained the most highly loaded items irrespective of the *DSM*-5 criteria, an empirical model without the video game subscale, an empirical model without the hypersexual subscale, and a model that fixed covariances between factors to 0 for those factors that were shown to be weakly correlated. Across alternative models, fit indices failed to rise to the level of acceptable fit or demonstrate significant improvements over the theoretical model (model with seven factors and five items for each factor that each reflects one of the five *DSM*-5 criteria). Additional steps were necessary to identify specification errors and improve the overall model.

Independent CFAs for each behavior of interest were performed to better understand contributions to poor fit. At this stage, the potential utility of the internalizing model was revisited. For the smoking subscale, fit indices descriptively (as compared with inferentially) indicated that the internalizing model was the best fit. This is consistent with some available literature, which critiques the utility and predictive validity of many of the *DSM*-5 criteria, such as neglect of major roles, in tobacco use disorders (Baker et al., 2012). For the gambling items, fit indices supported the internalizing model. However, this is inconsistent with the available literature, which supports the importance of externalizing symptoms in gambling disorder, including relationship problems and conflict in interpersonal relationships (Afifi, Brownridge, MacMillan, & Sareen, 2010; Petry & Kiluk, 2002; Suomi et al., 2013). Further, gambling items were rarely endorsed in this sample. The decision was made to retain items that would allow for either the internalizing or theoretical model, and Wave II data would be used to finalize the items for the gambling subscale. For the hypersexual items, an oversight caused the incorrect items to be retained when examining the theoretical model. This oversight resulted in an artificially low fit for the theoretical model, and in the face of this information, the internalizing model appeared to be a better fit. Given the oversight, specific attention will be paid when considering appropriate next steps and future research for the measure. Overall, the internalizing models were used to retain items for the smoking and hypersexual items, the theoretical and internalizing model were both considered when retaining for the gambling subscale, and the theoretical model was used to retain items for the remaining four subscales.

Wave II included 427 valid cases with responses to RAD items. Participants were also randomized to complete one or two additional measures for the purposes of exploring construct validity. The randomized procedure of exposing participants to only a select number of

associated measures was used to reduce participant burden. This method reduced the total sample

for the associated measures but not RAD responses. For the gambling subscale, EFA analyses

supported retaining items consistent with the theoretical model, and the gambling subscale was

reduced to five items before performing CFA for the total model. In contrast with earlier

analyses, robust least squares estimation was used to calculate fit and parameters. The total

model included one higher order factor of addiction and seven latent factors defined by five

observed indicators reflecting a range of *DSM*-5 criteria. Fit indices indicated excellent fit for the

total model. Estimates of internal consistency reliability were also very strong, which supports a

common latent factor of addiction across the seven subscales measuring very diverse behaviors.

There was overall support for construct validity, with the RAD total score significantly

and positively correlated with measures of depression, anxiety, impulsivity, negative childhood

events, and emotion dysregulation. The addiction total score—while related to these associated

features (e.g., depression and anxiety)—also appeared independent: All correlations were .503 or

lower. RAD total score was also significantly inversely associated with positive events or

protective factors in childhood. Higher total RAD scores were strongly associated with higher

levels of depression symptoms and moderately associated with higher levels of anxiety

symptoms, which is consistent with the literature; high rates of comorbidity between SUD,

depression, and anxiety are well documented in epidemiological data (Grant et al., 2006).

The relationship between RAD and self-reported impulsivity was tested using several

different measures. There were significant differences in the magnitude and direction of the

correlation across subscales and measures of impulsivity. This further supports a

multidimensional view of impulsivity, which has strong support in the literature (Berg, Latzman,

Bliwise, & Lilienfeld, 2015; Dawe & Loxton, 2004). In the current sample, the strongest

association between impulsivity and RAD total score was observed for negative urgency. The

strong association between negative urgency and addictive behaviors has been observed in

studies of self-harm, alcohol consumption, and eating problems in college students (Dir et al.,

2013); binge eating in a community sample (Racine et al., 2015); and prospective research

exploring the development of alcohol problems (Stojek & Fischer, 2013). Future research should

continue to explore prospective associations between negative urgency when considering a range

of addictive disorders, which could be more feasible with use of a transdiagnostic measure such

as RAD.

Some dimensions of impulsivity were unrelated to RAD total score, including sensation

seeking as measured by the Shortened UPPS-P and drive and fun seeking as measured by the

shortened BIS/BAS. It is plausible that the non-significant relationship between the drive and fun

seeking subscales was related to the tendency of RAD to capture maladaptive behaviors, while

the BIS/BAS subscales appear to characterize neutral or even adaptive behaviors. For example,

an item for the drive subscale includes "When I want something I usually go all-out to get it"

(Morean et al., 2014, p. 1007), and an item related to fun seeking includes "I often do things for

no other reason than that they might be fun" (Morean et al., 2014, p. 1007). The overall

association between impulsivity and RAD total score was strong, though a nuanced view that

adopts a multidimensional view of impulsivity most appropriately contextualizes the findings.

Regarding positive and negative events in childhood, the findings align with literature

highlighting the relationship between trauma and addiction as well as the positive impact specific

protective factors in childhood can have in the context of long-term adult outcomes. A recent

systematic review of 181 studies examining the relationship between interpersonal trauma and

addictive behaviors found mixed evidence, with 64% reporting no significant association and

35% reporting a positive significant association (Konkolÿ Thege et al., 2017). When the effects

were isolated to childhood trauma exposure, 40% of studies found a significant positive

association. These findings, as well as the moderate effect observed in the current data,

demonstrate the significance of trauma exposure during childhood, and its relationship to

addiction. However, there is heterogeneity in outcomes and exploration of moderators of these

effects are necessary. One possible moderator could include protective factors in childhood,

which was found to have a moderate inverse relationship with RAD total score in the current

sample. The body of literature related to protective factors and resilience is relatively smaller as

compared with the trauma literature. However, there is support for a range of protective factors

in reducing the overall burden of childhood maltreatment (Meng et al., 2018). Research

exploring additional modifiable moderators is warranted. In addition, while the review of

Konkolÿ Thege et al. (2017) explored the proportion of studies reporting an association between

interpersonal trauma and specific types of SUDs, future research should explore whether specific

types of trauma are associated with certain types of addictive disorders, including addictive

disorders beyond SUDs.

The data also demonstrated that higher levels of emotion dysregulation as measured by

the DERS were associated with higher total RAD score. This was true across subscales

measuring unique aspects of emotion dysregulation, with the strongest effects being observed for

impulsivity, poorer access to emotion regulation strategies, and total RAD score. Emerging

evidence supports emotion regulation as a transdiagnostic feature of anxiety disorders,

depressive disorders, eating disorders, and SUDs (Sloan et al., 2017). Sloan and colleagues

(2017) also found a significant positive effect for changes in emotion regulation following

effective treatment for a range of disorders, including SUD treatment (Sloan et al., 2017). More

research is needed to understand the similarities and differences between impulsivity and

emotion dysregulation and, further, if skill deficits specific to one of these constructs are more or

less amendable to intervention. For example, impulsivity is generally understood as a trait

(Kotov et al., 2010) and therefore potentially less mutable, though aspects of impulsivity such as

negative urgency lend themselves to intervention (Bardone-Cone, Butler, Balk, & Koller, 2016).

In contrast, many interventions, such as Dialectical Behavioral Therapy, specifically aim to

improve deficits in emotion regulation (Linehan, 1993). Additional research is also needed to

understand how these traits or lack of skills influence the trajectory of addictive disorders,

including a consideration of both prevention and treatment of addictive disorders.

   A discussion of each RAD subscale and all measures and subscales of associated

features, which represents a total of 133 correlations, is beyond the scope of this work. However,

the following discussion will consider the most notable findings, including findings that were

unexpected or contrary to hypotheses.

   The direction and strength of the relationship between the alcohol subscale and associated

features followed a similar pattern that was observed for the RAD total score, with few

exceptions. The strength of the association between symptoms related to alcohol use and anxiety

was stronger as compared with other RAD subscales. Alcohol problems and anxiety are highly

comorbid (Grant et al., 2004). Although debate exists regarding which condition should be

treated first (Flynn & Brown, 2008; Torrens et al., 2012), there is growing consensus that

accurately assessing and treating comorbid mood and anxiety disorders in substance abuse

treatment is necessary. A recent study by Wolitzky-Taylor and colleagues (2018) explored

moderators of a randomized treatment for substance use alone or substance use and anxiety

treatment. The authors found that the presence of an alcohol use disorder was associated with

greater improvement from combined anxiety and SUD treatment compared to SUD treatment alone. This effect was not observed for most other types of drug use disorders. Other addictive disorders (such as gambling) were not characterized in this sample.

The association between drug use symptoms and other related measures was less clear. The association between most measures of impulsivity and the drug use symptoms were weak or non-significant, with the exception of the impulsivity subscale from the DERS. Drug use symptoms were also unrelated to anxiety, adverse childhood events, or inversely related to positive childhood events. These effects may be due to limited variability and a high number of responses in the lowest available ordinal category, which contributed to kurtosis (Westfall, 2014). The non-normal nature of the data can negatively impact the maximum value of the correlation (Tabachnick, 2001). It is possible that this reflects the true distribution of a community sample, as drug use disorders are comparatively rarer than most of the other conditions that are screened for (Hasin & Grant, 2015). However, it is also possible that the items were written in such a manner that the difficulty was too high. That is, a person may need to be experiencing a more severe drug use disorder in order to answer affirmatively to items. Investigation of item difficulty requires ROC analyses (or other similar procedures) to compare responses of those who do and do not have a drug use disorder using a standardized assessment tool such as the structure clinical interview for diagnosis within *DSM*-5, which represents an important potential future direction.

Smoking symptoms were often weakly or non-significantly related to the other constructs of interest. Exceptions included the small or medium effect size for increased smoking symptoms being associated with increased levels of emotion dysregulation. Some research identifies emotion dysregulation as mediating the link between anxiety sensitivity (a known and robust

predictor of smoking; Powers et al., 2016) and beliefs about negative affect reduction following smoking (Johnson, Farris, Schmidt, & Zvolensky, 2012). Notably, there was a non-significant relationship between smoking and anxiety in the current sample, though the GAD-7 is intended to capture symptoms of generalized anxiety disorder rather than anxiety sensitivity. The data also suggested that higher levels of adverse events in childhood are associated with higher levels of smoking symptoms. This is consistent with the original validation data for the ACES measure, which found that a person with four or more adverse events was 1.8 times more likely to report current smoking, though this adjusted odds-ratio was much smaller than what was observed for other types of SUD in this sample (Anda et al., 2006).

The pattern of correlation between the gambling subscale and the associated constructs was very similar to the pattern observed for the drug use subscale, and the observed correlations may have been minimized in much the same way—there were low levels of endorsement which caused significant kurtosis, thereby limiting the maximum correlation values (Westfall, 2014). However, the kurtotic nature of the subscale was less extreme than what was observed for the drug use subscale, and in some cases, the correlations were slightly larger in size. For example, there was a small, significant effect supporting that higher levels of positive urgency were associated with higher levels of gambling symptoms. Work describing typologies of gambling has specifically identified a subtype of gambler that is motivated by enhancement motives or gambling in order to enhance positive mood states (Milosevic & Ledgerwood, 2010; Stewart, Zack, Collins, Klein, & Fragopoulos, 2008), which parallels behaviors associated with positive urgency. Future research should explore if motives differ for various types of addictive behaviors. Also, research should explore if one individual who experiences problems with more

than one addictive behavior may have similar or different motives for engagement in the different types of addictive behaviors.

There was a medium effect suggesting that individuals with higher levels of depression symptoms also have higher levels of binge eating symptoms. This is consistent with epidemiological data, which finds that about 32% of individuals with binge eating disorder also have a lifetime history of major depressive disorder and an additional almost 10% have a lifetime history of dysthymia (Hudson et al., 2007). The correlations between adverse childhood events and binge eating was negligible, which stands directly in contrast of treatment-seeking samples for individuals diagnosed with BED (Allison, Grilo, Masheb, & Stunkard, 2007; Becker & Grilo, 2011). These studies find rates of emotional abuse well over 50% and around 30% for both physical and sexual abuse among individuals with BED. This discrepancy could be a function of the treatment-seeking nature of the sample or related to the sample meeting diagnostic threshold of BED or both.

Some of the strongest associations for the hypersexual subscale were related to emotion dysregulation. While some have suggested a theoretical link between emotion dysregulation and hypersexual behavior (Garofalo, Velotti, & Zavattini, 2016), consistent empirical findings related to this association are lacking thus far. However, emotion dysregulation has been identified as a significant transdiagnostic factor for psychopathology (Mallorquí-Bagué et al., 2018), and so the significant association is plausible more generally. Given the relative lack of information related to hypersexuality, including a lack of diagnostic consensus, future research could begin by characterizing individuals who report problems in this area more generally. Demographically, individuals with hypersexuality are more likely to be male (Kafka, 2010), but data are not yet available on other sociodemographic predictors of hypersexual disorder.

Individuals with higher levels of video-gaming symptoms reported significantly more depression symptoms and anxiety symptoms. This direction and magnitude of this effect was similar to what was observed for other more behavioral forms of addiction (e.g., binge eating disorder), though the relationship between video game playing and depression is less well-established (as compared with the BED literature). A large longitudinal study found that a lifetime history of depression was not associated with increased risk of excessive video-game playing (Gentile et al., 2011), but another longitudinal study using growth-curve modeling found that increased symptoms related to video game playing were associated with a future increase in depression symptoms (Rehbein et al., 2010). A more recent cross-sectional, online study conducted in Korea found that individuals with comorbid internet gaming disorder and depression reported more severe internet gaming symptoms and higher scores on measures of alcohol use, anxiety, nicotine dependence, and impulsivity (Wang, Cho, & Kim, 2018). Given the inconsistency in these findings, continued attention to the prevalence and clinical implication of mood and anxiety disorder for individuals who also experience excessive video gaming is necessary.

The final step in Wave II tested the incremental validity of RAD in predicting the quantity and frequency of addictive behaviors when controlling for CMPB scores, one of the only existing transdiagnostic measures. The results were mixed. RAD significantly predicted smoking, video game playing, and hypersexuality over and above the prediction associated with CMPB scores. Further, the CMPB lacks a gambling subscale, so this can be understood as a strength of RAD, and the gambling subscale significantly predicted gambling frequency and quantity, though nothing was controlled for in this model. In contrast, RAD did not add significant predictive validity for drinking or binge eating, and neither the CMPB nor the RAD were significantly

associated with the quantity and frequency of drug taking. The null result was also maintained

when the variables were in a non-hierarchical regression. The results of the binge eating model

were particularly surprising given that the current work was partially motivated by some of the

shortcomings associated with the binge eating subscale within the CMPB. One possible

contributing factor was the low number of participants included in this model. Participants were

first asked if they ever experienced a sense of loss of control while eating. Only 43 participants

responded affirmatively to this statement, and therefore the dependent variable of the frequency

and quantity of loss of control eating included only 43 cases. This low level of power could

contribute to a type II error (Tabachnick, 2001). However, examining the standardized beta

weight for RAD indicated that the overall effect of including RAD in the model was almost

nonexistent. More research is needed to determine if this effect generalizes to other samples and

measures of binge eating. If this effect is replicated, it may indicate significant problems with the

construct validity for this particular RAD subscale. More broadly, it could indicate potential

problems with using SRAD criteria to characterize binge eating.

These results must be interpreted within the context of several important limitations. The most

significant limitation likely involves the relatively low level of endorsement of most of the

behaviors of interest. While this is likely consistent with the broader population, for whom this

measure was intended, the low level of endorsement presented problems at several stages of data

collection. During Wave I, the limitations associated with low rates of endorsement were

twofold. First, if the sample size for those who reported at least some engagement in the behavior

is very small, the confidence about generalizability to other samples decreases. Relatedly, if the

sample is likely capturing those who engage in the behavior at low levels, the relationship

between the indicators and the latent factor may be unduly influenced by those who have only

low levels of the behavior as compared with those who have higher levels of the behavior. For

example, the item within the alcohol subscale "It's hard to cut down, even though I know

drinking is bad for my health" was rarely endorsed. However, this may represent a very

important characteristic of those who do in fact have an alcohol use disorder. Some of these

issues could be sorted out through future research exploring sensitivity and specificity, but

developing the measure within this context nonetheless has some limitations. The second major

limitation for low endorsement rates, involves the distribution of data and accuracy of estimation

when skew or kurtosis is present. Extreme skew or kurtosis can cause less reliable estimation in

SEM (Li, 2016). This limitation is especially salient for Wave I, where attempts to use more

appropriate estimators were unsuccessful. However, the confirmation of the proposed factor

structure using a more appropriate estimator in Wave II alleviates most of the concern related to

this limitation, and the relative impact of the low rates of endorsement were generally less of a

concern in this wave of data collection. For the final sample in which reliability and validity

were explored, the problems largely mirrored those of Wave I, with sometimes very small

samples sizes (i.e., 43 cases for the binge eating quantity frequency variable) limiting broad

claims about generalizability of the sample.

Another significant limitation involved how the items were retained for the drug and

hypersexuality subscales. In both cases, a coding error caused items to be retained where other

items may have been more appropriate. In the case of the drug subscale, the error occurred when

examining the strength of the relationship between possible items and the latent factor. However,

the difference in the strength of the relationship between those items that were incorrectly

retained versus those that should have been retained was quite small, and overall this likely does

not significantly change the utility of the measure in its current form. The issue related to the

hypersexuality subscale is more complex. In this case, only items related to engaging in the

behavior over a longer a period of time than was intended, physical or psychological problems

caused by the behavior, and craving were retained. Items related to relationship problems and

neglect of major responsibilities were not retained. It is difficult to quantify the effect of this

error—the oversight causes the hypersexuality subscale to deviate from the theoretical impetus

of the project and makes the hypersexuality subscale different from most of the other subscales.

However, data from Wave II support a strong relationship between the indicators and the latent

factor. Moreover, estimates of reliability were strong as was evidence of construct validity for

this particular subscale. Future research could address this problem by collecting additional data

and using items that are consistent with the current form of the measure and items that would

correct the coding error. Analyses could be completed two times using the alternative versions of

the measure. Although the two forms would be non-nested and therefore could not be formally

compared, any parameters that are standardized (i.e., standardized factor loadings, Cronbach's α,

correlations with related constructs) could be used to determine the most optimal form of the

measure. In the interim, the strong estimates of reliability and evidence of construct validity

increase confidence about the measure in its current form.

Other limitations of the current study are largely consistent with most similar

measurement development studies and represent future directions as much as limitations. For

example, the current study investigated only one form of reliability and one form of validity.

Future research should investigate psychometric properties such as test-retest reliability and

criterion-related validity. Research related to criterion-related validity would require collecting a

large sample and having participants complete a "gold-standard" measure of the problem and the

RAD scale. Such data could be helpful for establishing the strength of the association between

the existing gold-standard measure and RAD. Additionally, these data could allow for cut-scores

to be developed. Specifically, while the continuous format of this measure has certain

advantages, there are some situations in which a categorical understanding of the responses (i.e.,

likely has a problem or likely does not have a problem) is helpful. Moreover, as many of the

gold-standard measures of these problems are clinician administered semi-structured interviews,

this type of study would also address the possible limitations associated with exclusive reliance

on self-report. While self-report can be helpful for potentially decreasing socially desirable

responding (an important consideration given the sensitive nature of many of these questions;

Dwight & Feigelson, 2000), self-report data also require a person to have a degree of self-

awareness, which may or may not be present. Overall, criterion-related investigations represent

an important future direction for the current line of research. There are other facets of this

research that like self-report could be considered a strength or limitation, depending on the goal

of the research or assessment more generally. For example, the measure is only intended to

screen for the presence of disorders, and it is not comprehensive. However, its relatively brief

nature may make it more feasible to use the measure in both research and clinical contexts.

Within the context of the study's strengths and limitations, the overall utility of the

current work must also be considered. The addiction syndrome model posits that the many forms

of addiction represent a single syndrome composed of a cluster of signs and symptoms with a

common etiology (Kendler, Jacobson, et al., 2003). And while there is some neurobiological,

genetic, and psychosocial research to support this theory, more information is needed. We do not

yet know the degree of comorbidity present for some of the behaviors that are less often

investigated, such as hypersexuality or binge eating in many studies of SUDs. Additionally, we

do not yet know the overall prevalence and ultimately the probability that a person may

discontinue one behavior only to begin engaging maladaptively in another type of addictive behavior. The current work provides one tool that can be used to address some of these gaps in the literature. The implications for this work also extend beyond assessment to include treatment. There is growing interest in understanding the utility of considering treatments proven effective for other similar conditions, rather than disorder-specific treatment. This is particularly true with regard to pharmacologic treatment. For example, there is new evidence supporting the efficacy of a combination of bupropion and naltrexone for BED (Guerdjikova et al., 2017), but naltrexone is a medication that has been on the market for many years targeting craving for individuals with either an alcohol use disorder or a cocaine use disorder (Hoeller, 2005; Schmitz, Stotts, Rhoades, & Grabowski, 2001). This transdiagnostic interest is also evident in psychotherapy research, including transdiagnostic manualized treatments (e.g., the Unified Protocol for Treatment of Emotional Disorders; Farchione et al., 2012) as well as the adaptation of treatments to address commonly co-occurring problems. For example, dialectical behavioral therapy, a treatment previously considered almost exclusively in the context of borderline personality disorder, has been studied in individuals experiencing comorbid eating and substance use disorders (Courbasson, Nishikawa, & Dixon, 2012). Such research and ultimately treatment in naturalistic settings may become more feasible if identifying comorbid conditions is easier, which can be accomplished through use of the RAD scale.

References

Abbott, M. W., & Volberg, R. A. (1996). The New Zealand national survey of problem and

pathological gambling. *Journal of Gambling Studies*, *12*(2), 143–160.

https://doi.org/10.1007/BF01539171

Afifi, T. O., Brownridge, D. A., MacMillan, H., & Sareen, J. (2010). The relationship of

gambling to intimate partner violence and child maltreatment in a nationally representative

sample. *Journal of Psychiatric Research*, *44*(5), 331–337.

https://doi.org/10.1016/j.jpsychires.2009.07.010

Agaku, I., King, B., & Dube, S. R. (2012). Cigarette smoking among adults: United States, 2011.

Morbidity and Mortality Weekly Report, *61*(44), 889–894.

Alegria, M., Woo, M., Cao, Z., Torres, M., Meng, X., & Striegel-Moore, R. (2007). Prevalence

and correlates of eating disorders in Latinos in the United States. *International Journal of

Eating Disorders*, *40*(S3), S15–S21. https://doi.org/10.1002/eat.20406

Allison, K. C., Grilo, C. M., Masheb, R. M., & Stunkard, A. J. (2007). High self-reported rates of

neglect and emotional abuse, by persons with binge eating disorder and night eating

syndrome. *Behaviour Research and Therapy*, *45*(12), 2874–2883.

https://doi.org/10.1016/j.brat.2007.05.007

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., … Giles, W.

H. (2006). The enduring effects of abuse and related adverse experiences in childhood.

European Archives of Psychiatry and Clinical Neuroscience, *256*(3), 174–186.

https://doi.org/10.1007/s00406-005-0624-4

Araujo, D. M. R., Santos, G. F. D. S., & Nardi, A. E. (2010). Binge eating disorder and

depression: A systematic review. *The World Journal of Biological Psychiatry*, *11*(2), 199–

207. https://doi.org/10.3109/15622970802563171

Badarudeen, S., & Sabharwal, S. (2010). Assessing readability of patient education materials: Current role in orthopaedics. *Clinical Orthopaedics and Related Research*, *468*(10), 2572–2580. https://doi.org/10.1007/s11999-010-1380-y

Baker, T. B., Breslau, N., Covey, L., & Shiffman, S. (2012). *DSM* criteria for tobacco use disorder and tobacco withdrawal: A critique and proposed revisions for *DSM*-5. *Addiction*, *107*(2), 263–275. https://doi.org/10.1111/j.1360-0443.2011.03657.x

Baker, T. B., Piper, M. E., McCarthy, D. E., Majeskie, M. R., & Fiore, M. C. (2004). Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*, *111*(1), 33–51. https://doi.org/10.1037/0033-295X.111.1.33

Bamber, D., Cockerill, I. M., & Carroll, D. (2000). The pathological status of exercise dependence. *British Journal of Sports Medicine*, *34*(2), 125–132. https://doi.org/10.1136/bjsm.34.2.125

Barbarich-Marsteller, N. C., Foltin, R. W., & Walsh, B. T. (2011). Does anorexia nervosa resemble an addiction? *Current Drug Abuse Reviews*, *4*(3), 197–200. https://doi.org/10.14440/jbm.2015.54.A

Bardone-Cone, A. M., Butler, R. M., Balk, M. R., & Koller, K. A. (2016). Dimensions of impulsivity in relation to eating disorder recovery. *International Journal of Eating Disorders*, *49*(11), 1027–1031. https://doi.org/10.1002/eat.22579

Bayer, R., & Stuber, J. (2006). Tobacco control, stigma, and public health: Rethinking the relations. *American Journal of Public Health*, *96*(1), 47–50. https://doi.org/10.2105/AJPH.2005.071886

Becker, D. F., & Grilo, C. M. (2011). Childhood maltreatment in women with binge-eating

disorder: Associations with psychiatric comorbidity, psychological functioning, and eating

pathology. *Eating and Weight Disorders*, *16*(2), 113–120.

https://doi.org/10.1007/BF03325316

Behrend, T. S., Sharek, D. J., Meade, A. W., & Wiebe, E. N. (2011). The viability of

crowdsourcing for survey research. *Behavior Research Methods*, *43*, 800–813.

https://doi.org/10.3758/s13428-011-0081-0

Bell, K., Salmon, A., Bowers, M., Bell, J., & McCullough, L. (2010). Smoking, stigma and

tobacco "denormarlization": Further reflections on the use of stigma as a public health tool.

Social Science & Medicine, *70*(3), 795–799. Retrieved from

http://www.sciencedirect.com/science/article/pii/S0277953609008211

Bendig, A. W. (1956). The development of a short form of the Manifest Anxiety Scale. *Journal

of Consulting Psychology*, *20*(5), 384–384. https://doi.org/10.1037/h0045580

Benowitz, N. L. (2009). Pharmacology of nicotine: Addiction, smoking-induced disease, and

therapeutics. *Annual Review of Pharmacology and Toxicology*, *49*(1), 57–71.

https://doi.org/10.1146/annurev.pharmtox.48.113006.094742

Berg, J. M., Latzman, R. D., Bliwise, N. G., & Lilienfeld, S. O. (2015). Parsing the heterogeneity

of impulsivity: A meta-analytic review of the behavioral implications of the UPPS for

psychopathology. *Psychological Assessment*, *27*(4), 1129–1146.

https://doi.org/10.1037/pas0000111

Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., Heeren, A., & Clark, L. (2015). Are we

overpathologizing everyday life? A tenable blueprint for behavioral addiction research.

Journal of Behavioral Addictions, *4*(3), 132–134. https://doi.org/10.1556/2006.4.2015.009

Bjureberg, J., Ljótsson, B., Tull, M. T., Hedman, E., Sahlin, H., Lundh, L. G., … Gratz, K. L.

(2016). Development and validation of a brief version of the Difficulties in Emotion

Regulation Scale: The DERS-16. *Journal of Psychopathology and Behavioral Assessment*,

38(2), 284–296. https://doi.org/10.1007/s10862-015-9514-x

Black, D. W., Kehrberg, L. L. D., Flumerfelt, D. L., & Schlosser, S. S. (1997). Characteristics of

36 subjects reporting compulsive sexual behavior. *American Journal of Psychiatry*, *154*(2),

243–249. https://doi.org/10.1176/ajp.154.2.243

Bradley, K. A., Bush, K. R., Epler, A. J., Dobie, D. J., Davis, T. M., Sporleder, J. L., …

Kivlahan, D. R. (2003). Two brief alcohol-screening tests From the alcohol use disorders

tdentification Test (AUDIT). *Archives of Internal Medicine*, *163*(7), 821–829.

https://doi.org/10.1001/archinte.163.7.821

Brewerton, T. D., Rance, S. J., Dansky, B. S., O'Neil, P. M., & Kilpatrick, D. G. (2014). A

comparison of women with child-adolescent versus adult onset binge eating: Results from

the National Women's Study. *International Journal of Eating Disorders*, *47*(7), 836–843.

https://doi.org/10.1002/eat.22309

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford

Press.

Bühringer, G., Kräplin, A., & Behrendt, S. (2012). Universal characteristics and consequences of

the addiction syndrome. In H. J. Shaffer, D. A. LaPlante, & S. E. Nelson (Eds.), *APA

addiction syndrome handbook* (Vol. 1, pp. 291–316). Washington, D.C.: American

Psychological Association.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source

of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, *6*(1), 3–5.

https://doi.org/10.1177/1745691610393980

Bush, K. R. (1998). The AUDIT Alcohol Consumption questions (AUDIT-C): An effective brief

    screening test for problem drinking. *Archives of Internal Medicine*, *158*(16), 1789–1795.

    https://doi.org/10.1001/archinte.158.16.1789

Butler, R., & Bauld, L. (2005). The parents' experience: coping with drug use in the family.

    Drugs: Education, Prevention and Policy, *12*(1), 35–45.

    https://doi.org/10.1080/0968763042000275308

Cai, R., Crane, E., Poneleit, K., & Paulozzi, L. (2010). Emergency department visits involving

    nonmedical use of selected prescription drugs — United States, 2004 – 2008. *Morbidity and*

    Mortality Weekly Report, *59*(23), 705–709.

Calcaterra, S., Glanz, J., & Binswanger, I. A. (2013). National trends in pharmaceutical opioid

    related overdose deaths compared to other substance related overdose deaths: 1999–2009.

    Drug and Alcohol Dependence, *131*(3), 263–270.

    https://doi.org/10.1016/j.drugalcdep.2012.11.018

Campbell-Sills, L., Liverant, G. I., & Brown, T. A. (2004). Psychometric evaluation of the

    behavioral inhibition/behavioral activation scales in a large sample of outpatients with

    anxiety and mood disorders. *Psychological Assessment*, *16*(3), 244–254.

    https://doi.org/10.1037/1040-3590.16.3.244

Campbell, M. M., & Stein, D. J. (2015). Hypersexual disorder. In N. M. Petry (Ed.), *Behavioral*

    addictions: DSM-5 and beyond (pp. 101–124). New York: Oxford.

Carpenter, C. M., Wayne, G. F., & Connolly, G. N. (2005). Designing cigarettes for women:

    New findings from the tobacco industry documents. *Addiction*, *100*(6), 837–851.

    https://doi.org/10.1111/j.1360-0443.2005.01072.x

Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective

responses to impending reward and punishment: The BIS/BAS Scales. *Journal of Personality and Social Psychology*, *67*(2), 319–333. https://doi.org/10.1037/0022-3514.67.2.319

Centers for Disease Control and Prevention. (2011). CDC health disparities and inequalities report: United States, 2011. *Morbidity and Mortality Weekly Report*, *60*(1), 1–116. https://doi.org/su6001a1 [pii]

Chandler, R. K., Fletcher, B. W., & Volkow, N. D. (2009). Treating drug abuse and addiction in the criminal justice system. *Journal of American Medical Association*, *301*(2), 183–190. https://doi.org/10.1001/jama.2008.976

Christo, G., Jones, S. L., Haylett, S., Stephenson, G. M., Lefever, R. M. H., & Lefever, R. (2003). The shorter PROMIS questionnaire: Further validation of a tool for simultaneous assessment of multiple addictive behaviours. *Addictive Behaviors*, *28*(2), 225–248. https://doi.org/10.1016/S0306-4603(01)00231-3

Chuang, Y.-C. (2006). Massively multiplayer online role-playing game-induced seizures: A neglected health problem in Internet addiction. *Cyberpsychology & Behavior*, *9*(4), 451–456. https://doi.org/10.1089/cpb.2006.9.451

Cicero, D. C., Neis, A. M., Klaunig, M. J., & Trask, C. L. (2017). The Inventory of Psychotic-Like Anomalous Self-Experiences (IPASE): Development and validation. *Psychological Assessment*, *29*(1), 13–25. https://doi.org/10.1037/pas0000304

Cloninger, C. R. (1991). The Tridimensional Personality Questionnaire: U.S. normative data. *Psychological Reports*, *69*(7), 1047. https://doi.org/10.2466/PR0.69.7.1047-1057

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Coleman, E., Miner, M., Ohlerking, F., & Raymond, N. C. (2001). Compulsive sexual behavior

inventory: A preliminary study of reliability and validity. *Journal of Sex and Marital

Therapy*, *27*(4), 325–332. https://doi.org/10.1080/009262301317081070

Compton, W. M., & Volkow, N. D. (2006). Major increases in opioid analgesic abuse in the

United States: Concerns and strategies. *Drug and Alcohol Dependence*, *81*(2), 103–107.

https://doi.org/10.1016/j.drugalcdep.2005.05.009

Comrey, A. L., & Lee, H. B. (2013). Interpretation and application of factor analytic results. In *A

first course in factor analysis* (2nd ed.). Hillsdale, NJ: Lawrence Eribaum Associates, Inc.

Conason, A., Teixeira, J., Hsu, C.-H., Puma, L., Knafo, D., & Geliebter, A. (2013). Substance

use following bariatric weight loss surgery. *JAMA Surgery*, *148*(2), 145–150.

https://doi.org/10.1001/2013.jamasurg.265

Conger, J. J. (1956). Alcoholism: Theory, problem and challenge. Reinforcement theory and the

dynamics of alcoholism. *Quarterly Journal of Studies on Alcohol*, *17*(2), 296–305.

Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/13336262

Conner, M., Grogan, S., Fry, G., Gough, B., & Higgins, A. R. (2009). Direct, mediated and

moderated impacts of personality variables on smoking initiation in adolescents.

Psychology & Health, *24*(9), 1085–1104. https://doi.org/10.1080/08870440802239192

Coumans, M., & Spreen, M. (2003). Drug use and the role of homelessness in the process of

marginalization. *Substance Use & Misuse*, *38*(3), 311–338. https://doi.org/10.1081/JA-

120017376

Courbasson, C., Nishikawa, Y., & Dixon, L. (2012). Outcome of dialectical behaviour therapy

for concurrent eating and substance use disorders. *Clinical Psychology & Psychotherapy*,

19(5), 434–449. https://doi.org/10.1002/cpp.748

Courtney, M. G. R. (2013). Determining the number of factors to retain in EFA: Using the SPSS

    R-Menu v2.0 to make more judicious estimations. *Practical Assessment, Research &*

    Evaluation, *18*(8), 1–14. https://doi.org/10.2147/JHL.S35483

Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short

    English version of the UPPS-P Impulsive Behavior Scale. *Addictive Behaviors*, *39*(9),

    1372–1376. https://doi.org/10.1016/j.addbeh.2014.02.013

Cyders, M. A., Smith, G. T., Spillane, N. S., Fischer, S. F., Annus, A. M., & Peterson, C. (2007).

    Integration of impulsivity and positive mood to predict risky behavior: Development and

    validation of a measure of positive urgency. *Psychological Assessment*, *19*(1), 107–118.

    https://doi.org/10.1037/1040-3590.19.1.107

Dawe, S., & Loxton, N. J. (2004). The role of impulsivity in the development of substance use

    and eating disorders. *Neuroscience and Biobehavioral Reviews*, *28*(3), 343–351.

    https://doi.org/10.1016/j.neubiorev.2004.03.007

Degenhardt, L., & Hall, W. (2012). Extent of illicit drug use and dependence, and their

    contribution to the global burden of disease. *The Lancet*, *379*, 55–70.

    https://doi.org/10.1016/S0140-6736(11)61138-0

Del Boca, F. K., & Noll, J. A. (2000). Truth or consequences: The validity of self-report data in

    health services research on addictions. *Addiction*, *95*(S3), 347–360.

    https://doi.org/10.1046/j.1360-0443.95.11s3.5.x

Deleuze, J., Rochat, L., Romo, L., Van der Linden, M., Achab, S., Thorens, G., … Billieux, J.

    (2015). Prevalence and characteristics of addictive behaviors in a community sample: A

    latent class analysis. *Addictive Behaviors Reports*, *1*, 49–56.

    https://doi.org/10.1016/j.abrep.2015.04.001

Demetrovics, Z., & Griffiths, M. D. (2012). Behavioral addictions: Past, present and future. *Journal of Behavioral Addictions*, *1*(1), 1–2. https://doi.org/10.1556/JBA.1.2012.1.0

Demianczyk, A. C., Jenkins, A. L., Henson, J. M., & Conner, B. T. (2014). Psychometric evaluation and revision of Carver and White's BIS/BAS scales in a diverse sample of young adults. *Journal of Personality Assessment*, *96*(5), 485–494. https://doi.org/10.1080/00223891.2013.870570

DeVellis, R. F. (2013). *Scale development: Theory and applications* (4th ed.). Thousand Oaks, CA: SAGE Publications, Inc.

DeWit, D. J., Adlaf, E. M., Offord, D. R., & Ogborne, A. C. (2000). Age at first alcohol use: A risk factor for the development of alcohol disorders. *The American Journal of Psychiatry*, *157*(5), 745–750. https://doi.org/10.1176/appi.ajp.157.5.745

Dick, D. M., Smith, G. T., Olausson, P., Mitchell, S. H., Leeman, R. F., O'Malley, S. S., & Sher, K. (2010). Understanding the construct of impulsivity and its relationship to alcohol use disorders. *Addiction Biology*, *15*(2), 217–226. https://doi.org/10.1111/j.1369-1600.2009.00190.x

Dir, A. L., Karyadi, K., & Cyders, M. A. (2013). The uniqueness of negative urgency as a common risk factor for self-harm behaviors, alcohol consumption, and eating problems. *Addictive Behaviors*, *38*(5), 2158–2162. https://doi.org/10.1016/j.addbeh.2013.01.025

Dube, S. R., Williamson, D. F., Thompson, T., Felitti, V. J., & Anda, R. F. (2004). Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse and Neglect*, *28*(7), 729–737. https://doi.org/10.1016/j.chiabu.2003.08.009

Dutra, L., Stathopoulou, G., Basden, S. L., Leyro, T. M., Powers, M. B., & Otto, M. W. (2008).

A meta-analytic review of psychosocial interventions for substance use disorders. *The American Journal of Psychiatry*, *165*(2), 179–187. https://doi.org/10.1176/appi.ajp.2007.06111851

Dwight, S. A., & Feigelson, M. E. (2000). A quantitative review of the effect of computerized testing on the measurement of social desirability. *Educational and Psychological Measurement*, *60*(3), 340–360. https://doi.org/10.1177/00131640021970583

Dymek, M. P., Le Grange, D., Neven, K., & Alverdy, J. (2001). Quality of life and psychosocial adjustment in patients after Roux-en-Y gastric Bypass: A brief report. *Obesity Surgery*, *11*(1), 32–39. https://doi.org/10.1381/096089201321454088

Erez, G., Pilver, C. E., & Potenza, M. N. (2014). Gender-related differences in the associations between sexual impulsivity and psychiatric disorders. *Journal of Psychiatric Research*, *55*(1), 117–125. https://doi.org/10.1016/j.jpsychires.2014.04.009

Espeleta, H. C., Brett, E. I., Ridings, L. E., Leavens, E. L. S., & Mullins, L. L. (2018). Childhood adversity and adult health-risk behaviors: Examining the roles of emotion dysregulation and urgency. *Child Abuse and Neglect*, *82*(February), 92–101. https://doi.org/10.1016/j.chiabu.2018.05.027

Fairburn, C. G., & Cooper, Z. (1993). The eating disorder examination. In C. G. Fairburn & Z. Cooper (Eds.), *Binge eating: Nature, assessment, and treatment* (12th ed., pp. 317–360). New York: Guilford Press.

Fairburn, C. G., Cooper, Z., Doll, H. A., Norman, P., & O'Connor, M. (2000). The natural course of bulimia nervosa and binge eating disorder in young women. *Archives of General Psychiatry*, *57*(7), 659–665. https://doi.org/10-1001/pubs.Arch Gen Psychiatry-ISSN-0003-990x-57-7-yoa9404

Falk, D. E., Yi, H. Y., & Hiller-Sturmhöfel, S. (2006). An epidemiologic analysis of co-

occurring alcohol and tobacco use and disorders: Findings from the National Epidemiologic

Survey on Alcohol and Related Conditions. *Alcohol Research and Health*, *29*(3), 162–171.

Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Thompson-Hollands, J., Carl, J.

R., … Barlow, D. H. (2012). Unified protocol for transdiagnostic treatment of emotional

disorders: A randomized controlled trial. *Behavior Therapy*, *43*(3), 666–678.

https://doi.org/10.1016/j.beth.2012.01.001

Farstad, S. M., von Ranson, K. M., Hodgins, D. C., El-Guebaly, N., Casey, D. M., &

Schopflocher, D. P. (2015). The influence of impulsiveness on binge eating and problem

gambling: A prospective study of gender differences in Canadian adults. *Psychology of

Addictive Behaviors*, *29*(3), 805–812. https://doi.org/10.1037/adb0000069

Fein, G., Landman, B., Tran, H., McGillivray, S., Finn, P., Barakos, J., & Moon, K. (2006).

Brain atrophy in long-term abstinent alcoholics who demonstrate impairment on a simulated

gambling task. *NeuroImage*, *32*(3), 1465–1471.

https://doi.org/10.1016/j.neuroimage.2006.06.013

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., …

Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of

the leading causes of death in adults: The adverse childhood experiences (ACE) study.

American Journal of Preventive Medicine, *14*(4), 245–258. https://doi.org/10.1016/S0749-

3797(98)00017-8

Festl, R., Scharkow, M., & Quandt, T. (2013). Problematic computer game use among

adolescents, younger and older adults. *Addiction*, *108*(3), 592–599.

https://doi.org/10.1111/add.12016

Fischer, S. F., Settles, R., Collins, B., Gunn, R., & Smith, G. T. (2012). The role of negative

   urgency and expectancies in problem drinking and disordered eating: Testing a model of

   comorbidity in pathological and at-risk samples. *Psychology of Addictive Behaviors*, *26*(1),

   112–123. https://doi.org/10.1037/a0023460

Flynn, P. M., & Brown, B. S. (2008). Co-occurring disorders in substance abuse treatment:

   Issues and prospects. *Journal of Substance Abuse Treatment*, *34*(1), 36–47.

   https://doi.org/10.1016/j.jsat.2006.11.013

Frank, D., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Kivlahan, D. R., & Bradley, K. A.

   (2008). Effectiveness of the AUDIT-C as a screening test for alcohol misuse in three

   race/ethnic groups. *Journal of General Internal Medicine*, *23*(6), 781–787.

   https://doi.org/10.1007/s11606-008-0594-0

Friedman, D. B., & Hoffman-Goetz, L. (2006). A systematic review of readability and

   comprehension instruments used for print and web-based cancer information. *Health

   Education & Behavior*, *33*(3), 352–373. https://doi.org/10.1177/1090198105277329

Friend, K. B., & Pagano, M. E. (2004). Smoking initiation among nonsmokers during and

   following treatment for alcohol use disorders. *Journal of Substance Abuse Treatment*, *26*(3),

   219–224. https://doi.org/10.1016/S0740-5472(04)00003-0

Garner, D. M., Olmstead, M. P., & Polivy, J. (1983). Development and validation of a

   multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International

   Journal of Eating Disorders*, *2*(2), 15–34. https://doi.org/10.1002/1098-

   108X(198321)2:2<15::AID-EAT2260020203>3.0.CO;2-6

Garofalo, C., Velotti, P., & Zavattini, G. C. (2016). Emotion dysregulation and hypersexuality:

   Review and clinical implications. *Sexual and Relationship Therapy*, *31*(1), 3–19.

https://doi.org/10.1080/14681994.2015.1062855

Gearhardt, A. N., Corbin, W. R., & Brownell, K. D. (2016). Development of the Yale Food

Addiction Scale version 2.0. *European Eating Disorders Review*, *30*(1), 113–121.

https://doi.org/10.1037/adb0000136

Gentile, D. A. (2009). Pathological video-game use among youth ages 8 to 18: A national study.

Psychological Science, *20*(5), 594–602. https://doi.org/10.1111/j.1467-9280.2009.02340.x

Gentile, D. A., Choo, H., Liau, A., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). Pathological

video game use among youths: A two-year longitudinal study. *Pediatrics*, *127*(2), e319–

e329. https://doi.org/10.1542/peds.2010-1353

Gilbody, S., Richards, D., Brealey, S., & Hewitt, C. (2007). Screening for depression in medical

settings with the Patient Health Questionnaire (PHQ): A diagnostic meta-analysis. *Journal

of General Internal Medicine*, *22*(11), 1596–1602. https://doi.org/10.1007/s11606-007-

0333-y

Goodman, A. (1990). Addiction: Definition and implications. *British Journal of Addiction*,

85(11), 1403–1408. https://doi.org/j.1360-0443.1990.tb01620.x

Goodman, J. K., Cryder, C. E., & Cheema, A. (2013). Data collection in a flat world: The

strengths and weaknesses of Mechanical Turk samples. *Journal of Behavioral Decision

Making*, *26*(3), 213–224. https://doi.org/10.1002/bdm.1753

Gordon, A. J., Maisto, S. A., McNeil, M., Kraemer, K. L., Conigliaro, R. L., Kelley, M. E., &

Conigliaro, J. (2001). Three questions can detect hazardous drinkers. *The Journal of Family

Practice*, *50*(4), 313–320. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11300982

Grant, B. F., Goldstein, R. B., Chou, P., Jung, J., Zhang, H., Pickering, R. P., … Al, E. (2015).

Epidemiology of *DSM*-5 alcohol use disorder: Results from the National Epidemiologic

Survey on Alcohol and Related Conditions III. *JAMA Psychiatry*, *72*(8), 757–766.

https://doi.org/10.1001/jamapsychiatry.2015.0584

Grant, B. F., Saha, T. D., Ruan, W. J., Goldstein, R. B., Chou, S. P., Jung, J., … Hasin, D. S.

(2016). Epidemiology of *DSM*-5 drug use disorder. *JAMA Psychiatry*, *73*(1), 39–47.

https://doi.org/10.1001/jamapsychiatry.2015.2132

Grant, B. F., Stinson, F. S., Dawson, D. A., Chou, P., Dufour, M. C., Compton, W. M., …

Kaplan, K. (2006). Prevalence and co-occurrence of substance use disorders and

independent mood and anxiety disorders. *Alcohol Research & Health*, *29*(2), 107–120.

https://doi.org/10.1001/archpsyc.61.8.807

Grant, B. F., Stinson, F. S., Dawson, D. A., Chou, S. P., Dufour, M. C., Compton, W., …

Kaplan, K. (2004). Prevalence and co-occurrence of substance use disorders and

independent mood and anxiety disorders. *Archives of General Psychiatry*, *61*(8), 807.

https://doi.org/10.1001/archpsyc.61.8.807

Grant, J. E., & Kim, S. W. (2003). Comorbidity of impulse control disorders in pathological

gamblers. *Acta Psychiatrica Scandinavica*, *108*(3), 203–207. https://doi.org/10.1034/j.1600-

0447.2003.00162.x

Grant, J. E., Levine, L., Kim, D., & Potenza, M. N. (2005). Impulse control disorders in adult

psychiatric inpatients. *The American Journal of Psychiatry*, *162*(11), 2184–2188.

https://doi.org/10.1176/appi.ajp.162.11.2184

Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2010). Introduction to behavioral

addictions. *The American Journal of Drug and Alcohol Abuse*, *36*(5), 233–241.

https://doi.org/10.3109/00952990.2010.491884

Grant, J. E., Schreiber, L. R. N., & Harvanko, A. M. (2012). Neurobiology of addiction: Support

for a syndrome model of addiction. In H. J. Shaffer, D. LaPlante, & S. Nelson (Eds.), *APA*

Addiction syndrome handbook: Foundations, influences, and expressions of addiction (Vol.

1, pp. 121–146). Washington D.C.: APA. https://doi.org/10.1037/13751-006

Grant, J. E., & Steinberg, M. A. (2005). Compulsive sexual behavior and pathological gambling.

Sexual Addiction & Compulsivity, *12*(2–3), 235–244.

https://doi.org/10.1080/10720160500203856

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and

dysregulation. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41–54.

https://doi.org/10.1023/B:JOBA.0000007455.08539.94

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In *A model for personality* (pp.

246–276). Berlin, Heidelberg: Springer. https://doi.org/10.1007/978-3-642-67783-0_8

Gray, J. A. (1987). Perspectives on anxiety and impulsivity–A commentary. *Journal of Research*

in Personality, *21*(4), 493–509. Retrieved from

http://www.sciencedirect.com/science/article/pii/0092656687900365

Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. *Cognition &*

Emotion, *4*(3), 269–288. https://doi.org/10.1080/02699939008410799

Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A.,

& Corey-Lisle, P. K. (2003). The economic burden of depression in the United States. *The*

Journal of Clinical Psychiatry, *64*(12), 1465–1475. https://doi.org/10.4088/JCP.v64n1211

Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance abuse in women.

Psychiatric Clinics of North America, *33*(2), 339–355.

https://doi.org/10.1016/j.psc.2010.01.004

Griffiths, M. D. (2011). Computer game playing and social skills: A pilot study. *Aloma*, *27*, 301–

310. Retrieved from http://revistaaloma.net/index.php/aloma/article/view/22

Griffiths, M. D., Kuss, D. J., & King, D. L. (2012). Video game addiction: Past, present and future. *Current Psychiatry Reviews*, *8*(4), 308–318. https://doi.org/10.2174/157340012803520414

Griffiths, M. D., van Rooij, A. J., Kardefelt-Winther, D., Starcevic, V., Király, O., Pallesen, S., … Demetrovics, Z. (2016). Working towards an international consensus on criteria for assessing internet gaming disorder: A critical commentary on Petry et al . (2014). *Addiction*, *111*(1), 167–175. https://doi.org/10.1111/add.13057

Grilo, C. M., Crosby, R. D., Masheb, R. M., White, M. A., Peterson, C. B., Wonderlich, S. A., … Mitchell, J. E. (2009). Overvaluation of shape and weight in binge eating disorder, bulimia nervosa, and sub-threshold bulimia nervosa. *Behaviour Research and Therapy*, *47*(8), 692–696. https://doi.org/10.1016/j.brat.2009.05.001

Grilo, C. M., White, M. A., Barnes, R. D., & Masheb, R. M. (2013). Psychiatric disorder co-morbidity and correlates in an ethnically diverse sample of obese patients with binge eating disorder in primary care settings. *Comprehensive Psychiatry*, *54*(3), 209–216. https://doi.org/10.1016/j.comppsych.2012.07.012

Grittner, U., Kuntsche, S., Graham, K., & Bloomfield, K. (2012). Social inequalities and gender differences in the experience of alcohol-related problems. *Alcohol and Alcoholism*, *47*(5), 597–605. https://doi.org/10.1093/alcalc/ags040

Grubbs, J. B., Volk, F., Exline, J. J., & Pargament, K. I. (2015). Internet pornography use: Perceived addiction, psychological distress, and the validation of a brief measure. *Journal of Sex & Marital Therapy*, *41*(1), 83–106. https://doi.org/10.1080/0092623X.2013.842192

Guerdjikova, A. I., Walsh, B., Shan, K., Halseth, A. E., Dunayevich, E., & McElroy, S. L.

(2017). Concurrent improvement in both binge eating and depressive symptoms with naltrexone/bupropion therapy in overweight or obese subjects with major depressive disorder in an open-label, uncontrolled study. *Advances in Therapy*, *34*(10), 2307–2315. https://doi.org/10.1007/s12325-017-0613-9

Haberstick, B. C., Young, S. E., Zeiger, J. S., Lessem, J. M., Hewitt, J. K., & Hopfer, C. J. (2014). Prevalence and correlates of alcohol and cannabis use disorders in the United States: Results from the national longitudinal study of adolescent health. *Drug and Alcohol Dependence*, *136*(1), 158–161. https://doi.org/10.1016/j.drugalcdep.2013.11.022

Hartmann, U. H. (2013). Re: Report of findings in a *DSM*-5 field trial for hypersexual disorder. *European Urology*, *64*(4), 685–686. https://doi.org/10.1016/j.eururo.2013.07.019

Hasin, D. S., Fenton, M. C., Skodol, A. E., Krueger, R. F., Keyes, K., Geier, T., … Grant, B. F. (2011). Personality disorders and the 3-year course of alcohol, drug, and nicotine use disorders. *Archives of General Psychiatry*, *68*(11), 1158–1167. https://doi.org/10.1001/archgenpsychiatry.2011.136

Hasin, D. S., & Grant, B. F. (2015). The National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Waves 1 and 2: Review and summary of findings. *Social Psychiatry and Psychiatric Epidemiology*, *50*(11), 1609–1640. https://doi.org/10.1007/s00127-015-1088-0

Hasin, D. S., O'Brien, C. P., Auriacombe, M., Borges, G., Bucholz, K. K., Budney, A., … Grant, B. F. (2013). *DSM*-5 criteria for substance use disorders: Recommendations and rationale. *The American Journal of Psychiatry*, *170*(8), 834–851. https://doi.org/10.1176/appi.ajp.2013.12060782

Heatherton, T. F., Kozlowski, L. T., Frecker, R. C., Fagerstrom, K. O., & Fagerström, K. O.

(1991). The Fagerstrom test for nicotine dependence –A revision of the Fagerstrom

tolerance questionnaire. *British Journal of Addiction*, *86*(9), 1119–1127.

https://doi.org/doi:10.1111/j.1360-0443.1991.tb01879.x

Henderson, M., & Freeman, C. P. L. (1987). A self-rating scale for bulimia the 'BITE.' *British

Journal of Psychiatry, *150*(1), 18–24. https://doi.org/10.1192/bjp.150.1.18

Henkel, D. (2011). Unemployment and substance use: A review of the literature (1990-2010).

Current Drug Abuse Reviews, *4*(1), 4–27. Retrieved from

http://www.ingentaconnect.com/content/ben/cdar/2011/00000004/00000001/art00002

Heym, N., Ferguson, E., & Lawrence, C. (2008). An evaluation of the relationship between

Gray's revised RST and Eysenck's PEN: Distinguishing BIS and FFFS in Carver and

White's BIS/BAS scales. *Personality and Individual Differences*, *45*(8), 709–715.

https://doi.org/10.1016/j.paid.2008.07.013

Hingson, R. W., Heeren, T., & Winter, M. R. (2006). Age at drinking onset and alcohol

dependence. *Archives of Pediatrics & Adolescent Medicine*, *160*(7), 739–746.

https://doi.org/10.1001/archpedi.160.7.739

Hodgins, D. C., Stea, J. N., & Grant, J. E. (2011). Gambling disorders. *The Lancet*, *378*, 1874–

1884. https://doi.org/10.1016/S0140-6736(10)62185-X

Hoeller, K. [Ed]. (2005). Efficacy and tolerability of long-acting injectable naltrexone for alcohol

dependence. *JAMA*, *293*(16), 1617–1624.

https://doi.org/http://dx.doi.org/10.1001/jama.293.16.1978-a

How To Do Parallel Analysis For Pca Or Factor Analysis In Stata? (2018). Retrieved April 3,

2019, from https://stats.idre.ucla.edu/stata/faq/how-to-do-parallel-analysis-for-pca-or-

factor-analysis-in-stata/

Hrabosky, J. I., Masheb, R. M., White, M. A., & Grilo, C. M. (2007). Overvaluation of shape and weight in binge eating disorder. *Journal of Consulting and Clinical Psychology*, *75*(1), 175–180. https://doi.org/10.1037/0022-006X.75.1.175

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hudson, J. I., Coit, C. E., Lalonde, J. K., & Pope, H. G. (2012). By how much will the proposed new *DSM*-5 criteria increase the prevalence of binge eating disorder? *The International Journal of Eating Disorders*, *45*(1), 139–141. https://doi.org/10.1002/eat.20890

Hudson, J. I., Hiripi, E., Pope, H. G., & Kessler, R. C. (2007). The prevalence and correlates of eating disorders in the National Comorbidity Survey Replication. *Biological Psychiatry*, *61*(3), 348–358. https://doi.org/10.1016/j.biopsych.2006.03.040

Hudson, J. I., Lalonde, J. K., Berry, J. M., Pindyck, L. J., Bulik, C. M., Crow, S. J., … Pope, H. G. (2006). Binge-Eating disorder as a distinct familial phenotype in obese individuals. *Archives of General Psychiatry*, *63*(3), 313–319. https://doi.org/10.1001/archpsyc.63.3.313

Hudson, J. I., Lalonde, J. K., Coit, C. E., Tsuang, M. T., McElroy, S. L., Crow, S. J., … Pope, H. G. (2010). Longitudinal study of the diagnosis of components of the metabolic syndrome in individuals with binge-eating disorder. *The American Journal of Clinical Nutrition*, *91*(6), 1568–1573. https://doi.org/10.3945/ajcn.2010.29203

Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., … Wang, P. (2010). Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*, *167*(7), 748–751. https://doi.org/10.1176/appi.ajp.2010.09091379

Ivezaj, V. I., Saules, K. K., Hoodin, F., Alschuler, K., Angelella, N. E., Collings, A. . S., …

    Wiedemann, A. A. (2010). The relationship between binge eating and weight status on

    depression, anxiety, and body image among a diverse college sample: A focus on

    Bi/Multiracial women. *Eating Behaviors*, *11*(1), 18–24.

    https://doi.org/10.1016/j.eatbeh.2009.08.003

Ivezaj, V. I., Saules, K. K., & Schuh, L. M. (2014). New-Onset substance use disorder after

    gastric bypass surgery: Rates and associated characteristics. *Obesity Surgery*, *24*, 1975–

    1980. https://doi.org/10.1007/s11695-014-1317-8

Jacobsen, L. K., Southwick, S. M., & Kosten, T. R. (2001). Substance use disorders in patients

    with posttraumatic stress disorder: A review of the literature. *The American Journal of*

    Psychiatry, *158*(8), 1184–1190. https://doi.org/10.1176/appi.ajp.158.8.1184

Johansson, A., Grant, J. E., Kim, S. W., Odlaug, B. L., & Gotestam, K. G. (2009). Risk factors

    for problematic gambling: A critical literature review. *Journal of Gambling Studies*, *25*(1),

    67–92. https://doi.org/10.1007/s10899-008-9088-6

Johnson, J. G., Spitzer, R. L., & Williams, J. B. W. (2001). Health problems, impairment and

    illnesses associated with bulimia nervosa and binge eating disorder among primary care and

    obstetric gynaecology patients. *Psychological Medicine*, *31*(8), 1455–1466.

    https://doi.org/10.1017/S0033291701004640

Johnson, K. A., Farris, S. G., Schmidt, N. B., & Zvolensky, M. J. (2012). Anxiety sensitivity and

    cognitive-based smoking processes: Testing the mediating role of emotion dysregulation

    among treatment-seeking daily smokers. *Journal of Addictive Diseases*, *31*(2), 143–157.

    https://doi.org/10.1080/10550887.2012.665695

Jonas, D. E., Garbutt, J. C., Brown, J. M., Amick, H. R., Brownley, K. A., Council, C. L., …

Harris, R. P. (2012). *Screening, behavioral counseling, and referral in primary care To reduce alcohol misuse. Comparative effectiveness review No. 64.* Rockville. Retrieved from www.effectivehealthcare.ahrq.gov/reports/final.cfm.

Kafka, M. P. (2010). Hypersexual disorder: A proposed diagnosis for *DSM*-V. *Archives of Sexual Behavior*, *39*(2), 377–400. https://doi.org/10.1007/s10508-009-9574-7

Kaiser, A. J., Milich, R., Lynam, D. R., & Charnigo, R. J. (2012). Negative urgency, distress tolerance, and substance abuse among college students. *Addictive Behaviors*, *37*(10), 1075–1083. https://doi.org/10.1016/j.addbeh.2012.04.017

Kalischuk, R. G., Nowatzki, N., Cardwell, K., Klein, K., & Solowoniuk, J. (2006). Problem gambling and its impact on families: A literature review. *International Gambling Studies*, *6*(1), 31–60. https://doi.org/10.1080/14459790600644176

Kane, T. A., Loxton, N. J., Staiger, P. K., & Dawe, S. (2004). Does the tendency to act impulsively underlie binge eating and alcohol use problems? An empirical investigation. *Personality and Individual Differences*, *36*(1), 83–94. https://doi.org/10.1016/S0191-8869(03)00070-9

Kaplan, M. S., & Krueger, R. B. (2010). Diagnosis, assessment, and treatment of hypersexuality. *Journal of Sex Research*, *47*(2), 181–198. https://doi.org/10.1080/00224491003592863

Kausch, O. (2003). Patterns of substance abuse among treatment-seeking pathological gamblers. *Journal of Substance Abuse Treatment*, *25*(4), 263–270. https://doi.org/10.1016/S0740-5472(03)00117-X

Kendler, K. S., Jacobson, K. C., Prescott, C. a., & Neale, M. C. (2003). Specificity of genetic and environmental risk factors for use and abuse/dependence of cannabis, cocaine, hallucinogens, sedatives, stimulants, and opiates in male twins. *American Journal of*

Psychiatry, *160*(4), 687–695. https://doi.org/10.1176/appi.ajp.160.4.687

Kendler, K. S., Prescott, C. a, Myers, J., & Neale, M. C. (2003). The Structure of Genetic and Environmental Risk Factors for Common Psychiatric and Substance Use Disorders in Men and Women, *60*.

Kessler, R. C., Hwang, I., LaBrie, R., Petukhova, M., Sampson, N. A., Winters, K. C., & Shaffer, H. J. (2008). *DSM*-IV pathological gambling in the National Comorbidity Survey Replication. *Psychological Medicine*, *38*(9), 1351–1360. https://doi.org/10.1017/S0033291708002900

Kheradmand, A., Zamani, B., Hedayati, N., Cheshomi, M., & Abedi, A. (2012). Comparing the social skills of students addicted to computer games with normal students. *European Psychiatry*, *2*(3–4), 1–7. https://doi.org/10.1016/S0924-9338(12)74212-8

Kincaid, J., Jr, R. F., Rogers, R., & Chissom, B. (1975). Derivation of new readability formulas (automated readability index, fog count and flesch reading ease formula) for navy enlisted personnel. Retrieved from http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA006655

Kingston, J., Clarke, S., Ritchie, T., & Remington, B. (2011). Developing and validating the "Composite Measure of Problem Behaviors." *Journal of Clinical Psychology*, *67*(7), 736–751. https://doi.org/10.1002/jclp.20802

Kline, R. B. (2010). *Principles and Practice of Structural Equation Modeling*. New York, NY: Guilford Press.

Konkolÿ Thege, B., Horwood, L., Slater, L., Tan, M. C., Hodgins, D. C., & Wild, T. C. (2017). Relationship between interpersonal trauma exposure and addictive behaviors: A systematic review. *BMC Psychiatry*, *17*(1), 1–17. https://doi.org/10.1186/s12888-017-1323-1

Konkolÿ Thege, B., Woodin, E. M., Hodgins, D. C., & Williams, R. J. (2015). Natural course of

behavioral addictions: a 5-year longitudinal study. *BMC Psychiatry*, *15*(1), 1–14.

https://doi.org/10.1186/s12888-015-0383-3

Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking "big" personality traits to

anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin*,

136(5), 768–821. https://doi.org/10.1037/a0020327

Kraus, S. W., Martino, S., & Potenza, M. N. (2016). Clinical characteristics of men interested in

seeking treatment for use of pornography. *Journal of Behavioral Addictions*, *5*(2), 169–178.

https://doi.org/10.1556/2006.5.2016.036

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity

measure. *Psychiatric Annals*, *32*(9), 509–515. https://doi.org/10.3928/0048-5713-

20020901-06

Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: validity of a brief

depression severity measure. *Journal of General Internal Medicine*, *16*(9), 606–613.

https://doi.org/10.1046/j.1525-1497.2001.016009606.x

Krueger, R. B. (2016). Diagnosis of hypersexual or compulsive sexual behavior can be made

using ICD-10 and *DSM*-5 despite rejection of this diagnosis by the American Psychiatric

Association. *Addiction*, *111*(12), 2110–2111. https://doi.org/10.1111/add.13366

Kuntsche, E., Knibbe, R., Engels, R., & Gmel, G. (2007). Drinking motives as mediators of the

link between alcohol expectancies and alcohol use among adolescents. *Journal of Studies

on Alcohol and Drugs*, *68*(1), 76–85. Retrieved from

http://www.ncbi.nlm.nih.gov/pubmed/17149520

Lance, C. E., & Vandenberg, R. J. (Eds.). (2009). *Statistical and methodological myths and*

urban legends: Doctrine, verity, and fable in the organizational and social sciences. New

York, NY: Routledge. https://doi.org/10.4324/9780203867266

Långström, N., & Hanson, R. K. (2006). High rates of sexual behavior in the general population:

Correlates and predictors. *Archives of Sexual Behavior*, *35*(1), 37–52.

https://doi.org/10.1007/s10508-006-8993-y

Lasser, K., Boyd, J. W., Woolhandler, S., Himmelstein, D. U., McCormick, D., & Bor, D. H.

(2000). Smoking and mental illness. *JAMA*, *284*(20), 2606–2610.

https://doi.org/10.1001/jama.284.20.2606

Lawrence, A. J., Luty, J., Bogdan, N. A., Sahakian, B. J., & Clark, L. (2009). Problem gamblers

share deficits in impulsive decision-making with alcohol-dependent individuals. *Addiction*,

104(6), 1006–1015. https://doi.org/10.1111/j.1360-0443.2009.02533.x

Ledgerwood, D. M., Arfken, C. L., Wiedemann, A., Bates, K. E., Holmes, D., & Jones, L.

(2013). Who goes to treatment? Predictors of treatment initiation among gambling help-line

callers. *American Journal on Addictions*, *22*(1), 33–38. https://doi.org/10.1111/j.1521-

0391.2013.00323.x

Ledgerwood, D. M., & Patel, M. D. (2012). Psychosocial and pharmacological treatments for

behavioral addictions. In J. Canales (Ed.), *Emerging targets for drug addiction treatment.*

(pp. 105–131). Nova Science Publishers, Inc.

Ledgerwood, D. M., & Petry, N. M. (2004). Gambling and suicidality in treatment-seeking

pathological gamblers. *Journal of Nervous and Mental Disease*, *192*(10), 711–714.

https://doi.org/10.1097/01.nmd.0000142021.71880.ce

Ledgerwood, D. M., Steinberg, M. A., Wu, R., & Potenza, M. N. (2005). Self-Reported

gambling-related suicidality among gambling helpline callers. *Psychology of Addictive*

Behaviors, *19*(2), 175–183. https://doi.org/10.1037/0893-164X.19.2.175

Ledgerwood, D. M., Weinstock, J., Morasco, B. J., & Petry, N. M. (2007). Clinical features and treatment prognosis of pathological gamblers with and without recent gambling-related illegal behavior. *The Journal of the American Academy of Psychiatry and the Law*, *35*(3), 294–301. https://doi.org/35/3/294 [pii]

Ledley, D. R., Marx, B. P., & Heimberg, R. G. (2010). *Making cognitive-behavioral therapy work: Clinical process for new practitioners* (2nd ed.). New York: Guilford Press. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc6&NEWS=N&AN= 2010-18741-000

Lesieur, H. R., & Blume, S. B. (1987). The South Oaks Gambling Screen (SOGS): A new instrument for the identification of pathological gamblers. *American Journal of Psychiatry*, *144*(9), 1184–1188. https://doi.org/10.1176/ajp.144.9.1184

Li, C.-H. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods*, *48*(3), 1–15. https://doi.org/10.3758/s13428-015-0619-7

Lin, J. C., Karno, M. P., Grella, C. E., Warda, U., Liao, D. H., Hu, P., & Moore, A. A. (2011). Alcohol, tobacco, and nonmedical drug use disorders in U.S. adults aged 65 tears and older: Data from the 2001–2002 National Epidemiologic Survey of Alcohol and Related Conditions. *The American Journal of Geriatric Psychiatry*, *19*(3), 292–299. https://doi.org/10.1097/JGP.0b013e3181e898b4

Linehan, M. M. (1993). *Cognitive-behavioral treatment of borderline personality disorders*. New York: Guilford Press.

Liu, M., & Peng, W. (2009). Cognitive and psychological predictors of the negative outcomes associated with playing MMOGs (massively multiplayer online games). *Computers in Human Behavior*, *25*(6), 1306–1311. https://doi.org/10.1016/j.chb.2009.06.002

Lorains, F. K., Cowlishaw, S., & Thomas, S. A. (2011). Prevalence of comorbid disorders in problem and pathological gambling: Systematic review and meta-analysis of population surveys. *Addiction*, *106*(3), 490–498. https://doi.org/10.1111/j.1360-0443.2010.03300.x

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. *Medical Care*, *46*(3), 266–274. https://doi.org/10.1097/MLR.0b013e318160d093

Loxton, N. J., & Dawe, S. (2001). Alcohol abuse and dysfunctional eating in adolescent girls: The influence of individual differences in sensitivity to reward and punishment. *The International Journal of Eating Disorders*, *29*(4), 455–462. https://doi.org/10.1002/eat.1042

Lozano, L. M., García-Cueto, E., & Muñiz, J. (2008). Effect of the number of response categories on the reliability and validity of rating scales. *Methodology*, *4*(2), 73–79. https://doi.org/10.1027/1614-2241.4.2.73

Maccallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling of fit involving a particular measure of model. *Psychological Methods*, *13*(2), 130–149. https://doi.org/10.1037/1082-989X.1.2.130

Macdonald, S., Cherpitel, C. J., Borges, G., DeSouza, A., Giesbrecht, N., & Stockwell, T. (2005). The criteria for causation of alcohol in violent injuries based on emergency room data from six countries. *Addictive Behaviors*, *30*(1), 103–113.

https://doi.org/10.1016/j.addbeh.2004.04.016

Mallorquí-Bagué, N., Vintró-Alcaraz, C., Sánchez, I., Riesco, N., Agüera, Z., Granero, R., …

Fernández-Aranda, F. (2018). Emotion regulation as a transdiagnostic feature among eating

disorders: Cross-Sectional and longitudinal approach. *European Eating Disorders Review*,

26(1), 53–61. https://doi.org/10.1002/erv.2570

Martin, P. R., & Petry, N. M. (2005). Are non-substance-related addictions really addictions?

The American Journal on Addictions, *14*(1), 1–7.

https://doi.org/10.1080/10550490590899808

Martins-De-Souza, D. (2013). Biomarkers for psychiatric disorders: Where are we standing?

Disease Markers, *35*(1), 1–2. https://doi.org/10.1155/2013/321071

Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: validation of a new

alcoholism screening instrument. *American Journal of Psychiatry*. Retrieved from

http://ajp.psychiatryonline.org/doi/pdf/10.1176/ajp.131.10.1121

McGue, M., Iacono, W. G., Legrand, L. N., & Elkins, I. (2001). Origins and consequences of age

at first drink. Familial risk and heritability. *Alcoholism, Clinical and Experimental

Research*, *25*(8), 1166–1173. https://doi.org/10.1111/j.1530-0277.2001.tb02331.x

Meng, X., Fleury, M.-J., Xiang, Y.-T., Li, M., & D'Arcy, C. (2018). Resilience and protective

factors among people with a history of child maltreatment: A systematic review. *Social

Psychiatry and Psychiatric Epidemiology*, *53*(5), 453–475. https://doi.org/10.1007/s00127-

018-1485-2

Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., &

Pallesen, S. (2011). Problematic video game use: Estimated prevalence and associations

with mental and physical health. *Cyberpsychology, Behavior, and Social Networking*,

14(10), 591–596. https://doi.org/10.1089/cyber.2010.0260

Meule, A., & Gearhardt, A. N. (2014). Food addiction in the light of *DSM*-5. *Nutrients*, *6*(9),

3653–3671. https://doi.org/10.3390/nu6093653

Meule, A., Heckel, D., Jurowich, C. F., Vögele, C., & Kübler, A. (2014). Correlates of food

addiction in obese individuals seeking bariatric surgery. *Clinical Obesity*, *4*, 228–236.

https://doi.org/10.1111/cob.12065

Micali, N., Solmi, F., Horton, N. J., Crosby, R. D., Eddy, K. T., Calzo, J. P., … Field, A. E.

(2015). Adolescent eating disorders predict psychiatric, high-risk behaviors and weight

outcomes in young adulthood. *Journal of the American Academy of Child and Adolescent

Psychiatry*, *54*(8), 652–659. https://doi.org/10.1016/j.jaac.2015.05.009

Mihordin, R. (2012). Behavioral Addiction—Quo Vadis? *The Journal of Nervous and Mental

Disease*, *200*(6), 489–491. https://doi.org/10.1097/NMD.0b013e318257c503

Milosevic, A., & Ledgerwood, D. M. (2010). The subtyping of pathological gambling: A

comprehensive review. *Clinical Psychology Review*, *30*(8), 988–998.

https://doi.org/10.1016/j.cpr.2010.06.013

Min, Y. (2008). *Robustness in confirmatory factor analysis: the effect of sample size, degree if

non-normality, model, and estimation method on accuracy of estimation for standard

errors*. University of Florida. Retrieved from

http://medcontent.metapress.com/index/A65RM03P4874243N.pdf%5Cnhttp://gradworks.u

mi.com/34/25/3425490.html

Mitchell, A. J., & Coyne, J. C. (2007). Do ultra-short screening instruments accurately detect

depression in primary care? A pooled analysis and meta-analysis of 22 studies. *British

Journal of General Practice*, *57*(535), 144–151.

Mitchell, J. E. (2016). Medical comorbidity and medical complications associated with binge-eating disorder. *International Journal of Eating Disorders*, *49*(3), 319–323. https://doi.org/10.1002/eat.22452

Morahan-Martin, J. (2008). Internet abuse: Emerging trends and lingering questions. In *Psychological aspects of cyberspace: Theory, research, applications* (pp. 32–69). Cambridge, UK: Cambridge University Press.

Morean, M. E., DeMartini, K. S., Leeman, R. F., Pearlson, G. D., Anticevic, A., Krishnan-Sarin, S., … O'Malley, S. S. (2014). Psychometrically improved, abbreviated versions of three classic measures of impulsivity and self-control. *Psychological Assessment*, *26*(3), 1003–1020. https://doi.org/10.1037/pas0000003

Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: Results from the World Health Surveys. *The Lancet*, *370*(9590), 851–858. https://doi.org/10.1016/S0140-6736(07)61415-9

Moyer, V. A. (2013). Screening and behavioral counseling interventions in primary care to reduce alcohol misuse: U.S. Preventive Services Task Force recommendation statement. *Annals of Internal Medicine*, *159*(3), 210–218. https://doi.org/10.7326/0003-4819-159-3-201308060-00652

Mozaffarian, D., Hao, T., Rimm, E. B., Willett, W. C., & Hu, F. B. (2011). Changes in diet and lifestyle and long-term weight gain in women and men. *The New England Journal of Medicine*, *364*(25), 2392–2404. Retrieved from http://search.proquest.com/docview/873539811?accountid=12860%5Cnhttp://jr3tv3gd5w.search.serialssolutions.com/?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rfr_id=info:sid/ProQ:psychologyshell&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&rft.gen

re=article&r

Muench, F., Morgenstern, J., Hollander, E., Irwin, T., O'Leary, A., Parsons, J. T., … Lai, B.

(2007). The consequences of compulsive sexual behavior: The preliminary reliability and

validity of the Compulsive Sexual Behavior Consequences Scale. *Sexual Addiction &*

Compulsivity, *14*(3), 207–220. https://doi.org/10.1080/10720160701480493

Murphy, C. M., Stojek, M. K., & MacKillop, J. (2014). Interrelationships among impulsive

personality traits, food addiction, and Body Mass Index. *Appetite*, *73*, 45–50.

https://doi.org/10.1016/j.appet.2013.10.008

Muthen, J. L., & Muthen, B. (2017). *MPlus User's Guide*. Los Angeles, CA: Author.

Napolitano, M. a., & Himes, S. (2011). Race, weight, and correlates of binge eating in female

college students. *Eating Behaviors*, *12*(1), 29–36.

https://doi.org/10.1016/j.eatbeh.2010.09.003

Nelson, C. J., Cho, C., Berk, A. R., Holland, J., & Roth, A. J. (2009). Are gold standard

depression measures appropriate for use in geriatric cancer patients? A systematic

evaluation of self-report depression instruments used with geriatric, cancer, and geriatric

cancer samples. *Journal of Clinical Oncology*, *28*(2), 348–356.

https://doi.org/10.1200/JCO.2009.23.0201

Newman, S. C., & Thompson, A. H. (2003). A population-based study of the association

between pathological gambling and attempted suicide. *Suicide & Life-Threatening*

Behavior, *33*(1), 80–87. https://doi.org/http://dx.doi.org/10.1521/suli.33.1.80.22785

Nordqvist, C., Johansson, K., & Bendtsen, P. (2004). Routine screening for risky alcohol

consumption at an emergency department using the AUDIT-C questionnaire. *Drug and*

Alcohol Dependence, *74*(1), 71–75. https://doi.org/10.1016/j.drugalcdep.2003.11.010

O'Neil, K. A., Conner, B. T., & Kendall, P. C. (2011). Internalizing disorders and substance use

disorders in youth: Comorbidity, risk, temporal order, and implications for intervention.

Clinical Psychology Review, *31*(1), 104–112. https://doi.org/10.1016/j.cpr.2010.08.002

Odlaug, B. L., Lust, K., Schreiber, L. R. N., Christenson, G., Derbyshire, K., Harvanko, A. M.,

… Grant, J. E. (2013). Compulsive sexual behavior in young adults. *Annals of Clinical

Psychiatry*, *25*(3), 193–200. Retrieved from

http://www.scopus.com/inward/record.url?eid=2-s2.0-

84878278098&partnerID=40&md5=e3a539ebca2194fea66b82f175031472

Pápay, O., Urbán, R., Griffiths, M. D., Nagygyörgy, K., Farkas, J., Kökönyei, G., …

Demetrovics, Z. (2013). Psychometric properties of the problematic online gaming

questionnaire short-form and prevalence of problematic online gaming in a national sample

of adolescents. *Cyberpsychology, Behavior and Social Networking*, *16*(5), 340–348.

https://doi.org/10.1089/cyber.2012.0484

Peer, K., Rennert, L., Lynch, K. G., Farrer, L., Gelernter, J., & Kranzler, H. R. (2013).

Prevalence of *DSM*-IV and *DSM*-5 alcohol, cocaine, opioid, and cannabis use disorders in a

largely substance dependent sample. *Drug and Alcohol Dependence*, *127*, 215–219.

https://doi.org/10.1016/j.drugalcdep.2012.07.009

Perez, M., & Warren, C. S. (2012). The relationship between quality of life, binge-eating

disorder, and obesity status in an ethnically diverse sample. *Obesity*, *20*(4), 879–885.

https://doi.org/10.1038/oby.2011.89

Petry, N. M. (Ed.). (2015). *Behavioral addictions: DSM-5® and beyond*. New York: Oxford

University Press. Retrieved from

http://www.oxfordmedicine.com/view/10.1093/med/9780199391547.001.0001/med-

9780199391547

Petry, N. M., Blanco, C., Auriacombe, M., Borges, G., Bucholz, K. K., Crowley, T. J., …

O'Brien, C. (2014). An overview of and rationale for changes proposed for pathological

gambling in *DSM-5*. *Journal of Gambling Studies*, *30*(2), 493–502.

https://doi.org/10.1007/s10899-013-9370-0

Petry, N. M., Blanco, C., Jin, C., & Grant, B. F. (2014). Concordance between gambling disorder

diagnoses in the *DSM*-IV and *DSM*-5: Results from the National Epidemiological Survey of

Alcohol and Related Disorders. *Psychology of Addictive Behaviors*, *28*(2), 586–591.

https://doi.org/10.1037/a0034661

Petry, N. M., Blanco, C., Stinchfield, R., & Volberg, R. (2012). An empirical evaluation of

proposed changes for gambling diagnosis in the *DSM*-5. *Addiction*, *108*(3), 575–581.

https://doi.org/10.1111/j.1360-0443.2012.04087.x

Petry, N. M., & Kiluk, B. D. (2002). Suicidal ideation and suicide attempts in treatment-seeking

pathological gamblers. *The Journal of Nervous and Mental Disease*, *190*(7), 462–469.

https://doi.org/10.1097/01.NMD.0000022447.27689.96

Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H.-J., Mößle, T., … O'Brien,

C. P. (2014). An international consensus for assessing internet gaming disorder using the

new *DSM*-5 approach. *Addiction*, *109*(9), 1399–1406. https://doi.org/10.1111/add.12457

Phillips, J., Frances, A., Cerullo, M. a, Chardavoyne, J., Decker, H. S., First, M. B., … Zachar, P.

(2012). The six most essential questions in psychiatric diagnosis: A pluralogue part 1:

Conceptual definitional issues in psychiatric diagnosis. *Philosophy, Ethics, and Humanities

in Medicine*, *7*(3), 1–29. https://doi.org/10.1186/1747-5341-7-9

Philpot, M., Pearson, N., Petratou, V., Dayanandan, R., Silverman, M., & Marshall, J. (2003).

Screening for problem drinking in older people referred to a mental health service: A

comparison of CAGE and AUDIT. *Aging & Mental Health*, *7*(3), 171–175.

https://doi.org/10.1080/1360786031000101120

Piper, M. E., Piasecki, T. M., Federman, E. B., Bolt, D. M., Smith, S. S., Fiore, M. C., & Baker,

T. B. (2004). A multiple motives approach to tobacco dependence: The Wisconsin

Inventory of Smoking Dependence Motives (WISDM-68). *Journal of Consulting and

Clinical Psychology*, *72*(2), 139–154. https://doi.org/10.1037/0022-006X.72.2.139

Piquet-Pessôa, M., Ferreira, G. M., Melca, I. A., & Fontenelle, L. F. (2014). *DSM*-5 and the

decision not to include sex, shopping or stealing as addictions. *Current Addiction Reports*,

1(3), 172–176. https://doi.org/10.1007/s40429-014-0027-6

Pomerleau, C. S., & Saules, K. K. (2007). Body image, body satisfaction, and eating patterns in

normal-weight and overweight/obese women current smokers and never-smokers. *Addictive

Behaviors*, *32*(10), 2329–2334. https://doi.org/10.1016/j.addbeh.2007.01.027

Pope, H. G., Lalonde, J. K., Pindyck, L. J., Walsh, T., Bulik, C. M., Crow, S. J., … Hudson, J. I.

(2006). Binge eating disorder: A stable syndrome. *American Journal of Psychiatry*,

163(12), 2181–2183. https://doi.org/10.1176/appi.ajp.163.12.2181

Potenza, M. N. (2006). Should addictive disorders include non-substance-related conditions?

Addiction, *101*(SUPPL. 1), 142–151. https://doi.org/10.1111/j.1360-0443.2006.01591.x

Powers, M. B., Davis, M. L., Kauffman, B. Y., Baird, S. O., Zvolensky, M., Rosenfield, D., …

Smits, J. A. J. (2016). Anxiety sensitivity and smoking variability among treatment seeking

smokers. *Addictive Disorders & Their Treatment*, *15*(3), 136–142.

https://doi.org/10.1097/ADT.0000000000000075

Prochaska, J. J. (2010). Failure to treat tobacco use in mental health and addiction treatment

settings: A form of harm reduction? *Drug and Alcohol Dependence*, *110*(3), 177–182.

https://doi.org/10.1016/j.drugalcdep.2010.03.002

Racine, S. E., Burt, S. A., Keel, P. K., Sisk, C. L., Neale, M. C., Boker, S., & Klump, K. L.

(2015). Examining associations between negative urgency and key components of objective

binge episodes. *International Journal of Eating Disorders*, *48*(5), 527–531.

https://doi.org/10.1002/eat.22412

Rawson, R. A., Marinelli-Casey, P., Anglin, M. D., Dickow, A., Frazier, Y., Gallagher, C., …

Zweben, J. (2004). A multi-site comparison of psychosocial approaches for the treatment of

methamphetamine dependence. *Addiction*, *99*(6), 708–717. https://doi.org/10.1111/j.1360-

0443.2004.00707.x

Ray, L. A., Courtney, K. E., & Bacio, G. A. (2008). Alcohol use disorders. In E. Craighead, D.

Miklowitz, & L. Craighead (Eds.), *Psychopathology history, diagnosis and empirical

foundations* (2nd ed., pp. 82–103). Hoboken, NJ: John Wiley & Sons. Retrieved from

http://www.nimh.nih.gov/statistics/1GAD_ADULT.shtml

Reed, P. L., Anthony, J. C., & Breslau, N. (2007). Incidence of drug problems in young adults

exposed to trauma and posttraumatic stress disorder: Do early life experiences and

predispositions matter? *Archives of General Psychiatry*, *64*(12), 1435–1442.

https://doi.org/64/12/1435 [pii]\r10.1001/archpsyc.64.12.1435

Rehbein, F., Kuhn, S., Rumpf, H.-J., & Petry, N. M. (2015). Internet gaming disorder. In N. M.

Petry (Ed.), *Behavioral addictions: DSM-5® and beyond*. Oxford University Press.

Retrieved from

http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=psyc11&NEWS=N&AN

=2015-21457-000

Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mößle, T. (2010). Prevalence and risk

factors of video game dependency in adolescence: Results of a German nationwide survey.

Cyberpsychology, Behavior, and Social Networking, *13*(3), 269–277.

https://doi.org/10.1089/cyber.2009.0227

Reichborn-Kjennerud, T., Bulik, C. M., Kendler, K. S., Roysamb, E., Maes, H., Tambs, K., &

Harris, J. R. (2003). Gender differences in binge-eating: A population-based twin study.

Acta Psychiatrica Scandinavica, *108*(3), 196–202. https://doi.org/10.1034/j.1600-

0447.2003.00106.x

Reid, R. C., Carpenter, B. N., Hook, J. N., Garos, S., Manning, J. C., Gilliland, R., … Fong, T.

(2012). Report of findings in a *DSM*-5 field trial for hypersexual disorder. *The Journal of

Sexual Medicine*, *9*(11), 2868–2877. https://doi.org/10.1111/j.1743-6109.2012.02936.x

Reslan, S., & Saules, K. K. (2013). Assessing the prevalence of and factors associated with

overweight, obesity, and binge eating as a function of ethnicity. *Eating and Weight

Disorders*, *18*(2), 209–219. https://doi.org/10.1007/s40519-013-0022-2

Reynolds, M., Mezey, G., Chapman, M., Wheeler, M., Drummond, C., & Baldacchino, A.

(2005). Co-morbid post-traumatic stress disorder in a substance misusing clinical

population. *Drug and Alcohol Dependence*, *77*(3), 251–258.

https://doi.org/10.1016/j.drugalcdep.2004.08.017

Robins, L. N., Helzer, J. E., Croughan, J., & Ratcliff, K. S. (1981). National Institute of Mental

Health Diagnostic Interview Schedule: Its history, characteristics, and validity. *Archives of

General Psychiatry*, *38*(4), 381–389.

https://doi.org/10.1001/archpsyc.1981.01780290015001

Rogier, G., & Velotti, P. (2018). Conceptualizing gambling disorder with the process model of

emotion regulation. *Journal of Behavioral Addictions*, *7*(2), 239–251.

https://doi.org/10.1556/2006.7.2018.52

Room, R. (2005). Stigma, social inequality and alcohol and drug use. *Drug and Alcohol Review*,

24(2), 143–155. https://doi.org/10.1080/09595230500102434

Rosseel, Y. (2012). Lavaan: an R package for structural equation modeling and more Version

0.5-12. *Journal of Statistical Software*, *48*(2), 1–36. Retrieved from

http://users.ugent.be/~yrosseel/lavaan/lavaanIntroduction.pdf

Saha, T. D., Compton, W. M., Chou, S. P., Smith, S., Ruan, W. J., Huang, B., … Grant, B. F.

(2012). Analyses related to the development of *DSM*-5 criteria for substance use related

disorders: 1. Toward amphetamine, cocaine and prescription drug use disorder continua

using Item Response Theory. *Drug and Alcohol Dependence*, *122*(1–2), 38–46.

https://doi.org/10.1016/j.drugalcdep.2011.09.004

Sartor, C. E., Scherrer, J. F., Shah, K. R., Xian, H., Volberg, R., & Eisen, S. A. (2007). Course of

pathological gambling symptoms and reliability of the lifetime gambling history measure.

Psychiatry Research, *152*(1), 55–61. https://doi.org/10.1016/j.psychres.2006.05.015

Saunders, J. B., Aasland, O. G., Babor, T. F., De la Fuente, J. R., & Grant, M. (1993).

Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO

collaborative project on early detection of persons with harmful alcohol consumption-II.

Addiction, *88*(6), 791–804. https://doi.org/10.1111/j.1360-0443.1993.tb02093.x

Schmitz, J. M., Stotts, A. L., Rhoades, H. M., & Grabowski, J. (2001). Naltrexone and relapse

prevention treatment for cocaine-dependent patients. *Addictive Behaviors*, *26*(2), 167–180.

https://doi.org/10.1016/S0306-4603(00)00098-8

Schulte, E. M., Joyner, M. a., Potenza, M. N., Grilo, C. M., & Gearhardt, A. N. (2015). Current

considerations regarding food addiction. *Current Psychiatry Reports*, *17*(4), 1–8.

https://doi.org/10.1007/s11920-015-0563-3

Schultz, K., Hook, J. N., Davis, D. E., Penberthy, J. K., & Reid, R. C. (2014). Nonparaphilic

hypersexual behavior and depressive symptoms: A meta-analytic review of the literature.

Journal of Sex & Marital Therapy, *40*(6), 477–487.

https://doi.org/10.1080/0092623X.2013.772551

Schwartz, R. S., & Benowitz, N. L. (2010). Nicotine addiction. *New England Journal of

Medicine*, *362*(24), 2295–2303. https://doi.org/10.1056/NEJMra0809890

Sejud, L. R. (2013). *The differential role of impulsivity, neuroticism, and negative affect within

and across scores on measures of behavioral addiction and substance abuse*. *ProQuest

dissertations and theses*. Baylor University.

Selzer, M. L., Vinokur, A., & van Rooijen, L. (1975). A self-administered Short Michigan

Alcoholism Screening Test (SMAST). *Journal of Studies on Alcohol*, *36*(1), 117–126.

https://doi.org/10.15288/jsa.1975.36.117

Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V.

(2004). Toward a syndrome model of addiction: Multiple expressions, common etiology.

Harvard Review of Psychiatry, *12*(6), 367–374.

https://doi.org/10.1080/10673220490905705

Shaffer, H. J., LaPlante, D. A., & Nelson, S. (2012). *APA addiction syndrome handbook:

Foundations, influences, and expressions of addiction*. Washington D.C.: American

Psychological Association. Retrieved from http://psycnet.apa.org/psycinfo/2012-00716-

000/

Shaw, M. C., Forbush, K. T., Schlinder, J., Rosenman, E., & Black, D. W. (2007). The effect of

pathological gambling on families, marriages, and children. *CNS Spectrums*, *12*(8), 615–622. https://doi.org/10.1017/S1092852900021416

Sher, K. J., Grekin, E. R., & Williams, N. a. (2005). The development of alcohol use disorders. *Annual Review of Clinical Psychology*, *1*, 493–523. https://doi.org/10.1146/annurev.clinpsy.1.102803.144107

Shmulewitz, D., Wall, M. M., Aharonovich, E., Spivak, B., Weizman, A., Frisch, A., … Hasin, D. S. (2013). Validity of proposed *DSM*-5 diagnostic criteria for nicotine use disorder: Results from 734 Israeli lifetime smokers. *Psychological Medicine*, *43*(10), 2179–2190. https://doi.org/10.1017/S0033291712002954

Sloan, E., Hall, K., Moulding, R., Bryce, S., Mildred, H., & Staiger, P. K. (2017). Emotion regulation as a transdiagnostic treatment construct across anxiety, depression, substance, eating and borderline personality disorders: A systematic review. *Clinical Psychology Review*, *57*, 141–163. https://doi.org/10.1016/j.cpr.2017.09.002

Slutske, W. S. (2006). Natural recovery and treatment-seeking in pathological gambling: Results of two U.S. national surveys. *American Journal of Psychiatry*, *163*(2), 297–302. https://doi.org/10.1176/appi.ajp.163.2.297

Smith, D. G., & Robbins, T. W. (2013). The neurobiological underpinnings of obesity and binge eating: A rationale for adopting the food addiction model. *Biological Psychiatry*, *73*(9), 804–810. https://doi.org/10.1016/j.biopsych.2012.08.026

Smolak, L., & Striegel-Moore, R. H. (2001). Challenging the myth of the golden girl: Ethnicity and eating disorders. In *Eating disorders: Innovative directions in research and practice* (pp. 111–132). Washington D.C.: American Psychological Association. https://doi.org/10.1037/10403-006

Sorbara, M., & Geliebter, A. (2002). Body image disturbance in obese outpatients before and

after weight loss in relation to race, gender, binge eating, and age of onset of obesity. *The International Journal of Eating Disorders*, *31*(4), 416–423.

https://doi.org/10.1002/eat.10046

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for

assessing generalized anxiety disorder. *Archives of Internal Medicine*, *166*(10), 1092–1097.

https://doi.org/10.1001/archinte.166.10.1092

Stavro, K., Rizkallah, E., Dinh-williams, L., Stavro, K., Rizkallah, E., & Dinh-williams, L.

(2013). Hypersexuality among a substance use disorder population. *Sexual Addiction & Compulsivity*, *20*(3), 210–216. https://doi.org/10.1080/10720162.2013.787379

Stewart, A. L., Hays, R. D., & Ware, J. E. (1988). The MOS Short-form General Health Survey.

Medical Care, *26*(7), 724–735. https://doi.org/10.1097/00005650-198807000-00007

Stewart, S. H., Zack, M., Collins, P., Klein, R. M., & Fragopoulos, F. (2008). Subtyping

pathological gamblers on the basis of affective motivations for gambling: Relations to

gambling problems, drinking problems, and affective motivations for drinking. *Psychology of Addictive Behaviors*, *22*(2), 257–268. https://doi.org/10.1037/0893-164X.22.2.257

Stice, E., Marti, C. N., & Rohde, P. (2013). Prevalence, incidence, impairment, and course of the

proposed *DSM*-5 eating disorder diagnoses in an 8-year prospective community study of

young women. *Journal of Abnormal Psychology*, *122*(2), 445–457.

https://doi.org/10.1037/a0030679

Stice, E., Presnell, K., Shaw, H., & Rohde, P. (2005). Psychological and behavioral risk factors

for obesity onset in adolescent girls: A prospective study. *Journal of Consulting and Clinical Psychology*, *73*(2), 195–202. https://doi.org/10.1037/0022-006X.73.2.195

Stinchfield, R., Govoni, R., & Ron Frisch, G. (2005). *DSM*-IV diagnostic criteria for

pathological gambling: Reliability, validity, and classification accuracy. *The American

Journal on Addictions*, *14*(1), 73–82. https://doi.org/10.1080/10550490590899871

Stockwell, T., Hodgson, R., Edwards, G., Taylor, C., & Rankin, H. (1979). The development of a

questionnaire to measure severity of alcohol dependence. *British Journal of Addiction to

Alcohol & Other Drugs*, *74*(1), 79–87. Retrieved from

http://onlinelibrary.wiley.com/doi/10.1111/j.1360-0443.1979.tb02415.x/abstract

Stojek, M., & Fischer, S. (2013). Impulsivity and motivations to consume alcohol: A prospective

study on risk of dependence in young adult women. *Alcoholism: Clinical and Experimental

Research*, *37*(2), 292–299. https://doi.org/10.1111/j.1530-0277.2012.01875.x

Straus, M., Gelles, R., & Smith, C. (1990). Physical violence in American families: Risk factors

and adaptations to violence in 8,145 families. *Family Relations*, *39*, 349–353.

Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *Canadian

Journal of Psychiatry*, *39*(3), 135–140. https://doi.org/10.1177/070674379403900303

Striegel-Moore, R. H., Bedrosian, R., Wang, C., & Schwartz, S. (2012). Why men should be

included in research on binge eating: Results from a comparison of psychosocial

impairment in men and women. *International Journal of Eating Disorders*, *45*(2), 233–240.

https://doi.org/10.1002/eat.20962

Striegel-Moore, R. H., Dohm, F.-A., Kraemer, H. C., Schreiber, G. B., Barr, T. C., & Daniels, S.

R. (2007). Risk factors for binge eating disorders: An exploratory study. *International

Journal of Eating Disorders*, *40*(6), 481–487. https://doi.org/10.1002

Striegel-Moore, R. H., Wilfley, D. E., Pike, K. M., Dohm, F. A., & Fairburn, C. G. (2000).

Recurrent binge eating in black American women. *Archives of Family Medicine*, *9*(1), 83–

87. https://doi.org/10.1001/archfami.9.1.87

Stuber, J., Galea, S., & Link, B. G. (2009). Stigma and smoking: The consequences of our good

   intentions. *Social Service Review*, *83*(4), 585–609. https://doi.org/10.1086/650349

Substance Abuse and Mental Health Administration. (n.d.). Substance abuse treatment

   admissions involving abuse of pain relievers 1998 and 2008. Retrieved from

   http://oas.samhsa.gov/2k10/230/

Suomi, A., Jackson, A. C., Dowling, N. a., Lavis, T., Patford, J., Thomas, S. a., … Cockman, S.

   (2013). Problem gambling and family violence: Family member reports of prevalence,

   family impacts and family coping. *Asian Journal of Gambling Issues and Public Health*,

   3(1), 1–15. https://doi.org/10.1186/2195-3007-3-13

Suurvali, H., Cordingley, J., Hodgins, D. C., & Cunningham, J. (2009). Barriers to seeking help

   for gambling problems: A review of the empirical literature. *Journal of Gambling Studies*,

   25(3), 407–424. https://doi.org/10.1007/s10899-009-9129-9

Tabachnick, B. G. (2001). *Using multivariate statistics* (6th ed.). Boston: MA: Pearson.

Tanaka, J. S. (1987). "How big is big enough?": Sample size and goodness of fit in structural

   equation models with latent variables. *Child Development*, *58*(1), 134–146.

   https://doi.org/10.2307/1130296

Targhetta, R., Nalpas, B., & Perney, P. (2013). Argentine tango: Another behavioral addiction?

   Journal of Behavioral Addictions, *2*(3), 179–186. https://doi.org/10.1556/JBA.2.2013.007

Thurstone, L. L. (1947). *Multiple factor analysis*. Chicago: University of Chicago Press.

   Retrieved from http://doi.apa.org/psycinfo/1947-15068-000

Timko, C., Moos, R. H., Finney, J. W., & Lesar, M. D. (2000). Long-term outcomes of alcohol

   use disorders: Comparing untreated individuals with those in alcoholics anonymous and

formal treatment. *Journal of Studies on Alcohol*, *61*(4), 529–540. Retrieved from

http://www.ncbi.nlm.nih.gov/pubmed/10928723

Toce-Gerstein, M., Gerstein, D. R., & Volberg, R. A. (2003). A hierarchy of gambling disorders

in the community. *Addiction*, *98*(12), 1661–1672. https://doi.org/10.1111/j.1360-

0443.2003.00545.x

Torrens, M., Rossi, P. C., Martinez-Riera, R., Martinez-Sanvisens, D., & Bulbena, A. (2012).

Psychiatric co-morbidity and substance use disorders: Treatment in parallel systems or in

one integrated system? *Substance Use & Misuse*, *47*(8), 1005–1014.

https://doi.org/10.3109/10826084.2012.663296

U.S. Preventive Task Force. (2002). Clinical guidelines screening for depression:

Recommendations and rationale, *136*(10), 760–764.

van de Mortel, T. F. (2008). Faking it: Social desirability response bias in self- report research

report research. *Australian Journal of Advanced Nursing*, *25*(4), 40–48.

Velicer, W. (1976). Determining the number of components from the matrix of partial correla-

tions. *Psychometrika*, *41*(3), 321–327.

Voigt, D. C., Dillard, J. P., Braddock, K. H., Anderson, J. W., Sopory, P., & Stephenson, M. T.

(2009). Carver and White's (1994) BIS/BAS scales and their relationship to risky health

behaviours. *Personality and Individual Differences*, *47*(2), 89–93.

https://doi.org/10.1016/j.paid.2009.02.003

Wang, H. R., Cho, H., & Kim, D. J. (2018). Prevalence and correlates of comorbid depression in

a nonclinical online sample with *DSM*-5 internet gaming disorder. *Journal of Affective

Disorders*, *226*, 1–5. https://doi.org/10.1016/j.jad.2017.08.005

Ware, J., Sherbourne, C., & Davies, A. (1992). Developing and testing the MOS 20-item short-

form health survey. In A. L. Stewart & J. E. Ware (Eds.), *Measuring functioning and well-being: The medical outcomes study approach* (pp. 277–290). Durham: Duke University Press. Retrieved from http://www.rand.org/pubs/external_publications/EP19920058

Weinstock, J., Burton, S., Rash, C. J., Moran, S., Biller, W., Krudelbach, N., … Morasco, B. J. (2011). Predictors of engaging in problem gambling treatment: Data from the West Virginia Problem Gamblers Help Network. *Psychology of Addictive Behaviors*, *25*(2), 372–379. https://doi.org/10.1037/a0023240

Weinstock, J., Rash, C., Burton, S., Moran, S., Biller, W., O'Neil, K., & Kruedelbach, N. (2013). Examination of proposed *DSM*-5 changes to pathological gambling in a helpline sample. *Journal of Clinical Psychology*, *69*(12), 1305–1314. https://doi.org/10.1002/jclp.22003

Weiss, N. H., Forkus, S. R., Contractor, A. A., & Schick, M. R. (2018). Difficulties regulating positive emotions and alcohol and drug misuse: A path analysis. *Addictive Behaviors*, *84*, 45–52. https://doi.org/10.1016/j.addbeh.2018.03.027

Weltzin, T. E., Weisensel, N., Franczyk, D., Burnett, K., Klitz, C., & Bean, P. (2005). Eating disorders in men: Update. *The Journal of Men's Health & Gender*, *2*(2), 186–193. https://doi.org/10.1016/j.jmhg.2005.04.008

Westfall, P. H. (2014). Kurtosis as Peakedness. *The American Statistician*, *68*(3), 191–195. https://doi.org/10.1080/00031305.2014.917055

Whitaker, R., & Cosgrove, L. (2015). *Psychiatry under the influence: Institutional corruption, social injury, and prescriptions for reform*. New York, NY: Palgrave Macmilon.

White, A., Castle, I.-J. P., Chen, C. M., Shirley, M., Roach, D., & Hingson, R. W. (2015). Converging patterns of alcohol use and related outcomes among females and males in the United States, 2002 to 2012. *Alcoholism: Clinical and Experimental Research*, *39*(9), 1712–

1726. https://doi.org/10.1111/acer.12815

Widiger, T. A. (1991). Definition, diagnosis, and differentiation. *Journal of Personality Disorders*, *5*(1), 42–51. https://doi.org/10.1521/pedi.1991.5.1.42

Wikler, A. (1948). Recent progress in reasearch on the neurophysiological basis of morphine addiction. *American Journal of Psychiatry*, *105*(5), 328–338. Retrieved from http://ajp.psychiatryonline.org/doi/pdf/10.1176/ajp.105.5.329

Wilcox, H. C., Conner, K. R., & Caine, E. D. (2004). Association of alcohol and drug use disorders and completed suicide: an empirical review of cohort studies. *Drug and Alcohol Dependence*, *76*, S11–S19. https://doi.org/10.1016/j.drugalcdep.2004.08.003

Williams, R. J., & Volberg, R. A. (2010). *Best practices in the population assessment of problem gambling: Report prepared for the Ontario Problem Gambling Research Centre.* Guelph, Ontario, Canada. Retrieved from https://www.uleth.ca/dspace/handle/10133/1259

Witbrodt, J., Mulia, N., Zemore, S. E., & Kerr, W. C. (2014). Racial/Ethnic disparities in alcohol-related problems: Differences by gender and level of heavy drinking. *Alcoholism: Clinical and Experimental Research*, *38*(6), 1662–1670. https://doi.org/10.1111/acer.12398

Wolfling, K., Thalemann, R., & Grusser-Sinopoli, S. M. (2008). Computer game addiction: A psychopathological symptom complex in adolescence. *Computerspielsucht*, *35*(5), 226–232. https://doi.org/10.1055/s-2007-986238

Wolitzky-Taylor, K., Niles, A. N., Ries, R., Krull, J. L., Rawson, R., Roy-Byrne, P., & Craske, M. (2018). Who needs more than standard care? Treatment moderators in a randomized clinical trial comparing addiction treatment alone to addiction treatment plus anxiety disorder treatment for comorbid anxiety and substance use disorders. *Behaviour Research and Therapy*, *107*, 1–9. https://doi.org/10.1016/j.brat.2018.05.005

World Health Organization. (2004). *Global status report on alcohol 2004*. Geneva, Switzerland.

Retrieved from

http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Global+Status+Report+o

n+Alcohol+2004#0

Worthington, R. L., & Whittaker, T. A. (2006). Scale development research: A content analysis

and recommendations for best practices. *The Counseling Psychologist*, *34*(6), 806–838.

https://doi.org/10.1177/0011000006288127

Yanovski, S. Z., Marcus, M. D., Wadden, T. a., & Walsh, B. T. (2014). The Questionnaire on

Eating and Weight Patterns-5: An updated screening instrument for binge eating disorder.

International Journal of Eating Disorders, *48*(3), 259–261.

https://doi.org/10.1002/eat.22372

Young, R., Oei, T. P., & Knight, R. G. (1990). The tension reduction hypothesis revisited: An

alcohol expectancy perspective. *Addiction*, *85*(1), 31–40. https://doi.org/10.1111/j.1360-

0443.1990.tb00621.x

Zapolski, T. C. B., Cyders, M. A., & Smith, G. T. (2009). Positive urgency predicts illegal drug

use and risky sexual behavior. *Psychology of Addictive Behaviors*, *23*(2), 348–354.

https://doi.org/10.1037/a0014684

Zerhouni, O., Bègue, L., Brousse, G., Carpentier, F., Dematteis, M., Pennel, L., … Cherpitel, C.

J. (2013). Alcohol and violence in the emergency room: A review and perspectives from

psychological and social sciences. *International Journal of Environmental Research and

Public Health*, *10*(10), 4584–4606. https://doi.org/10.3390/ijerph10104584

APPENDICES

Appendix A: Tables

Table 1

Goodman's (1990) Early Conceptualization of Behavioral Addiction

A. Recurrent failure to resist impulses to engage in a specified behavior.
B. Increasing sense of tension immediately prior to initiating the behavior
C. Pleasure or relief at the time of engaging in the behavior
D. A feeling of lack of control while engaging in the behavior
E. At least five of the following
    1. Frequent preoccupation with the behavior or with activity that is preparatory to the behavior.
    2. Frequent engaging in the behavior to a greater extent or over a longer period of time than was intended.
    3. Repeated efforts to reduce, control, or stop the behavior.
    4. A great deal of time spent in activities necessary for the behavior from its effects.
    5. Frequent engaging in the behavior when expected to fulfill occupation academic, domestic, or social obligations.
    6. Important social, occupational, or recreational activities given up or reduced because of the behavior.
    7. Continuation of the behavior despite knowledge of having a persistent recurrent social, financial, psychological, or physical problem that is caused by the behavior.
    8. Tolerance: need to increase the intensity or frequency of the behavior in order to achieve the desired effect or diminished effect with continued behavior of the same intensity.
    9. Restlessness or irritability if unable to engage in the behavior.
F. Some symptoms of the disturbance have persisted for at least 1 month or have occurred repeatedly over a longer period of time.

Note. Adapted from "Addiction: Definition and implications" by A. Goodman, 1990, *British Journal of Addiction*, *85*(11) p. 1403–1408.

Table 2.

Results of Epidemiological Research Examining Severity and Discrimination of DSM-5 Criteria

CRITERION	Prevalence (%)	Factor Loadings	Criterion response model parameters	
			Severity (s.e.)	Discrimination (s.e.)
DSM-IV dependence				
Tolerance	3.8	.74	2.29 (.040)	2.19 (.068)
Withdrawal	4.0	.84	2.05 (.030)	2.99 (.098)
Larger/longer	7.0	.87	1.69 (.020)	3.35 (.107)
Quit/control	5.6	.76	2.03 (.033)	2.26 (.064)
Time spent	1.4	.89	2.39 (.037)	4.10 (.200)
Activities given up	0.5	.93	2.70 (.054)	4.96 (.388)
Physical/psychological problems	2.8	.91	2.08 (.026)	4.29 (.218)
DSM-IV abuse				
Hazardous use	6.1	.77	1.94 (.036)	2.38 (.076)
Social/interpersonal problems	1.2	.92	2.40 (.035)	4.69 (.293)
Neglected major roles	0.5	.93	2.65 (.042)	5.21 (.364
Craving	2.2	.83	2.34 (.035)	3.02 (.120)

Note. s.e. = standard error. Adapted from "*DSM*-5 criteria for substance use disorders: Recommendations and rationale" By D. S Hasin, et al., 2013, *The American Journal of Psychiatry*, *170*(8), p. 834–851.

Table 3

DSM-5 Diagnostic Criteria for Alcohol Use Disorder

A. A problematic pattern of alcohol use leading to clinically significant impairment or distress, as manifested by at least two of the following, occurring within a 12-month period:

    1. Alcohol is often taken in larger amounts or over a longer period than was intended.

    2. There is a persistent desire or unsuccessful efforts to cut down or control alcohol

    3. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects.

    4. Craving, or a strong desire or urge to use alcohol.

    5. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home.

    6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol.

    7. Important social, occupational, or recreational activities are given up or reduced because of alcohol use.

    8. Recurrent alcohol use in situations in which it is physically hazardous.

    9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol.

    10. Tolerance, as defined by either of the following:

        a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect.

        b. A markedly diminished effect with continued use of the same amount of alcohol.

    11. Withdrawal, as manifested by either of the following:

        a. The characteristic withdrawal syndrome for alcohol

        b. Alcohol (or a closely related substance, such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms.

Table 4

Summary of Prevalence of DSM-5 Indicators Among Those with a Drug Use Disorder

Substance	Activities given up	Physical or psychological problems	Neglect role	Social/ interpersonal problems	Larger/Longer
Amphetamine	10.80%	18.11%	12.80%	25.66%	14.74%
Cocaine	16.02%	22.63%	15.94%	30.74%	19.34%
Sedative	5.22%	8.08%	7.83%	13.67%	8.33%
Tranquilizers	5.92%	9.53%	8.22%	15.99%	9.68%
Opioids	5.34%	8.87%	7.66%	14.21%	10.80%

Note. Adapted from "Analyses related to the development of *DSM*-5 criteria for substance use related disorders: 1. Toward amphetamine, cocaine and prescription drug use disorder continua using Item Response Theory" by T. D. Saha, et al., 2012, *Drug and Alcohol Dependence*, *122*(1-2), p. 38–46.

Table 5

DSM-5 Diagnostic Criteria for Gambling Disorder

A Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period

1 Needs to gamble with increasing amounts of money in order to achieve the desired excitement.

2 Is restless or irritable when attempting to cut down or stop gambling.

3 Has made repeated unsuccessful efforts to control, cut back, or stop gambling.

4 Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble).

5 Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).

6 After losing money gambling, often returns another day to get even ("chasing" one's losses).

7 Lies to conceal the extent of involvement with gambling.

8 Has jeopardized or lost a significant relationship, job, or educational, or career opportunity because of gambling.

9 Relies on others to provide money to relieve desperate financial situations caused by gambling

B The gambling behavior is not better explained by a manic episode.

Table 6

DSM-5 Diagnostic Criteria for Binge-Eating Disorder

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

    1. Eating, in a discrete period of time (for example, within any 2-hour period), an amount of food that is definitely larger than what most people would eat in a similar period of time under similar circumstances.

    2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

B. The binge-eating episodes are associated with three (or more) of the following:

    1. Eating much more rapidly than normal

    2. Eating until feeling uncomfortably full

    3. Eating large amounts of food when not feeling physically hungry

    4. Eating alone because of feeling embarrassed by how much one is eating

    5. Feeling disgusted with oneself, depressed, or very guilty afterwards

C. Marked distress regarding binge eating is present.

D. The binge eating occurs, on average, at least once a week for three months.

E. The binge eating is not associated with the recurrent use of inappropriate compensatory behavior as in bulimia nervosa (for example, purging) and does not occur exclusively during the course of bulimia nervosa or anorexia nervosa

Table 7

Proposed Diagnostic Criteria for Hypersexual Disorder

A	Over a period of at least 6 months, recurrent and intense sexual fantasies, sexual urges, or sexual behaviors in association with 3 or more of the following 5 criteria:

    1 Time consumed by sexual fantasies, urges, or behaviors repetitively interfere with other important (non-sexual) goals, activities, and obligations.

    2 Repetitively engaging in sexual fantasies, urges, or behaviors in response to dysphoric mood states (e.g., anxiety, depression, boredom, irritability).

    3 Repetitively engaging in sexual fantasies, urges, or behaviors in response to stressful life events.

    4 Repetitive but unsuccessful efforts to control or significantly reduce these sexual fantasies, urges, or behaviors.

    5 Repetitively engaging in sexual behaviors while disregarding the risk for physical or emotional harm to self or others.

B There is clinically significant personal distress or impairment in social, occupational, or other important areas of functioning associated with the frequency and intensity of these sexual fantasies, urges, or behaviors.

C These sexual fantasies, urges or behaviors are not due to the direct physiological effect of an exogenous substance (e.g., a drug of abuse or a medication)

Specify if: Masturbation; Pornography; Sexual Behavior with Consenting Adults; Cybersex; Telephone Sex; Strip Clubs; or Other

Note. Adapted from "Hypersexual Disorder: A Proposed Diagnosis for *DSM*-V" by A. P. Kafka, 2010, *Archives of Sexual Behavior, 39*(2), p. 377-400.

Table 8

DSM-5 Diagnostic Criteria for Internet Gaming Disorder

A. Persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period

1. Preoccupation with playing (The individual thinks about previous gaming activity or anticipates playing the next game; internet gaming becomes the dominant activity in daily life).

2. Withdrawal symptoms when not playing (These symptoms are typically described as irritability, anxiety, or sadness, but there are not physical signs of pharmacological withdrawal).

3. Tolerance--the need to spend increasing amounts of time engaged in internet games

4. Unsuccessful attempts to control the participation in internet games

5. Loss of interests in previous hobbies or entertainment as a result of, and with the exception of, internet games

6. Continues playing despite knowledge of psychosocial problems.

7. Has deceived family members, therapists, or others regarding the amount of internet gaming

8. Use of Internet games to escape or relieve negative moods (e.g., feelings of helplessness, guilt, or anxiety).

9. Has jeopardized or lost a significant relationship, job, educational, or career opportunity because of participation in internet games

Table 9

SPQ Subscales Correlated with Validated Scales Measuring Similar Constructs

Comparison tests	Relevant SPQ subscales					
	Alcohol	Drugs	Prescribed drugs	Gambling	Food bingeing	Food starving
CAGE ($n=316$)[a]	.78***	.05	.21*	.13	−.22*	−.14
SMAST ($n=430$)[a]	.74***	.00	.23***	.13	−.20*	−.08
SADQ ($n=430$)[a]	.73***	−.04	.23***	.10	−.14	−.02
SODQ ($n=370$)[a]	−.01	.64***	.53***	.26***	−.19*	−.14
SDS ($n=370$)[a]	−.05	.76***	.40***	.31***	−.23**	−.17*
SOGS ($n=460$)[a]	.03	.10	.02	.50***	−.02	−.04
EDI ($n=467$)[a]	−.04	−.01	.18*	.00	.74***	.61***
BITE ($n=464$)[a]	−.14	.00	.07	−.07	.73***	.64***

Note. Nonparametric two-tailed Spearman correlations were used. A Bonferroni correction for all 48 tests sets the alpha level at $p < .001$. a: the total clinical sample was 497 but not all subjects completed comparison tests.

Adapted from "The shorter PROMIS questionnaire: Further validation of a tool for simultaneous assessment of multiple addictive behaviours" by G. Christo et al., 2003, *Addictive Behaviors*, *28*(2), 225–248.

* $p < .001$, ** $p .00001$ *** $p < .0000001$.

Table 10

ACE Scores' Association with Significant Mental and Physical Health Problems

ACE score	(N)	Mental health disturbances								Somatic health disturbances					
		Panic reactions		Depressed affect		Anxiety		Hallucinations		Sleep disturbance		Severe obesity		Multiple somatic symptoms	
		%	Adjusted odds ratio	%	Adjusted odds ratio	%	Adjusted odds ratio	%	Adjusted odds ratio	%	Adjusted odds ratio	%	Adjusted odds ratio	%	Adjusted odds ratio
0	(6255)	8.3	1.0 (referent)	18.4	1.0 (referent)	7.8	1.0 (referent)	1.3	1.0 (referent)	36.3	1.0 (referent)	5.6	1.0 (referent)	5.1	1.0 (referent)
1	(4514)	10.9	1.3 (1.2–1.5)	25.2	1.5 (1.3–1.6)	9.1	1.2 (1.1–1.4)	1.5	1.1 (0.8–1.5)	41.6	1.2 (1.1–1.3)	7.4	1.3 (1.1–1.5)	6.4	1.3 (1.1–1.5)
2	(2758)	13.6	1.7 (1.4–1.9)	34.1	2.2 (2.0–2.4)	12.4	1.7 (1.4–1.9)	2.3	1.6 (1.2–2.3)	47.5	1.6 (1.4–1.7)	8.3	1.4 (1.2–1.7)	8.6	1.8 (1.5–2.1)
3	(1650)	16.8	2.0 (1.7–2.4)	38.8	2.5 (2.2–2.8)	14.1	1.8 (1.6–2.2)	2.9	2.0 (1.4–2.9)	51.1	1.8 (1.6–2.0)	8.8	1.5 (1.2–1.8)	8.1	1.6 (1.3–2.0)
≥4	(2160)	20.9	2.5 (2.2–2.9)	49.0	3.6 (3.2–4.0)	19.0	2.4 (2.1–2.8)	4.0	2.7 (1.9–3.7)	56.1	2.1 (1.9–2.4)	11.9	1.9 (1.6–2.2)	13.9	2.7 (2.3–3.2)
Total	(17337)	12.2	–	28.4	–	10.9	–	2.0	–	43.3	–	7.6	–	7.4	–

Note. Adapted from "The enduring effects of abuse and related adverse experiences in childhood." by R. F. Anda, 2006, *European Archives of Psychiatry and Clinical Neuroscience, 256*(3), p. 174–186.

Table 11

Summary Findings Related to Psychometric Properties of Available Impulsivity Measures

Scale/version	Data Set 1 (TTURC)				Data Set 2 (CTNA)			
	RMSEA	CFI	TLI	SRMR	RMSEA	CFI	TLI	SRMR
BIS–11 versions								
Original version (Patton et al., 1995)								
30 items; six first-order subscales and three second-order subscales	.087	.590	.549	.107	.081	.638	.602	.092
30 items; three subscales	.091	.548	.511	.108	.087	.570	.535	.096
Brief versions								
15 items; three subscales (Spinella, 2007)	.098	.782	.737	.095	.088	.813	.774	.104
24 items; two subscales (Haden & Shiva, 2008, 2009)	.084	.716	.688	**.076**	.087	.683	.651	**.082**
13 items; two subscales (Reise et al., 2013)	.091	**.937**	**.988**	**.040**	.099	**.929**	.867	**.042**
Eight items; one subscale (Steinberg et al., 2013)	.159	.676	.547	.088	.107	.838	.773	**.064**
NEW brief version: Eight items; two subscales	**.041**	**.980**	**.969**	**.030**	**.055**	**.962**	**.941**	**.039**
BIS/BAS versions								
Original version (Carver & White, 1994): 20 items; four subscales	.070	.823	.795	**.079**	.072	.817	.788	**.079**
Two-factor version consistent with Gray's RST, 1987: 20 items; two factors	.084	.731	.698	**.079**	.077	.827	.792	.081
Five-factor Version 2 (Heym et al., 2008): 20 items, five subscales	**.069**	.830	.798	**.074**	.072	.823	.790	**.076**
Brief version (Campbell-Sills et al., 2004): 17 items; four subscales	.071	.834	.830	**.079**	.077	.827	.792	.081
NEW brief version: 13 items; four subscales	*.053*	*.927*	*.880*	*.033*	**.042**	**.957**	**.943**	**.046**
BSCS versions								
Original version (Tangney et al., 2004): 13 items; one subscale	.089	.754	.704	**.069**	.101	.795	.754	**.066**
Brief version (Maloney et al., 2012): Eight items; two subscales	**.064**	**.926**	.891	**.043**	.097	.898	.849	**.047**

Note. Bolded model fit indices indicate acceptable model fit based on the following recommendations: Bentler's comparative fit index (CFI) & Tucker–Lewis Index (TLI) > .90, root-mean-square error of approximation (RMSEA) < .07, and standardized root-mean-square residual (SRMR) < .08. *Italicized* fit indices indicate model fit associated with exploratory factor analysis. BIS–11 = Barratt Impulsiveness Scale, Version 11; TTURC = Transdisciplinary Tobacco Use Research Center; CTNA = Center for the Translational Neuroscience of Alcohol; RST = reinforcement sensitivity theory.

Note. Adapted from "Psychometrically improved, abbreviated versions of three classic measures of impulsivity and self-control" by R. Morean et al., 2014, *Psychological Assessment*, 26(3), p. 1003–1020.

Table 12

Eliminated Items Due to Poor Agreement About Item Content and Relationship to DSM-5 Criteria

Alcohol Use

    I have skipped certain social or work events because of my drinking.

    Sometimes I don't feel like doing anything after I've been drinking.

    Sometimes I'd rather drink alone than go out with friends.

    There are times that I haven't gotten things done at work, home, or school because of drinking.

Drug Use

    Being high can make it hard to get things done at home.

    I don't socialize as much because of my drug use.

    Sometimes I use drugs instead of going out with friends.

Smoking

    I have been criticized for smoking when I am supposed to be doing something else.

    I have skipped certain work or social events because smoking was not allowed.

    Little smoke breaks can add up, and I don't get to things I should.

Gambling

    I have felt a little embarrassed about my gambling.

    I've needed people to help me out because of money problems related to gambling.

    My friends/family have expressed concern about the money I lose gambling.

    Some problems at home or work are related to gambling.

Binge Eating

    Sometimes after overeating, I don't want to do anything.

    Sometimes I feel driven to overeat

Hypersexuality

    I spend more time than I want to thinking about sex or watching porn.

    I've had some disagreements with others about my porn or sex habits.

    Sometimes I feel hopeless about changing my sex or porn habits.

    Sometimes I need to have sex or watch porn before I can do other important things.

Video-gaming

    Even if I have other things to do, I feel pulled to play video games.

    If I want to achieve a gaming goal, I will keep going for longer than I said I would.

Table 13

Demographic Characteristics Wave I Sample

Race

	Frequency	Percent
White	172	69.64
Black	15	6.07
Hispanic	20	8.10
American Native	1	0.40
Asian	23	9.31
Pacific Islander	1	0.40
Middle Eastern	2	0.81
Other	1	0.40
Biracial	4	1.62
Multiracial	5	2.02
Refuse	3	1.21
Total	247	100.00

Gender

Male	114	45.97
Female	133	53.63
Transgender	1	0.40
Total	248	100.00

Education

High School	47	18.95
Technical Program/Certificate	16	6.45
Associate's Degree	42	16.94
Bachelor's Degree	98	39.52
Master's Degree	35	14.11
PhD	10	4.03
Total	248	100.00

Employment

Full Time (> 35 hrs/wk)	145	58.47
Part time (Regular hours)	23	9.27
Part time (Irregular hours)	16	6.45
Working full time and going to school	1	0.40
Working part time and going to school	6	2.42
Full time student	10	4.03
Part time student	1	0.40
Unemployed, on disability	6	2.42
Unemployed	27	10.89
Retired	8	3.23
Military service	2	0.81

Table 13 *continued*
Employment continued

Variable	Frequency	Percent
Prefer not to answer	3	1.21
Total	248	100.00

Income

> $150,000	23	9.27
$100,000 - $149,000	27	10.89
$75,000 - $99,000	34	13.71
$50,000 - $74,000	45	18.15
$25,000 - $49,000	75	30.24
$10,000 - $24,000	32	12.90
< $9,000	9	3.63
Don't know, or prefer not to say	3	1.21
Total	248	100.00

Socioeconomic Status

We have barely enough to get by	40	16.26
We have enough to get by, but no more	85	34.55
We are solidly middle class	92	37.40
We have plenty of "extras"	21	8.54
We have plenty of "luxuries"	5	2.03
Don't know/ unsure / prefer not to say	3	1.22
Total	246	100.00

Age

Age				Std.
N	Minimum	Maximum	Mean	Deviation
245	18	79	38.11	12.20

Table 14

Descriptive Statistics for Alcohol Items

Item	N Valid	N Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min.	Max.
A_C_1	299	1	1.90	1	1.64	1.67	1.56	1	7
A_C_2	296	4	2.16	1	1.79	1.35	0.49	1	7
A_C_3	292	8	1.56	1	1.32	2.46	5.26	1	7
A_C_4	294	6	1.69	1	1.38	2.18	4.02	1	7
A_C_5	298	2	2.11	1	1.78	1.48	0.96	1	7
A_H_1	298	2	1.58	1	1.34	2.36	4.63	1	7
A_H_10	296	4	1.82	1	1.59	1.87	2.31	1	7
A_H_3	291	9	1.71	1	1.50	2.12	3.39	1	7
A_H_5	293	7	1.54	1	1.30	2.64	6.46	1	7
A_H_6	298	2	1.83	1	1.58	1.88	2.44	1	7
A_H_7	298	2	1.86	1	1.59	1.82	2.16	1	7
A_H_8	296	4	1.60	1	1.33	2.37	5.04	1	7
A_H_9	295	5	1.49	1	1.24	2.72	6.94	1	7
A_LL_1	295	5	1.78	1	1.56	2.04	3.03	1	7
A_LL_2	296	4	1.87	1	1.58	1.71	1.69	1	7
A_LL_3	298	2	1.69	1	1.42	2.13	3.71	1	7
A_LL_4	296	4	1.91	1	1.68	1.81	2.08	1	7
A_LL_5	296	4	1.91	1	1.60	1.73	1.91	1	7
A_LL_6	297	3	1.68	1	1.41	2.28	4.34	1	7
A_LL_7	294	6	1.74	1	1.50	2.04	3.05	1	7
A_LL_8	295	5	1.77	1	1.53	1.99	2.91	1	7
A_N_1	298	2	1.63	1	1.41	2.29	4.39	1	7
A_N_4	298	2	1.49	1	1.20	2.65	6.34	1	7
A_N_5	299	1	1.51	1	1.24	2.69	6.71	1	7
A_N_6	298	2	1.49	1	1.19	2.63	6.28	1	7
A_R_1	295	5	1.72	1	1.55	2.26	4.09	1	7
A_R_2	294	6	1.50	1	1.24	2.67	6.71	1	7
A_R_4	296	4	1.57	1	1.28	2.43	5.22	1	7
A_R_5	296	4	1.51	1	1.32	2.70	6.53	1	7

Note. The first letter in the item name refers to the purported factor: A: Alcohol. The second letter refers to the purported *DSM* criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 15

Summary of Exploratory Factor Analysis Results for Alcohol Items Using Minimum Residual Estimation

Item	Factor Loadings
A_LL_1	**.92**
A_H_3	**.90**
A_LL_5	.89
A_LL_7	.89
A_LL_2	.89
A_LL_8	.88
A_N_5	**.87**
A_LL_6	.87
A_H_5	.86
A_C_3	**.86**
A_H_7	.86
A_H_8	.85
A_C_5	.85
A_LL_3	.85
A_R_1	.83
A_R_5	**.83**
A_H_1	.81
A_C_1	.81
A_R_2	.79
A_H_10	.76
A_H_6	.75
A_C_2	.75
A_C_4	.74
A_LL_4	.73
A_N_1	.72
A_R_4	.71
A_H_9	.65

Note. Items that were retained are bolded.

Table 16

Descriptive Statistics for Drug Items

Item	N Valid	N Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min.	Max.
D_C_1	296	4	1.73	1	1.54	2.26	4.15	1	7
D_C_2	296	4	1.66	1	1.50	2.39	4.69	1	7
D_C_3	297	3	1.53	1	1.32	2.76	7.00	1	7
D_H_2	299	1	1.49	1	1.33	2.94	7.90	1	7
D_H_5	297	3	1.38	1	1.20	3.48	11.58	1	7
D_H_3	293	7	1.35	1	1.15	3.56	12.19	1	7
D_LL_4	295	5	1.33	1	1.06	3.55	12.52	1	7
D_LL_3	293	7	1.38	1	1.18	3.41	11.08	1	7
D_N_1	292	8	1.40	1	1.22	3.40	11.13	1	7
D_N_3	296	4	1.23	1	0.84	4.37	19.98	1	7
D_R_1	294	6	1.35	1	1.13	3.50	11.53	1	7

Note. The first letter in the item name refers to the purported factor: D: Drug. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 17

Summary of Exploratory Factor Analysis Results for Drug Items Using Minimum Residual Estimation

Item	Factor Loadings
D_C_3	.90
D_LL_4	.90
D_H_3	.87
D_H_2	**.86**
D_R_2	.86
D_LL_3	**.85**
D_H_5	.85
D_N_3	.83
D_R_1	**.82**
D_C_2	.79
D_N_1	**.77**
D_C_1	**.75**

Note. Items that were retained are bolded.

Table 18

Descriptive Statistics for Smoking Items

Item	N Valid	Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min.	Max.
S_C_1	295	5	1.87	1	1.81	1.90	2.14	1	7
S_C_2	294	6	1.63	1	1.48	2.41	4.80	1	7
S_C_3	295	5	1.73	1	1.58	2.23	3.90	1	7
S_C_4	296	4	1.65	1	1.48	2.29	4.14	1	7
S_C_5	297	3	2.11	1	2.03	1.61	1.00	1	7
S_C_6	297	3	2.01	1	1.97	1.73	1.40	1	7
S_H_10	295	5	2.02	1	1.95	1.65	1.10	1	7
S_H_2	297	3	1.73	1	1.68	2.23	3.52	1	7
S_H_4	297	3	1.67	1	1.56	2.41	4.74	1	7
S_H_5	295	5	1.86	1	1.86	1.92	2.09	1	7
S_H_6	297	3	1.56	1	1.41	2.64	5.97	1	7
S_H_7	296	4	1.67	1	1.52	2.33	4.38	1	7
S_H_8	295	5	1.56	1	1.34	2.41	4.86	1	7
S_LL_1	296	4	1.75	1	1.61	2.11	3.16	1	7
S_LL_2	298	2	1.81	1	1.74	2.01	2.52	1	7
S_LL_3	298	2	1.79	1	1.71	2.05	2.80	1	7
S_LL_4	296	4	1.70	1	1.60	2.28	3.95	1	7
S_LL_5	297	3	1.68	1	1.60	2.28	3.95	1	7
S_LL_6	295	5	1.72	1	1.65	2.26	3.78	1	7
S_LL_7	294	6	1.72	1	1.64	2.25	3.83	1	7
S_N_2	298	2	1.70	1	1.57	2.24	3.81	1	7
S_N_5	299	1	1.50	1	1.25	2.67	6.51	1	7
S_R_1	296	4	1.78	1	1.70	2.08	2.95	1	7
S_R_3	294	6	1.71	1	1.59	2.24	3.76	1	7
S_R_4	294	6	1.48	1	1.32	2.99	8.23	1	7
S_R_5	293	7	1.57	1	1.44	2.65	6.12	1	7
S_R_6	296	4	1.49	1	1.23	2.54	5.55	1	7

Note. The first letter in the item name refers to the purported factor: S: Smoking. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 19

Summary of Exploratory Factor Analysis Results for Smoking Items Using Minimum Residual Estimation

Item	Factor Loadings
S_H_5	**.94**
S_C_6	**.93**
S_C_3	.93
S_R_1	**.92**
S_R_3	.92
S_LL_2	**.92**
S_LL_3	.92
S_C_1	.92
S_C_2	.92
S_H_4	.91
S_C_4	.90
S_LL_1	.87
S_LL_4	.87
S_N_2	**.87**
S_H_10	.86
S_LL_5	.85
S_LL_7	.85
S_LL_6	.83
S_H_7	.83
S_H_8	.82
S_R_5	.81
S_R_6	.80
S_H_6	.78
S_H_2	.77
S_R_4	.74
S_N_5	.74
S_C_5	.68

Note. Items that were retained are bolded.

Table 20

Descriptive Statistics for Gambling Items

Item	N Valid	Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min	Max
G_H_3	294	6	1.76	1	1.62	2.09	3.14	1	7
G_H_4	298	2	1.44	1	1.24	3.04	8.63	1	7
G_C_1	298	2	1.28	1	0.89	3.74	14.78	1	7
G_C_3	297	3	1.31	1	1.03	3.63	12.60	1	7
G_LL_4	294	6	1.29	1	0.95	3.86	15.45	1	7
G_LL_5	293	7	1.29	1	0.92	3.66	13.73	1	7
G_N_1	294	6	1.25	1	0.93	4.15	17.75	1	7
G_N_2	296	4	1.20	1	0.85	4.48	19.62	1	6
G_N_3	296	4	1.18	1	0.78	5.02	25.34	1	6
G_N_5	297	3	1.20	1	0.80	4.63	22.49	1	7
G_R_1	298	2	1.19	1	0.78	4.85	24.13	1	6
G_R_3	297	3	1.25	1	0.95	4.28	18.32	1	7

Note. The first letter in the item name refers to the purported factor: G: Gambling. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 21

Summary of Exploratory Factor Analysis Results for Gambling Items Using Minimum Residual Estimation

Item	Factor Loadings
G_C_3	**.93**
G_R_3	**.93**
G_LL_4	**.91**
G_N_5	**.89**
G_N_3	.86
G_N_2	.86
G_N_1	.85
G_LL_5	.84
G_C_1	.83
G_H_4	**.66**
G_H_3	.49

Note. Items that were retained are bolded.

Table 22

Descriptive Statistics for Binge Eating Items

Item	N Valid	Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min	Max
B_C_1	295	5	3.09	1	2.09	0.49	-1.15	1	7
B_C_2	296	4	2.75	1	2.04	0.75	-0.83	1	7
B_H_10	295	5	2.22	1	1.92	1.32	0.30	1	7
B_H_11	293	7	2.31	1	2.00	1.24	0.08	1	7
B_H_2	295	5	2.30	1	1.96	1.29	0.25	1	7
B_H_3	298	2	2.21	1	1.90	1.37	0.49	1	7
B_H_4	298	2	1.99	1	1.83	1.68	1.44	1	7
B_H_5	297	3	2.54	1	2.04	1.01	-0.44	1	7
B_H_6	295	5	2.05	1	1.81	1.65	1.45	1	7
B_H_7	295	5	2.12	1	1.71	1.48	1.09	1	7
B_H_8	297	3	2.51	1	2.10	1.09	-0.30	1	7
B_H_9	295	5	2.42	1	1.93	1.09	-0.13	1	7
B_LL_2	295	5	2.18	1	1.87	1.40	0.64	1	7
B_LL_3	296	4	2.53	1	1.92	0.99	-0.26	1	7
B_LL_4	297	3	2.25	1	1.82	1.33	0.60	1	7
B_LL_5	300	0	2.71	1	2.06	0.83	-0.73	1	7
B_LL1	298	2	2.47	1	1.90	1.09	-0.07	1	7
B_N_3	294	6	1.90	1	1.64	1.76	1.94	1	7
B_N_4	296	4	1.57	1	1.29	2.42	5.07	1	7
B_N_5	299	1	1.76	1	1.52	2.09	3.35	1	7
B_R_1	297	3	1.47	1	1.26	2.92	7.95	1	7
B_R_2	296	4	1.64	1	1.42	2.39	4.86	1	7
B_R_3	296	4	1.71	1	1.47	2.23	4.14	1	7

Note. The first letter in the item name refers to the purported factor: B: Binge Eating. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 23

Summary of Exploratory Factor Analysis Results for Binge Eating Items Using Minimum Residual Estimation

Item	Factor Loadings
B_H_10	**.91**
B_LL_4	**.90**
B_H_11	.88
B_LL1	.88
B_H_2	.87
B_H_5	.85
B_H_8	.85
B_LL_3	.84
B_H_9	.84
B_H_3	.81
B_H_7	.80
B_LL_5	.79
B_N_5	**.79**
B_R_3	**.78**
B_H_6	.77
B_C_2	**.76**
B_LL_2	.75
B_N_4	.74
B_R_2	.73
B_H_4	.72
B_N_3	.70
B_C_1	.63
B_R_1	.63

Note. Items that were retained are bolded.

Table 24

Descriptive Statistics for Hypersexuality Items

Item	N Valid	Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Minimum	Maximum
P_C_2	298	2	2.21	1	1.841	1.333	0.501	1	7
P_C_3	296	4	1.88	1	1.593	1.808	2.195	1	7
P_C_4	292	8	1.86	1	1.492	1.723	1.852	1	7
P_H_1	290	10	1.85	1	1.517	1.714	1.882	1	7
P_H_2	295	5	1.64	1	1.375	2.290	4.503	1	7
P_H_6	298	2	1.68	1	1.403	2.098	3.383	1	7
P_LL_3	298	2	1.71	1	1.461	2.208	4.110	1	7
P_LL_5	300	0	1.62	1	1.352	2.290	4.577	1	7
P_N_3	298	2	1.43	1	1.194	3.048	8.744	1	7
P_N_2	295	5	1.27	1	0.838	3.404	11.306	1	6
P_R_3	295	5	1.45	1	1.099	2.719	6.999	1	7
P_R_1	296	4	1.45	1	1.119	2.765	7.210	1	7

Notes. The first letter in the item name refers to the purported factor: P: Porn/Hypersexuality. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 25

Summary of Exploratory Factor Analysis Results for Hypersexuality Items Using Minimum Residual Estimation

Item	Factor Loadings		
	Factor 1	Factor 2	Factor 3
P_N_2	**.90**	-.1	-.13
P_R_3	**.82**	-.01	-.11
P_H_2	**.77**	.05	.14
P_R_1	**.70**	.08	.03
P_LL_5	**.66**	.15	.20
P_H_6	**.52**	.37	.12
P_N_3	**.49**	.24	-.45
P_H_1	**.45**	.42	.22
P_LL_3	-.05	**.91**	-.01
P_C_3	.11	**.77**	-.22
P_C_2	-.06	**.69**	.06
P_C_4	.17	**.63**	.22

Note. The highest factor loading for each item is bolded.

Table 26

Descriptive Statistics for Video Game Items

Item	N Valid	Missing	Mean	Mode	Std. Deviation	Skewness	Kurtosis	Min	Max
V_C_1	299	1	1.67	1	1.40	2.20	4.06	1	7
V_C_2	298	2	1.72	1	1.47	2.17	3.94	1	7
V_C_3	297	3	1.59	1	1.22	2.29	4.91	1	7
V_H_1	296	4	1.86	1	1.58	1.86	2.43	1	7
V_H_2	295	5	1.62	1	1.31	2.32	4.77	1	7
V_H_3	294	6	1.76	1	1.46	2.00	3.05	1	7
V_H_4	294	6	1.65	1	1.43	2.37	4.77	1	7
V_H_7	297	3	1.69	1	1.36	2.05	3.44	1	7
V_LL_1	300	0	1.94	1	1.58	1.55	1.29	1	7
V_LL_2	298	2	1.73	1	1.52	2.13	3.49	1	7
V_LL_3	297	3	2.11	1	1.76	1.50	1.14	1	7
V_LL_4	297	3	2.16	1	1.83	1.42	0.73	1	7
V_N_3	293	7	2.04	1	1.67	1.46	0.89	1	7
V_N_5	294	6	1.74	1	1.51	2.25	4.30	1	7
V_N_6	297	3	1.79	1	1.58	2.13	3.68	1	7
V_R_1	296	4	1.71	1	1.47	2.21	4.15	1	7
V_R_2	297	3	1.53	1	1.20	2.40	5.11	1	7

Note. The first letter in the item name refers to the purported factor: V: Video Game. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category.

Table 27

Summary of Exploratory Factor Analysis Results for Video Game Items Using Minimum Residual Estimation

Item	Factor Loadings
V_H_4	**.86**
V_LL_3	**.85**
V_N_3	**.85**
V_C_2	**.84**
V_LL_4	.84
V_H_7	.83
V_LL_1	.83
V_H_1	.83
V_C_1	.82
V_LL_2	.82
V_H_2	.81
V_H_3	.81
V_N_6	.79
V_R_1	**.78**
V_C_3	.78
V_N_5	.76
V_R_2	.76

Note. Items that were retained are bolded.

Table 28

Fit Statics for Alternative Factor Structures in Wave I Sample

Model	Overall fit indices				
	χ^2 (df)	CFI	TLI	RMSEA	SRMR
Model 1 Retain one item for each *DSM*-5 criterion and retain and covary all 7 factors (theoretical model)	1393.484(539), $p < .001$	.902	.891	.081	.072
Model 2 Theoretical model without neglect items	812.753(329), $p < .001$	.926	.915	.077	.066
Model 3 Retain most highly loaded health problems, craving, and using larger amount/over a longer period of time (internalizing)	1135.162(539), $p < .001$	.927	.919	.067	.053
Model 4 Covary all 7 factors and retain the 5 items with the highest factor loading irrespective of *DSM*-5 criteria (empirical model)	.1430.870(539), $p < .001$	.910	.901	.083	.055
Model 5 Empirical model without the hypersexual factor	1105.054(390), $p < .001$	.920	.911	.087	.054
Model 6 Empirical model without the video game factor	1173.358(390), $p < .001$	.914	.904	.090	.055
Model 7 Theoretical model with fixed covariances for factors that are weakly correlated	1456.339(542), $p < .001$	.891	.881	.085	.144

Note. CFA = Confirmatory Factor Analysis, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Residual, *DSM*-5 = Diagnostic and Statistical Manual for Psychiatric Disorders.

Table 29

Retained Item Type for Empirical Model

DSM-5 Criteria	Frequency
Craving	8
Health problems	11
Longer/Larger	11
Relationship problems	2
Neglect of role	3
Grand Total	**35**

Note. DSM-5 = Diagnostic and Statistical Manual for Psychiatric Disorders.

Table 30

Retained Item Type for Empirical Model by Factor

Factor/*DSM*-5 Criteria	Frequency
Alcohol	
Health problems	1
Longer/Larger	4
Binge Eating	
Health problems	3
Longer/Larger	2
Drug	
Craving	3
Health problems	2
Gambling	
Craving	1
Longer/Larger	1
Neglect of role	2
Relationship problems	1
Pornography/Sex	
Craving	1
Health problems	3
Longer/Larger	1
Smoking	
Craving	2
Health problems	1
Longer/Larger	1
Relationship problems	1
Video Gaming	
Craving	1
Health problems	1
Longer/Larger	2
Neglect of role	1
Grand Total	**35**

Note. DSM-5 = Diagnostic and Statistical Manual for Psychiatric Disorders.

Table 31

CFAs for Two Different Methods of Retaining Items in Wave I

	Model 1 (Theoretical Model)					Model 2[a] (Internalizing Model)				
	χ^2 (df)	CFI	TLI	RMSEA	SRMR	χ^2 (df)	CFI	TLI	RMSEA	SRMR
Alcohol	21.846(5), $p = .001$	.987	.974	.109	.019	51.061(5), $p \leq .001$	.968	.937	.179	.026
Drug	35.506(5), $p \leq .001$	.975	.950	.147	.025	39.761, $p \leq .001$	.971	.941	.155	.033
Smoking	14.244(5), $p = .001$	.995	.991	.080	.009	9.524(5), $p \leq .001$	.998	.995	.056	.006
Gambling	55.336(5), $p \leq .001$	.967	.935	.187	.024	8.067(5), $p = .153$	.997	.993	.046	.020
Binge Eating	21.427(5), $p = .001$	.984	.968	.106	.028	31.370(5), $p \leq .001$	.979	.958	.136	.029
Hypersexual	12.153(5), $p = .033$	.990	.980	.071	.021	28.311(5), $p \leq .001$	.977	.955	.127	.024
Video Gaming	28.311(5), $p \leq .001$	.977	.955	.127	.024	52.284(5), $p \leq .001$	.957	.915	.183	.039

Note. CFA = Confirmatory Factor Analysis, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, RMSEA = Root Mean Square Error of Approximation, SRMR =Standardized Root Mean Residual, *DSM*-5 =Diagnostic and Statistical Manual for Psychiatric Disorders.

[a]Shading indicates that this model was utilized to retain items.

Table 32

Demographics for Wave II Sample

Race

Variable	Frequency	Percent
White	267	62.82
Black	58	13.65
Hispanic	24	5.65
American Native	6	1.41
Asian	42	9.88
Pacific Islander	1	0.24
Middle Eastern	2	0.47
Biracial	20	4.71
Multiracial	2	0.47
Total	427	100.0

Gender

Male	163	38.17
Female	259	60.66
Transgender FTM	2	0.47
Transgender MTF	1	0.23
Refuse to Answer	2	0.47
Total	427	100.00

Education

Less than High School	1	0.23
High School	104	24.36
Technical Program/Certificate	30	7.03
Associates Degree	66	15.46
Bachelor's Degree	173	40.52
Master's Degree	43	10.07
PhD	10	2.34
Total	427	100.00

Employment

Full Time (> 35 hrs/wk)	259	60.66
Part time (Regular hours)	38	8.90
Part time (Irregular hours)	37	8.67
Working full time and going to school	4	0.94
Working part time and going to school	4	0.94
Full time student	11	2.58
Part time student	1	0.23

Table 32 *continued*
Employment continued

Variable	Frequency	Percent
Unemployed, on disability	8	1.87
Unemployed	46	10.77
Retired	17	3.98
Other	2	0.47
Total	427	100.00

Income

	Frequency	Percent
> $150,000	31	7.26
$100,000 - $149,000	44	10.30
$75,000 - $99,000	45	10.54
$50,000 - $74,000	100	23.42
$25,000 - $49,000	120	28.10
$10,000 - $24,000	59	13.82
< $9,000	17	3.98
Don't know, or prefer not to say	11	2.58
Total	427	100.00

Socioeconomic Status

	Frequency	Percent
We have barely enough to get by	66	15.46
We have enough to get by, but no more	165	38.64
We are solidly middle class	159	37.24
We have plenty of "extras"	33	7.73
We have plenty of "luxuries"	3	0.70
Don't know/ unsure / prefer not to say	1	0.23
Total	427	100.00

Age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	426	19.00	73.00	37.27	11.86

Table 33

Summary of Select Studies Characterizing Mturk Sample Characteristics.

	Behrend et al. (2011) (N = 270)	Arditte et al. (2015) (N = 1,098)	Shapiro et al. (2013) (N = 443)	**Current Sample (N = 427)**
Caucasian	79.78%	79.00%	83.50%	**62.82%**
African American	3.00%	7.90%	5.20%	**13.65%**
Asian	8.24%	7.30%	5.90%	**9.88%**
Hispanic	5.24%	7.70%	4.10%	**5.65%**
Other/multiple	2.25%	5.80%	1.30%	**8.00%**
% Female	63.30%	51.50%	54.00%	**60.66%**

Table 34

Descriptive Statistics for Items in Wave II

Item	N Valid	Missing	Mean	Median	Mode	Std. Deviation	Kurtosis
A_1_1	420	7	1.93	1	1	1.70	1.88
A_2_2	420	7	1.78	1	1	1.51	2.97
A_3_3	420	7	1.71	1	1	1.54	4.03
A_4_4	420	7	1.62	1	1	1.41	5.66
A_5_5	420	7	1.69	1	1	1.56	4.12
D_1_6	420	7	1.20	1	1	0.80	28.37
D_2_7	420	7	1.27	1	1	0.97	16.57
D_3_8	420	7	1.17	1	1	0.74	31.87
D_4_9	420	7	1.20	1	1	0.81	26.37
D_5_10	420	7	1.39	1	1	1.23	10.00
S_1_11	420	7	2.12	1	1	2.06	0.77
S_2_12	420	7	2.03	1	1	1.95	1.12
S_3_13	420	7	2.07	1	1	2.07	0.94
S_4_14	420	7	2.02	1	1	1.93	1.31
S_5_15	420	7	2.10	1	1	2.10	0.84
G_2_17	420	7	1.52	1	1	1.36	6.97
G_4_19	420	7	1.63	1	1	1.51	4.58
G_5_20	420	7	1.32	1	1	1.02	13.50
G_6_21	420	7	1.27	1	1	1.00	17.07
G_7_22	420	7	1.25	1	1	0.96	19.35
B_1_24	420	7	2.60	1	1	2.01	-0.56
B_2_25	420	7	1.56	1	1	1.40	6.22
B_3_26	420	7	1.85	1	1	1.76	2.52
B_4_27	420	7	1.64	1	1	1.53	4.84
B_5_28	420	7	2.00	1	1	1.73	1.57
P_1_29	420	7	2.92	2	1	2.12	-1.08
P_2_30	420	7	2.08	1	1	1.68	1.22
P_3_31	420	7	2.22	1	1	1.82	0.39
P_4_32	420	7	2.01	1	1	1.70	1.09
P_5_33	420	7	1.86	1	1	1.50	2.43
V_1_34	420	7	1.56	1	1	1.35	5.30
V_2_35	420	7	2.25	1	1	1.93	0.15
V_3_36	420	7	1.88	1	1	1.63	2.27
V_4_37	420	7	1.50	1	1	1.28	6.93
V_5_38	420	7	1.61	1	1	1.36	4.80

Note. The first letter in the item name refers to the purported factor: A: Alcohol, D: Drug, S: Smoking, G: Gambling, B: Binge Eating, P: Pornography/Sexual behavior, V: Videogames. The first number refers to the sequence within a subscale and the second number refers to the sequence in the total scale.

Table 35

Correlations for RAD, Depression, and Anxiety

Variable	1	2	3	4	5	6	7	8	9
1. RAD Total									
2. RAD Alcohol	.647**								
3. RAD Drug	.617**	.346**							
4. RAD Smoking	.608**	.349**	.289**						
5. RAD Gambling	.565**	.291**	.355**	.236**					
6. RAD Binge Eating	.523**	.171**	.238**	.127**	.137**				
7. RAD Hypersexuality	.580**	.220**	.329**	.104*	.252**	.212**			
8. RAD Video Games	.581**	.303**	.296**	.103*	.306**	.210**	.283**		
9. Depression	.503**	.300**	.342**	.189*	.298**	.409**	.334**	.415**	
10. Anxiety	.314**	.312**	.064	.154	.158	.242**	.185*	.228**	.739**

**. Correlation is significant at the .01 level (2-tailed).
*. Correlation is significant at the .05 level (2-tailed).

Table 36

Correlations for RAD and Impulsivity as Measured by the Shortened UPPS-P

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. RAD Total												
2. RAD Alcohol	.647**											
3. RAD Drug	.617**	.346**										
4. RAD Smoking	.608**	.349**	.289**									
5. RAD Gambling	.565**	.291**	.355**	.236**								
6. RAD Binge Eating	.523**	.171**	.238**	.127**	.137**							
7. RAD Hypersexuality	.580**	.220**	.329**	.104*	.252**	.212**						
8. RAD Video Games	.581**	.303**	.296**	.103*	.306**	.210**	.283**					
9. Negative Urgency	.470**	.356**	.218*	.154	.121	.398**	.279**	.214*				
1. Lack of Perseverance	.186*	.107	.179*	.013	-.074	.249**	.234**	-.027	.210*			
11. Lack of Premeditation	.379**	.211*	.172	.083	.056	.450**	.237**	.181*	.549**	.563**		
12. Sensation Seeking	.142	.213*	.106	-.024	.029	-.031	.230*	.050	.306**	-.044	-.013	
13. Positive Urgency	.238**	.275**	.078	.038	.217*	.104	.106	.144	.592**	.124	.339**	.373**

**. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Table 37
Correlations for RAD, Behavioral Inhibition, and Behavioral Activation

Variable	1	2	3	4	5	6	7	8	9	10	11
1. RAD Total											
2. RAD Alcohol	.647**										
3. RAD Drug	.617**	.346**									
4. RAD Smoking	.608**	.349**	.289**								
5. RAD Gambling	.565**	.291**	.355**	.236**							
6. RAD Binge Eating	.523**	.171**	.238**	.127**	.137**						
7. RAD Hypersexuality	.580**	.220**	.329**	.104*	.252**	.212**					
8. RAD Video Games	.581**	.303**	.296**	.103*	.306**	.210**	.283**				
9. Inhibition	-.269**	-.220*	-.130	-.095	-.073	-.283**	-.116	-.074			
1. Drive	.024	-.130	.131	.135	.001	.047	-.057	-.031	.044		
11. Fun Seeking	-.089	-.127	-.093	-.011	.086	.033	-.170	-.029	.162	.434**	
12. Reward Seeking	-.311**	-.271**	-.102	-.075	-.057	-.187*	-.316**	-.128	.583**	.393**	.422**

Note. BIS/BAS: Behavioral Inhibition System/Behavioral Activation System items based on the work by Morean et al., (2014).**. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Table 38
Correlations for RAD and Negative/Positive Childhood Events

Variable	1	2	3	4	5	6	7	8	9
1. RAD Total									
2. RAD Alcohol	.647**								
3. RAD Drug	.617**	.346**							
4. RAD Smoking	.608**	.349**	.289**						
5. RAD Gambling	.565**	.291**	.355**	.236**					
6. RAD Binge Eating	.523**	.171**	.238**	.127**	.137**				
7. RAD Hypersexuality	.580**	.220**	.329**	.104*	.252**	.212**			
8. RAD Video Games	.581**	.303**	.296**	.103*	.306**	.210**	.283**		
9. Adverse Childhood Events	.282**	.278**	.136	.314**	.178*	.094	.094	.073	
10. Positive Childhood Events	-.239*	-.340**	-.168	-.190*	-.192*	.079	-.018	-.229*	-.354**

**. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Table 39

Correlations for RAD and Difficulties with Emotion Regulation

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. RAD Total													
2. RAD Alcohol	.647**												
3. RAD Drug	.617**	.346**											
4. RAD Smoking	.608**	.349**	.289**										
5. RAD Gambling	.565**	.291**	.355**	.236**									
6. RAD Binge Eating	.523**	.171**	.238**	.127**	.137**								
7. RAD Hypersexuality	.580**	.220**	.329**	.104*	.252**	.212**							
8. RAD Video Games	.581**	.303**	.296**	.103*	.306**	.210**	.283**						
9. Emotion Regulation Total	.442**	.324**	.270**	.233**	.278**	.311**	.316**	.222**					
1. ↓ Emotional Clarity	.334**	.346**	.205*	.135	.196*	.201*	.220**	.205*	.669**				
11. ↓Goal Directed Behavior	.279**	.204*	.141	.089	.186*	.261**	.251**	.102	.848**	.480**			
12. Impulsivity	.478**	.390**	.348**	.314**	.319**	.313**	.227**	.209*	.780**	.431**	.567**		
13. ↓ Access to ER strategies	.415**	.296**	.228**	.255**	.245**	.272**	.297**	.213*	.957**	.601**	.749**	.710**	
14. ↓ Emotional Acceptance	.376**	.206*	.258**	.175*	.241**	.261**	.313**	.232**	.872**	.534**	.653**	.568**	.818**

Notes. ER = Emotion Regulation. ↓ = lack of. Subscales are from the DERS-16 by Bjureberg et al., (2016)
**. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).

Table 40

Quantity and Frequency Items Use to Compare Incremental Validity of RAD and CMPB

Behavior	Frequency	Quantity
Alcohol	In the past three months, how often did you drink alcohol?	In the past three months, when you drank alcohol, how many drinks did you typically have?
Drugs	In the past three months, which of the following drugs/substances caused you the most problems? [and] In the past three months, how often have you used [selected choice]?	In the past three months, when you used [selected choice], how much time did you typically spend high?
Smoking	In the past three months, how often have you used tobacco products, including cigarettes, electronic cigarettes, dip, cigars, or other tobacco products?	[If cigarettes are selected] In the past three months, when you smoked cigarettes, how much did you typically smoke?
Gambling	In the past three months, how often have you gambled, including lottery, cards, sports betting, or casino games?	In the past three months, which statement best describes the quantity of money that you gambled with?[a]
Binge Eating	In the past 3 months, how often did you eat a/an [selected quantity choice] amount and experience a sense of loss of control?	In the past three months, when you experienced a sense of loss of control, how large is the amount of food you typically eat?[B]
Hypersexual Behavior	In the past 3 months, how often did you engage in any type of sexual behavior, including masturbation, pornography use, sex with a partner, or casual sex?	In the past three months, when you engaged in sexual behavior, how much time did you spend on average?
Video Games	In the past there months, how often did you play video games?	In the past three months, when you played video games, how much time did you spend on average for each episode of play?

Note: CMPB = Composite Measure of Problem Behaviors (Kingston et al., 2011).

[a]For example, I bet with very small or trivial amounts of money [or] When betting, I have bet very large amounts of money, including risking savings or other large financial problems.

[b]Small (like a handful of grapes or one cookie) [or] Unusually Large (like two full meals, three main courses, or eating an unusually large amount of one food or combinations of foods like a whole large cake or a whole large pizza

Table 41

Linear Regression Models Exploring Predictive Validity of RAD and CMPB

Behavior	Variable	B	95% CI		Beta	*p* value	ΔR^2
			Lower	Upper			
Alcohol	CMPB	3.49	2.11	4.86	0.41	<0.001	0.19
	RAD	0.07	-0.15	0.29	0.05	0.56	0.00
Drug	CMPB	1.27	-0.39	2.94	0.18	0.13	0.05
	RAD	0.10	-0.12	0.33	0.11	0.37	0.01
Smoking	CMPB	0.70	-1.00	2.40	0.11	0.41	0.13
	RAD	0.32	0.11	0.53	0.43	0.00	0.12
Gambling[a]	CMPB						
	RAD	0.13	0.10	0.16	0.47	<0.001	0.22
Binge Eating	CMPB	2.28	0.60	3.95	0.42	0.01	0.18
	RAD	0.01	-0.21	0.22	0.01	0.93	0.00
Hypersexual	CMPB	0.07	-0.14	0.27	0.04	0.53	0.06
	RAD	0.09	-0.14	0.27	0.38	<0.001	0.11
Video Games	CMPB	0.35	-0.09	0.79	0.13	0.12	0.17
	RAD	0.16	0.10	0.23	0.41	<0.001	0.09

Note. CMPB= Composite Measure of Problem Behaviors (Kingston et al., 2011)
[a]CMPB does not have a gambling subscale

Appendix B: Measures

PATIENT HEALTH QUESTIONNAIRE-9 (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? (Use "✔" to indicate your answer)	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING ___0___ + _____ + _____ + _____

■Total Score: _____

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke and colleagues, with an educational grant from Pfizer Inc. No permission required to reproduce, translate, display or distribute.

GAD-7

Over the last 2 weeks, how often have you been bothered by the following problems? (Use "✔" to indicate your answer)	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

(For office coding: Total Score T____ = ____ + ____ + ____)

Study ID: _____
Administration Date/Study time point:_____

Adverse Childhood Experience (ACE) Questionnaire
Finding your ACE Score ra hbr 10 24 06

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household **often** …
   Swear at you, insult you, put you down, or humiliate you?
   or
   Act in a way that made you afraid that you might be physically hurt?
   Yes No   If yes enter 1   _____

2. Did a parent or other adult in the household **often** …
   Push, grab, slap, or throw something at you?
   or
   Ever hit you so hard that you had marks or were injured?
   Yes No   If yes enter 1   _____

3. Did an adult or person at least 5 years older than you **ever**…
   Touch or fondle you or have you touch their body in a sexual way?
   or
   Try to or actually have oral, anal, or vaginal sex with you?
   Yes No   If yes enter 1   _____

4. Did you **often** feel that …
   No one in your family loved you or thought you were important or special?
   or
   Your family didn't look out for each other, feel close to each other, or support each other?
   Yes No   If yes enter 1   _____

5. Did you **often** feel that …
   You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
   or
   Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
   Yes No   If yes enter 1   _____

6. Were your parents **ever** separated or divorced?
   Yes No   If yes enter 1   _____

7. Was your mother or stepmother:
   Often pushed, grabbed, slapped, or had something thrown at her?
   or
   Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?
   or
   Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
   Yes No   If yes enter 1   _____

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
   Yes No   If yes enter 1   _____

9. Was a household member depressed or mentally ill or did a household member attempt suicide?
   Yes No   If yes enter 1   _____

10. Did a household member go to prison?
    Yes No   If yes enter 1   _____

Now add up your "Yes" answers: _____ **This is your ACE Score**

Administered By:___
Data Entered By:___

PACES

When you were growing up, prior to your 18th birthday:

	Yes	No
1. Did you have someone who loved you unconditionally (you did not doubt that they cared about you)?	○	○
2. Did you have at least one best friend (someone you could trust, had fun with)?	○	○
3. Did you do anything regularly to help others (e.g., volunteer at a hospital, nursing home, church) or do special projects in the community to help others (food drives, Habitat for Humanity)?	○	○
4. Were you regularly involved in organized sports groups (e.g., soccer, basketball, track) or other physical activity (e.g., competitive cheer, gymnastics, dance, marching band)?	○	○
5. Were you an active member of at least one civic group or a non-sport social group such as scouts, church, or youth group?	○	○
6. Did you have an engaging hobby -- an artistic or intellectual pastime either alone or in a group (e.g., chess club, debate team, musical instrument or vocal group, theater, spelling bee, or did you read a lot)?	○	○
7. Was there an adult (not your parent) you trusted and could count on when you needed help or advice (e.g., coach, teacher, minister, neighbor, relative)?	○	○
8. Was your home typically clean AND safe with enough food to eat?	○	○
9. Overall, did your schools provide the resources and academic experiences you needed to learn?	○	○
10. In your home, were there rules that were clear and fairly administered?	○	○

CMPB

This questionnaire is designed to ask you about a range of behaviours that you may, or may not, engage in. It includes 21 statements and you are required to rate the extent to which each statement characterises you, using the scale below

1 - - - - - - - - 2 - - - - - - - - 3 - - - - - - - - - 4 - - - - - - - - - 5 - - - - - - - - 6

Very unlike me	Quite unlike me	A little unlike me	A little like me	Quite like me	Very Like me

For example, if you read a statement and think "it's very unlike me to do X" you would write a "1" next to the statement. If you think "that's only very slightly like me" write '4', or if you think "it's very like me to do that", write '6'.

Before completing the questionnaire, please take note of the following points:
Where questions refer to sexual behaviours, this includes both foreplay and all forms of sexual intercourse. Where questions refer to drugs, this means the use of illegal drugs. This would include, for example, Cannabis, Cocaine, Ecstasy etc. Where questions refer to smoking, this means tobacco.

Please read each statement carefully and answer as honestly as possible. All answers are anonymous. Please do not leave any answers blank.

It's like me ....

1	to say no to drugs, including cannabis	1 2 3 4 5 6
2	to be pre-occupied by thoughts about smoking when smoking is prohibited	1 2 3 4 5 6
3	to sometimes consume more than 6 alcoholic drinks in one evening	1 2 3 4 5 6
4	to smoke tobacco	1 2 3 4 5 6
5	to generally have no interest in taking drugs, including cannabis	1 2 3 4 5 6
6	to sometimes engage in sexual activities with someone I have only just met.	1 2 3 4 5 6
7	to sometimes actively seek out drugs for personal use (this includes cannabis).	1 2 3 4 5 6
8	to feel irritation/frustration if I am in a non-smoking environment.	1 2 3 4 5 6
9	to drink a lot more alcohol than I initially intended.	1 2 3 4 5 6
10	to feel excitement and/or tension in anticipation of getting drunk.	1 2 3 4 5 6
11	to prefer being in places where smoking is prohibited.	1 2 3 4 5 6

12	to be excited by the opportunity of taking drugs (this includes cannabis)	1 2 3 4 5 6
13	to sometimes have more than one sexual partner.	1 2 3 4 5 6
14	to sometimes engage in sexual actives with someone when really I shouldn't	1 2 3 4 5 6
15	to feel the urge to have a cigarette.	1 2 3 4 5 6
16	to sometimes feel that I need to take drugs (this includes cannabis)	1 2 3 4 5 6
17	to go out with friends who are drinking, but opt to stay sober	1 2 3 4 5 6
18	to sometimes think that I might have a drugs problem (this includes cannabis).	1 2 3 4 5 6
19	to sometimes feel that I need an alcoholic drink	1 2 3 4 5 6

We consider a behavior to be excessive when you engage in it with a frequency and/or in a way that makes you and/or those around you unhappy, when you break your personal rules about and/or engage in the behavior when you didn't intend to. A sign of excessive

If applicable, please answer the next set of questions.
Given the above definition of excessive behavior...

1	Estimate how many times you had out of control or somehow excessive (for you) smoking during the last month.	
1a	Estimate how many times you have out of control or somehow excessive (for you) smoking during a typical month.	
2	Estimate how many times you had out of control or somehow excessive (for you) alcohol use during the last month.	
2a	Estimate how many times you have out of control or somehow excessive (for you) alcohol use during a typical month.	
3	Estimate how many times you had out of control or somehow excessive (for you) substance use (excluding alcohol) during the last month.	
3a	Estimate how many times you have out of control or somehow excessive (for you) substance use (excluding alcohol) during a typical month.	
4	Estimate how many times you had out of control or somehow excessive (for you) sex during the last month.	
4a	Estimate how many times you have out of control or somehow excessive (for you) sex during a typical month.	

Retained BIS/BAS items from Morean et al., (2013)

1. Criticism or scolding hurts me quite a bit.
2. I feel pretty worried or upset when I think or know somebody is angry at me.
3. If I think something unpleasant is going to happen I usually get pretty "worked up."
4. I worry about making mistakes.
5. I go out of my way to get things I want.
6. When I want something I usually go all-out to get it.
7. If I see a chance to get something I want I move on it right away.
8. When I'm doing well at something I love to keep at it.
9. When I get something I want, I feel excited and energized.
10. I will often do things for no other reason than that they might be fun.
11. I often act on the spur of the moment.
12. I crave excitement and new sensations
13. It would excite me to win a contest.

Shortened UPPS-P

Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short
English version of the UPPS-P Impulsive Behavior Scale. *Addictive Behaviors*, *39*(9),
1372–1376. http://doi.org/10.1016/j.addbeh.2014.02.013

1. I generally like to see things through to the end.
2. My thinking is usually careful and purposeful.
3. When I am in great mood, I tend to get into situations that could cause me problems.
4. Unfinished tasks really bother me.
5. I like to stop and think things over before I do them.
6. When I feel bad, I will often do things I later regret in order to make myself feel better now.
7. Once I get going on something I hate to stop.
8. Sometimes when I feel bad<comma> I can't seem to stop what I am doing even though it is making me feel worse.
9. I quite enjoy taking risks.
10. I tend to lose control when I am in a great mood.
11. I finish what I start.
12. I tend to value and follow a rational, "sensible" approach to things.
13. When I am upset I often act without thinking.
14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.
15. When I feel rejected, I will often say things that I later regret.
16. I would like to learn to fly an airplane.
17. Others are shocked or worried about the things I do when I am feeling very excited.
18. I would enjoy the sensation of skiing very fast down a high mountain slope.
19. I usually think carefully before doing anything.
20. I tend to act without thinking when I am really excited.

DERS-16

Please indicate how often the following apply to you.

	Almost Never (0–10%)	Some-times (11–35%)	About Half Of the Time (36–65%)	Most of the Time (66–90%)	Almost Always (91–100%)
1. I have difficulty making sense out of my feelings.	1	2	3	4	5
2. I am confused about how I feel.	1	2	3	4	5
3. When I'm upset, I have difficulty getting work done.	1	2	3	4	5
4. When I'm upset, I become out of control.	1	2	3	4	5
5. When I'm upset, I believe that I will remain that way for a long time.	1	2	3	4	5
6. When I'm upset, I believe that I'll end up feeling very depressed.	1	2	3	4	5
7. When I'm upset, I have difficulty focusing on other things.	1	2	3	4	5
8. When I'm upset, I feel out of control.	1	2	3	4	5
9. When I'm upset, I feel ashamed with myself for feeling that way.	1	2	3	4	5
10. When I am upset, I feel like I am weak.	1	2	3	4	5
11. When I'm upset, I have difficulty controlling my behaviors.	1	2	3	4	5
12. When I'm upset, I believe there is nothing can do to make myself feel better.	1	2	3	4	5
13. When I'm upset, I become irritated with myself for feeling that way.	1	2	3	4	5
14. When I am upset, I start to feel very bad about myself.	1	2	3	4	5
15. When I'm upset, I have difficulty thinking about anything else.	1	2	3	4	5
16. When I am upset, my emotions feel overwhelming.	1	2	3	4	5

The Shorter PROMIS Questionnaire

A.1. Notes

In this questionnaire certain terms are used which have general meanings attached to them. "Tobacco" should be taken to mean either tobacco, cigarettes, cigars, snuff, tobacco bags, and nicorette chewing gum.
"Drugs" should be taken to mean cannabis, heroin, cocaine, LSD, magic mushrooms, 'designer drugs', amphetamines, and other stimulants.
"Prescription drugs" or "medication" includes all medicines that have a mood-altering effect, especially tranquilisers, antidepressants, sleeping tablets, painkillers, cough mixtures and cold cures, slimming pills, and antihistamines.
"Caffeine" includes coffee, tea, chocolate, cola, lemonade, and Pro-plus.
"Work" includes hobbies and interests, cults, and sects.
"Gambling and risk taking" includes property ventures, stocks and shares, insurance, and other business risks.

Each question is on a six-point scale. Please read each question carefully before answering. Place a cross on the scale between one and six to indicate the extent to which the statement is 'Like' you or 'Not like' you.
For example: A cross at the 'Like me' extreme would indicate that the statement definitely applied to you.
i.e., Not like me _ _ _ _ _ X Like me

A cross at the 'Not like me' extreme would indicate that the statement definitely did not apply to you.
i.e., Not like me X_ _ _ _ _ Like me

A cross in between the two extremes indicates more or less agreement with one extreme.
e.g., If you felt that 'Like me' is more appropriate than 'Not like me' you would answer as follows:
i.e., Not like me _ _ _ X_ _ _ Like me
or i.e., Not like me _ _ _X_ _ Like me

and if you felt that 'Not like me' is more appropriate than 'Like me' you would use one of the remaining two points as follows:
i.e., Not like me _ X _ _ _ _ Like me
or i.e., Not like me _ _ X _ _ _ Like me

If you think that a question is just not applicable or incomprehensible to you please answer 'Not like me', as follows:
i.e., Not like me X _ _ _ _ _ Like me

Do not leave any answers blank.

A.2 . The Shorter PROMIS Questionnaire

Alcohol
4. I have found that feeling light-headed has often been irrelevant in deciding when to stop drinking alcohol.
18. I have found that having one drink tended not to satisfy me but made me want more.
37. I have had a complete blank of ten minutes or more in my memory when trying to recall what   was doing after drinking alcohol on the previous day or night.
43. I have used alcohol as both a comfort and strength.
51. I have tended to gulp down the first (alcoholic) drink fairly fast.
74. I had a good head for alcohol so that others appeared to get drunk more readily than I did.
82. I have found it strange to leave half a glass of (alcoholic) drink.
134. I have been irritable and impatient if there has been more than ten minutes of conversation at a meal or social function before my host offers me an alcoholic drink.
136. I have deliberately had an alcoholic drink before going out to a place where alcohol may not be available.
140. I have often drunk significantly more alcohol than I intended to.

Shopping
8. I have felt uncomfortable when shopping with other people because it has restricted my freedom.
17. I have particularly enjoyed buying bargains so that I often finished up with more than I need.
48. I tend to use shopping as both a comfort and a strength even when I do not need anything.
 59. I have tended to go shopping just in case I might see something I want.
61. When I have been shopping with family members, friends, or other people, I have tended to disguise the full extent of my purchases.
80. I have often bought so many goods (groceries, sweets, household goods, books, etc.) that it would take a month to get through them.
84. I have preferred to keep my shopping supplies topped up in case of war or natural disaster, rather than let my stocks nm low.
93. I have bought things not so much as a means of providing necessities but more as a reward that I deserve for the stresses that I endure.
123. I have felt that I become a real person only when I am shopping or spending.
156. I have often gone shopping to calm my nerves.

Food bingeing
10. I have tended to think of food not so much as a satisfier of hunger but as a reward for all the stress I endure.
23. I have tended to use food as both a comfort and a strength even when I have not been hungry.
44. I have found that being full has often been irrelevant in deciding when to stop eating.
50. I have found that I have sometimes put on weight even when I am trying to diet.
71. Other people have expressed repeated serious concern about my excessive eating.

85. I have often preferred to eat alone rather than in company.

95. When I have definitely eaten too much I have tended to feel defiant as well as disappointed in myself.

113. I have preferred to graze like a cow throughout the day rather than ever allow myself to get hungry.

116. I have had three or more different sizes of clothes in my adult (non-pregnant, if female) wardrobe.

138. I have been aware that once I have consumed certain foods I have found it difficult to control further eating.

Compulsive helping submissive

14. I have tended to pride myself on never being a burden to others.

35. Other people have tended to express concern that I am not doing enough for my own pleasure.

39. I have tried to avoid all risks of upsetting other people.

45. I tended to give (an act of service to others) and not count the costs even though the costs mount progressively.

58. I have tended to remain loyal and faithful regardless of what I may endure in a close relationship .

62. I have liked to make myself useful to other people even when they do not appreciate what I do.

 86. I have tended to take on more work for someone close to me even if I have not finished the previous batch.

103. I have felt like a real person only when performing acts of service for some- one else.

149. I have often helped someone close to me more than I intended.

158. I have felt most in control of my feelings when performing services of one kind or another for someone else.

Tobacco

6. I have preferred to use nicotine throughout the day rather than only at specific times.

21. I have tended to use nicotine as both a comfort and strength even when I feel that I did not want any.

47. I have been afraid that I will put on excessive amounts of weight or become particularly irritable or depressed if I give up using nicotine altogether.

64. I have often found that having my first use of nicotine in any day tends not to satisfy me, but made me want more.

83. I have continued to use nicotine even when I have had a bad cold or even more serious respirato1y problem.

104. I have found that my nicotine consumption goes up or down when I am off alcohol or drugs or when I am on a diet.

131. I have deliberately used nicotine before going out to a place where I may not be able to use it.

132. When I ran out of my favorite form of nicotine, I have accepted the offer of an alternative that I do not particularly like.

146. I have often used nicotine to calm my nerves.

151. I have oft n used nicotine significantly more than I intended to.

Gambling

7. I have found that the amount that I have won or lost has often been irrelevant in deciding when to stop gambling or risk taking.

65. I have stolen or embezzled to cover gambling losses or to cover my losses in risky ventures.

77. I have found it more painful for me to give up gambling and risk taking than to give up a close friendship.

89. Other people have expressed repeated serious concern over my gambling or risk taking.

94. I have tended to accept opportunities for further gambling or risk taking despite having just completed a session or a project.

108. I have preferred to gamble or to take risks in one way or another throughout the day rather than at pat1icular times.

120. I have tended to use gambling or risk-taking as a form of comfort and strength even when I have not felt that I particularly want to gamble or take further 1isks.

135. I have gambled or taken risks at the first opportunity in case I did not get the chance later on.

137. When my favorite form of gambling or risk taking is unavailable I have gambled on something elseIno1mally disliked.

147. I have been irritable and impatient if there is a complete break of 10 minutes in a gambling session.

Food starving

13. In a restaurant or even at home I have often tried to persuade others to choose dishes that I knew I would like even though I would probably refuse to eat them.

34. When I have eaten in company I have liked to be with special friends or family members whom I can rely on to finish off some foods for me.

53. I have had a list of so many things that I dare not eat, so that there is very little left that I can eat.

57. I have often chewed something and then taken it out of my mouth and thrown it away.

100. I have particularly enjoyed eating raw vegetables and also salty or sour things.

109. When I have eaten in company I have tended to time my eating as a form of strategy so that others are not really aware of just how little I am eating.

119. When I have eaten something reasonably substantial I have tended to feel disappointed or even angry with myself as well as slightly relieved.

139. I have become irritable and impatient at meal times if someone has tried to persuade me to eat something.

144. I have often avoided meal times by claiming that I have already eaten when it is not true.

152. Some food has made me wish I could eat it like other people do but I nonetheless find that I could not bring myself to do so.

Compulsive helping dominant

11. I have been afraid that I would be thought of as (and perhaps become) a callous person if I do not show my capacity for self-denial and caretaking on a daily basis.
25. The things I have done for others have often resulted in there being not much left of my personal life.
32. I have preferred to look after other people on my own rather than as part of a team.
49. I have found life rather empty when someone for whom I was eating gets better and I have felt resentful at times when I am no longer needed.
69. I have tended to use my self-denial and caretaking for others as both a comfort and strength for myself.
111. I have found that I tend to adopt a self-denying and caretaking role in many of my relationships.
117. I have regularly given unsolicited advice to other people on how to solve their problems.
122. I have found it difficult to leave any loose ends in a conversation in which I am trying to be helpful.
127. I have often stayed up half the night having 'helpful' conversations.
155. I have felt that I have become a real person only when I am tidying up the physical, emotional, and social messes made by someone else.

Recreational drugs

9. I have particularly enjoyed getting a really strong effect from recreational drugs.
24. I have had a sense of increased tension and excitement when I knew that I had the opportunity to get some drugs.
41. Other people have expressed repeated serious concern about some aspects of my drug use.
66. I have found that getting high tends to result in my going on to take more drugs.
76. I have tended to use drugs as both a comfort and strength.
88. I have often found that I use all of the drugs in my possession even though I had intended to spread them out over several occasions.
98. I have tended to make sure that I have the drugs or the money for drugs before concentrating on other things.
141. I have been irritable or impatient if my supply of drugs is delayed for 10 minutes or so for no good reason.
143. I have tended to use more drugs if I have got more.
159. I have deliberately used drugs before going out for a time if I have felt there might not be the opportunity to use them later.

Sex

2. I have found it difficult to pass over opportunities for casual or illicit sex.
20. Other people have expressed repeated serious concern over my sexual behavior.
30. I have prided myself on the speed with which I can get to have sex with someone and I have found that sex with a complete stranger is stimulating.
70. I have taken opportunities to have sex despite having just had it with somebody else.
75. I have found that making a sexual conquest has caused me to lose interest in that partner and led me to begin looking for another.

90. I have tend d to ensure that I have sex of one kind or another rather than wait for my regular partner to be available again after an illness or absence.

110. I have had repeated affairs even though I had a regular relationship.

114. I have had three or more regular sexual pai1ners at the same time. 128. I have had voluntary sex with someone that I dislike.

148. I have tended to change partners if sex becomes repetitive.

Work

12. I have taken on a piece of work that I actively disliked not so much out of necessity but more simply to keep myself occupied.

26. I have tended to work faster and for longer hours than any other people of my own ability so that they have found it difficult to keep up with me.

36. When I have definitely ove1worked and got myself irritable and overtired I have tended to feel defiant as well as slightly ashamed.

40. I have tended to tidy up the mess that someone else has got into at work, even when I have not been asked to do so.

46. I have found that finishing a specific project is often irrelevant in deciding when to stop working.

56. When working with others I have tended to disguise the full amount of time and effort that I put into my work.

67. I have tended to keep reserve projects up my sleeve just in case I find some time, even a few minutes to spare.

73. I have regularly covered other people's work and responsibilities even when there was no need for me to do so.

102. Other people have expressed repeated serious concern over the amount of time I spend working.

133. I have found that once I start work in any day I find it difficult to get "out of the swing of it" and relax.

Relationships dominant

5. I have tended to look for, or take on, positions of power or influence so that I rise to a position of emotional or practical power over others as rapidly as possible.

29. I have found it difficult not to take up a position of power or influence when it is available, even when I do not really need it and can see no pa1licular use for it.

72. I have preferred to have power and influence in all my relationships rather than allow myself to be vulnerable.

96. I have been afraid that my life will fall apart and that others will take advantage of me if I give up the power and influence that I have held or now hold.

101. I have regularly undermined other people's positions of power or influence even though they may have significantly less than my own.

106. I have found that having all the power and influence that I need for my own personal and professional life is irrelevant when deciding when to stop seeking more.

118. I have tended to use a position of power or influence as a comfort and strength regardless of whether there are particular problems needing my attention in other aspects of my life.

126. I have looked for all opportunities for power and influence as and when they arise.

130. In a new relationship I have felt uncomfortable until I hold the most powerful position .

160. I have tended to neglect other aspects of my life when I have felt that my position of power or influence is under threat.

Caffeine

1. I have had an intimate relationship with caffeine so that in a strange way I have felt that I became a real person only when I used it.

22. I have preferred to take caffeine on my own rather than in company.

28. I have felt it would be more painful for me to give up caffeine than to give up a close friendship.

31. I have regularly stolen or helped myself to other people's caffeine even though I had enough money to buy my own.

52. I have tended to time my intake of caffeine so that others are not really aware of my total intake.

60. I have had a sense of increased tension and excitement when I buy caffeine substances or when I see advellisements for them.

l 07. I have found that my intake of another form of caffeine tends to increase when I am off my own favorite.

115. When I have used too much caffeine I have tended to feel defiant as well as disappointed in myself.

142. I have sometimes rushed through a meal, or skipped it altogether, so that I can have some caffeine.

145. I have often been capable of drinking 20 cups of tea or coffee or cola or lemonade or eating 20 chocolates in a day.

Prescription drugs

15. I have felt an increased tension or awareness when it has come to the time when I normally take my prescribed medication.

38. Other people have expressed repeated serious concern about my use of presription medicines.

42. I have taken more than the prescribed dose of my prescription medication as and when I feel it necessary.

92. If my prescription medicines supply was being strictly controlled I would hang onto some old tablets even if they were definitely beyond their expiration date.

99. Other people (e.g., doctors) have commented that they would be knocked out by a fraction of the prescription medication that I have regularly taken.

112. I have found that my previous doses of prescription medicines are no longer successful in controlling my symptoms.

121. I have continued to take prescription medication because I find that it helps me, even though the original stresses for which the medication was prescribed, have been resolved.

125. If l had run out of my prescribed medication I would take an alternative even if I was not sure of its effects.

153. I have been irritable and impatient if my prescribed medication is delayed for 10 minutes.

157. I have oft n found myself taking more prescribed medication than I intended to.

Exercise
3. I have often been so tired with exercise that I have found it difficult to walk or to climb up stairs.
19. I have preferred to exercise alone rather than in company.
33. I have often tried to take exercise several times a day.
54. I have particularly enjoyed getting wringing wet with sweat when I exercise.
68. I have often felt a sense of tension and excitement when about to take exercise.
79. I have responded positively to an unexpected invitation to exercise despite having just finished my regular exercise.
97. I have felt that I become a real person only when I am exercising.
105. I have tended to use exercise as both a comfort and strength even when I have been perfectly fit and do not need any more.
129. I have often taken exercise just to tire myself sufficiently for sleep.
154. When I have gone out I have often taken sports clothes and equipment with me "just in case" the opportunity to exercise arises.

Relationships submissive
16. I have tended to be upset when someone close to me takes care of someone else.
27. I have felt that I become a real person only when I am being totally looked after by someone else.
55. I have found that other people have tended to express progressively more concern about my dependent relationships.
63. I have tended to find someone else to be close to when my primary partner is away even for a short time.
78. I have tended to find new close relationships within days or weeks of the failure of the old one.
81. I have tended to venture into company only if have someone to look after me.
87. I have felt an ove1whelming sense of excitement when I find a new person to look after my needs or a new way in which an existing partner can look after them better.
91. I have tended to think that a close friendship is when someone else really looks after me.
124. I have tended to get irritable and impatient when people look after themselves rather than me.
150. I have felt most in control of my feelings when other people are performing services of one kind or another for me.

Appendix C: Proposed Factor Structure
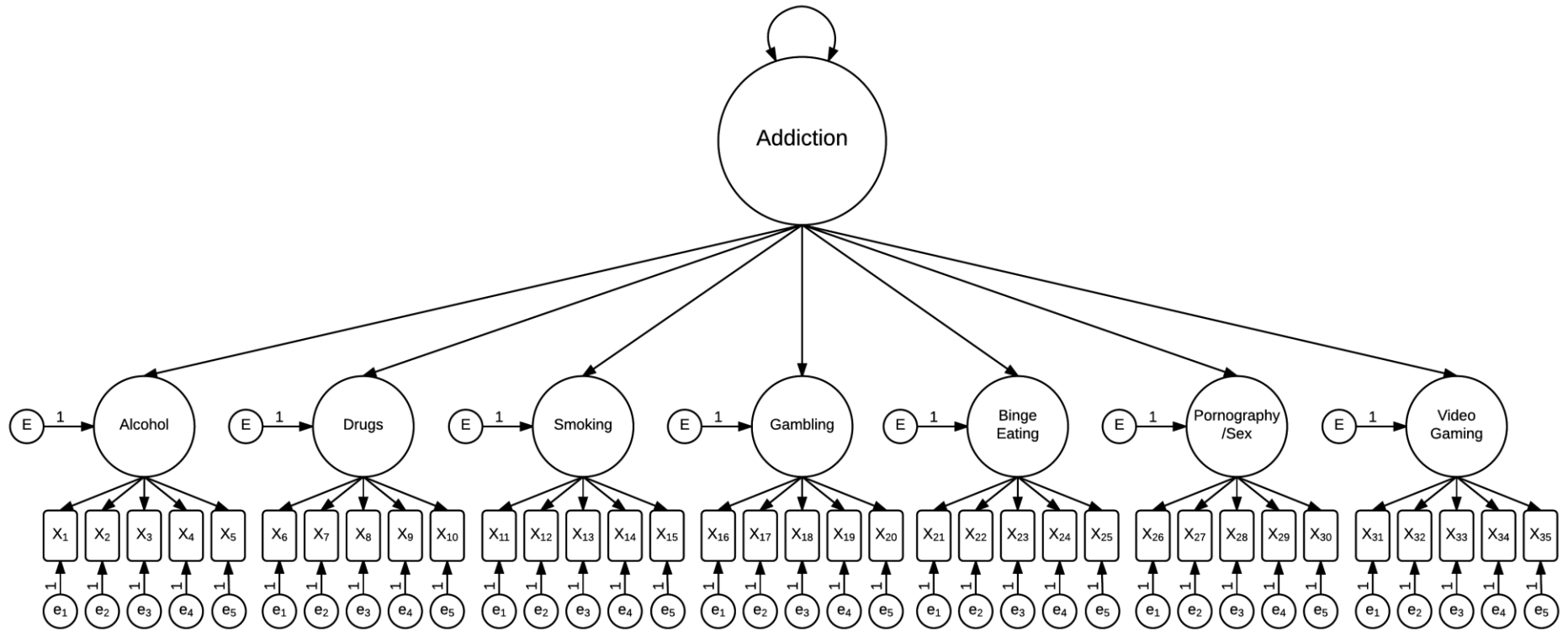
Figure 6. Hypothesized Factor Structure for Proposed Measure

Appendix D: IRB Approval

RESEARCH @ EMU

UHSRC Determination: EXEMPT
DATE: January 17, 2017
TO: Meagan Carr, M.S.
Department of Psychology
Eastern Michigan University
Re: UHSRC: #1002874-1
Category: Exempt category *2*
Approval Date: January 17, 2017
Title: RAD Study

Your research project, entitled **RAD Study,** has been determined **Exempt** in accordance with federal regulation 45 CFR 46.102. UHSRC policy states that you, as the Principal Investigator, are responsible for protecting the rights and welfare of your research subjects and conducting your research as described in your protocol.

Renewals: Exempt protocols do not need to be renewed. When the project is completed, please submit the **Human Subjects Study Completion Form** (access through IRBNet on the UHSRC website).

Modifications: You may make minor changes (e.g., study staff changes, sample size changes, contact information changes, etc.) without submitting for review. However, if you plan to make changes that alter study design or any study instruments, you must submit a **Human Subjects Approval Request Form** and obtain approval prior to implementation. The form is available through IRBNet on the UHSRC website.

Problems: All major deviations from the reviewed protocol, unanticipated problems, adverse events, subject complaints, or other problems that may increase the risk to human subjects **or** change the category of review must be reported to the UHSRC via an **Event Report** form, available through IRBNet on the UHSRC website

Follow-up: If your Exempt project is not completed and closed after **three years**, the UHSRC office will contact you regarding the status of the project.

Please use the UHSRC number listed above on any forms submitted that relate to this project, or on any correspondence with the UHSRC office.

Good luck in your research. If we can be of further assistance, please contact us at 734-487-3090 or via e-mail at human.subjects@emich.edu. Thank you for your cooperation.

Sincerely,

Alissa Huth-Bocks, Ph.D.
Chair
CAS Human Subjects Review Committee

Appendix E: Factor Loading Total Item Pool

Table 42

Factor Loading Total Item Pool

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Variance
S_H_5	**0.98**	0.01	-0.05	-0.01	0.01	-0.05	-0.01	0.90	0.098
S_R_1	**0.97**	-0.04	-0.03	0.00	-0.07	0.01	-0.03	0.87	0.128
S_C_6	**0.96**	0.04	-0.03	0.03	-0.02	-0.05	-0.01	0.89	0.115
S_C_1	**0.94**	0.03	-0.03	0.00	-0.01	0.00	-0.06	0.86	0.137
S_C_3	**0.94**	-0.02	0.02	0.00	-0.10	0.05	0.01	0.88	0.119
S_LL_2	**0.93**	-0.04	-0.02	0.01	0.03	0.04	-0.04	0.86	0.138
S_R_3	**0.92**	0.00	0.04	0.02	-0.06	0.00	0.01	0.86	0.14
S_LL_6	**0.91**	-0.03	-0.06	0.03	0.03	-0.11	-0.02	0.73	0.269
S_C_2	**0.91**	-0.03	-0.02	0.00	-0.02	0.05	0.05	0.85	0.146
S_LL_3	**0.90**	-0.01	0.02	0.00	0.00	0.05	-0.01	0.85	0.146
S_LL_1	**0.90**	0.03	0.02	-0.07	-0.05	-0.05	0.04	0.79	0.213
S_H_4	**0.90**	0.07	0.01	0.00	-0.03	-0.03	0.01	0.83	0.168
S_H_10	**0.90**	0.07	-0.05	0.02	0.03	-0.07	-0.07	0.77	0.227
S_C_4	**0.88**	-0.04	0.07	0.04	0.03	0.03	0.01	0.83	0.171
S_LL_4	**0.84**	-0.05	0.02	0.01	-0.05	0.11	0.04	0.77	0.232
S_N_2	**0.82**	-0.06	0.05	-0.04	0.02	0.09	0.08	0.77	0.227
S_LL_5	**0.81**	0.02	0.07	-0.04	0.01	0.00	0.07	0.73	0.266
S_R_6	**0.76**	-0.01	0.03	0.04	0.11	0.00	0.04	0.66	0.342
S_LL_7	**0.75**	0.07	0.01	0.03	0.02	0.15	-0.04	0.74	0.265
S_C_5	**0.71**	0.04	0.10	0.01	-0.12	-0.10	0.05	0.52	0.483
S_H_8	**0.71**	0.10	0.06	-0.07	0.11	0.02	0.09	0.71	0.288
S_R_5	**0.69**	0.04	-0.01	0.06	0.04	0.20	-0.03	0.70	0.304
S_H_7	**0.68**	0.17	0.03	0.06	0.17	0.04	-0.03	0.75	0.251
S_R_4	**0.64**	0.08	0.02	0.05	0.18	-0.04	0.09	0.60	0.4
S_N_5	**0.62**	-0.04	0.13	-0.06	0.10	0.19	0.02	0.60	0.402
S_H_6	**0.61**	0.15	0.09	-0.08	0.12	0.08	0.08	0.67	0.333
S_H_2	**0.61**	0.05	0.00	-0.04	0.15	0.21	0.03	0.66	0.341
A_LL_8	-0.03	**0.92**	-0.02	0.01	0.00	0.01	-0.07	0.80	0.204
A_H_3	0.03	**0.91**	-0.01	-0.03	-0.09	0.03	0.00	0.83	0.174
A_LL_1	-0.01	**0.91**	0.02	0.03	-0.05	0.06	-0.02	0.85	0.147
A_LL_2	-0.05	**0.91**	0.02	-0.01	0.03	-0.01	-0.02	0.80	0.201
A_LL_5	-0.01	**0.91**	0.00	0.01	-0.07	0.00	0.02	0.80	0.196
A_C_5	-0.03	**0.88**	-0.01	-0.04	-0.07	-0.01	0.08	0.75	0.248
A_C_1	0.00	**0.87**	-0.01	-0.10	-0.03	-0.09	0.07	0.70	0.303
A_LL_7	0.01	**0.86**	0.00	-0.02	0.07	-0.03	0.05	0.80	0.204
A_H_8	0.07	**0.86**	-0.10	0.07	-0.04	0.04	-0.02	0.76	0.245
A_LL_6	-0.04	**0.86**	0.04	0.08	-0.04	0.07	-0.04	0.78	0.224
A_C_3	-0.03	**0.85**	-0.01	-0.01	0.02	0.05	0.01	0.75	0.254

Table 42 *continued*

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Variance
A_H_7	0.07	**0.84**	0.05	-0.07	0.04	-0.09	0.03	0.75	0.247
A_N_5	0.10	**0.83**	-0.02	0.03	0.01	-0.01	0.00	0.77	0.23
A_H_5	0.01	**0.82**	0.06	-0.02	0.05	0.03	-0.01	0.76	0.243
A_R_1	0.05	**0.81**	0.02	0.02	0.03	-0.03	0.01	0.70	0.3
A_C_2	-0.10	**0.80**	0.08	0.02	-0.09	-0.06	0.09	0.61	0.389
A_LL_3	0.05	**0.79**	-0.03	0.01	0.10	0.07	-0.04	0.74	0.256
A_H_10	0.09	**0.76**	0.01	0.05	0.03	-0.19	0.07	0.61	0.389
A_R_5	0.01	**0.74**	-0.01	0.02	0.11	0.16	-0.02	0.72	0.276
A_H_6	0.00	**0.73**	0.10	-0.03	-0.02	0.01	0.00	0.59	0.412
A_H_1	0.00	**0.73**	0.04	0.03	0.17	0.05	0.00	0.70	0.303
A_LL_4	0.03	**0.70**	-0.02	-0.03	-0.05	0.11	0.05	0.57	0.434
A_C_4	0.00	**0.69**	0.01	0.02	0.06	0.08	0.00	0.57	0.433
A_R_2	0.05	**0.69**	0.03	0.01	0.09	0.11	-0.01	0.65	0.354
A_N_1	0.05	**0.67**	0.01	0.04	0.18	-0.02	-0.05	0.56	0.441
A_R_4	0.06	**0.66**	0.04	0.02	0.00	0.05	0.00	0.52	0.48
A_H_9	0.02	**0.56**	0.11	0.08	0.13	-0.03	0.04	0.47	0.526
B_LL_4	-0.07	0.00	**0.93**	0.02	-0.08	0.02	0.02	0.84	0.161
B_H_11	-0.01	-0.06	**0.91**	0.02	-0.04	0.02	-0.03	0.79	0.208
B_H_10	-0.02	0.01	**0.90**	0.03	0.00	0.02	0.00	0.83	0.17
B_H_5	-0.01	-0.02	**0.89**	-0.01	-0.06	0.00	0.01	0.75	0.247
B_H_2	0.01	0.02	**0.88**	-0.03	-0.01	0.00	-0.04	0.77	0.226
B_LL1	-0.02	0.06	**0.88**	-0.02	-0.07	0.04	0.00	0.79	0.209
B_LL_3	-0.03	-0.03	**0.87**	-0.02	-0.03	0.01	0.01	0.72	0.277
B_H_8	-0.02	0.02	**0.86**	-0.01	0.01	-0.01	-0.03	0.74	0.263
B_H_9	0.03	0.01	**0.84**	-0.01	-0.06	0.04	0.01	0.72	0.28
B_LL_5	0.01	0.03	**0.81**	-0.03	-0.07	0.07	-0.09	0.66	0.342
B_H_7	0.08	0.07	**0.78**	-0.02	-0.02	-0.07	-0.02	0.66	0.339
B_C_2	0.01	0.04	**0.78**	0.01	-0.07	-0.08	0.04	0.61	0.388
B_H_3	0.02	0.10	**0.77**	0.01	-0.04	0.06	0.00	0.67	0.326
B_R_3	0.00	-0.04	**0.75**	0.05	0.19	0.00	-0.01	0.65	0.353
B_LL_2	0.09	-0.06	**0.74**	-0.02	0.05	0.03	0.01	0.59	0.414
B_H_6	0.06	0.08	**0.72**	0.09	0.03	-0.07	-0.02	0.62	0.376
B_N_5	0.05	0.09	**0.71**	0.05	0.15	-0.05	0.02	0.65	0.346
B_H_4	0.02	-0.09	**0.71**	0.02	0.09	0.02	0.15	0.56	0.436
B_R_2	0.08	0.00	**0.69**	-0.03	0.24	-0.08	0.01	0.59	0.411
B_C_1	-0.05	-0.01	**0.67**	0.08	-0.16	0.03	0.05	0.45	0.548
B_N_4	0.05	0.05	**0.66**	0.02	0.22	-0.01	0.05	0.61	0.387
B_N_3	0.09	0.02	**0.59**	0.09	0.25	0.00	0.04	0.58	0.419
B_R_1	0.09	-0.02	**0.54**	-0.01	**0.35**	0.04	0.02	0.53	0.469
V_LL_3	0.00	-0.03	0.05	**0.89**	-0.12	-0.04	0.04	0.76	0.241
V_LL_4	0.01	0.01	0.00	**0.87**	-0.04	0.00	-0.06	0.73	0.274
V_C_1	0.02	-0.05	-0.07	**0.86**	-0.06	0.01	0.04	0.71	0.289

Table 42 *continued*

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Variance
V_C_2	0.03	-0.01	-0.07	**0.85**	0.00	-0.02	0.06	0.73	0.266
V_H_1	-0.06	0.02	-0.02	**0.85**	-0.01	0.04	-0.03	0.70	0.297
V_LL_1	0.00	-0.01	0.07	**0.84**	-0.10	0.06	0.00	0.72	0.278
V_H_7	-0.01	0.03	0.01	**0.83**	0.03	0.00	-0.04	0.70	0.301
V_N_6	-0.02	-0.05	0.02	**0.83**	-0.10	0.02	0.01	0.66	0.343
V_H_4	0.03	0.03	0.07	**0.83**	0.06	-0.02	-0.01	0.75	0.248
V_N_3	0.02	-0.06	0.04	**0.82**	0.06	-0.03	0.05	0.73	0.268
V_H_3	-0.04	0.00	0.00	**0.81**	-0.08	-0.03	0.14	0.69	0.306
V_LL_2	0.05	0.05	0.01	**0.79**	0.04	0.05	-0.03	0.69	0.307
V_C_3	0.06	0.01	0.02	**0.79**	0.11	-0.12	-0.04	0.64	0.357
V_N_5	-0.02	0.06	-0.10	**0.75**	0.01	0.11	0.02	0.62	0.375
V_H_2	0.01	0.00	0.06	**0.75**	0.17	-0.02	0.01	0.69	0.314
V_R_1	-0.04	0.07	0.02	**0.70**	0.20	0.08	-0.03	0.68	0.322
V_R_2	-0.02	0.01	0.04	**0.69**	0.19	0.06	0.00	0.63	0.367
G_R_3	-0.02	0.03	0.07	0.04	**0.83**	0.06	0.07	0.85	0.154
G_C_3	0.00	0.05	0.03	0.08	**0.81**	0.12	0.03	0.87	0.133
G_N_5	-0.01	0.02	0.02	0.05	**0.80**	0.08	0.09	0.81	0.188
G_N_2	-0.02	0.03	0.04	0.07	**0.79**	0.03	0.05	0.74	0.259
G_LL_4	0.03	0.07	-0.02	0.09	**0.79**	0.05	0.05	0.80	0.201
G_LL_5	0.16	0.04	-0.01	0.05	**0.74**	-0.01	0.04	0.69	0.308
G_N_3	-0.01	0.05	0.01	0.06	**0.74**	0.19	0.06	0.81	0.187
G_N_1	-0.02	0.08	0.01	0.02	**0.72**	0.15	0.09	0.76	0.235
G_C_1	0.11	0.07	0.03	-0.01	**0.72**	-0.01	0.07	0.66	0.342
G_H_4	0.22	0.11	-0.02	0.07	**0.50**	0.04	0.04	0.49	0.505
G_H_3	0.12	0.08	0.08	0.12	**0.38**	-0.11	0.11	0.28	0.722
D_LL_4	-0.04	0.05	-0.02	0.01	-0.03	**0.88**	0.11	0.84	0.159
D_C_3	0.14	0.01	0.03	-0.01	-0.09	**0.87**	0.02	0.85	0.153
D_LL_3	-0.02	0.06	0.01	0.04	-0.03	**0.81**	0.10	0.75	0.245
D_C_2	0.22	-0.02	0.03	0.04	-0.12	**0.76**	0.01	0.71	0.293
D_N_3	0.03	0.01	0.02	-0.01	0.16	**0.72**	0.05	0.72	0.281
D_H_3	0.01	0.06	0.01	-0.02	0.25	**0.72**	0.00	0.78	0.215
D_H_5	0.01	0.11	0.01	-0.02	0.21	**0.72**	-0.03	0.76	0.24
D_H_2	0.04	0.11	0.01	0.06	0.09	**0.72**	0.04	0.75	0.247
D_C_1	0.12	0.06	0.09	0.09	-0.23	**0.71**	0.11	0.67	0.332
D_R_1	0.05	0.04	-0.02	0.10	0.20	**0.66**	0.03	0.72	0.283
D_N_1	0.08	0.02	0.07	0.04	0.22	**0.62**	-0.04	0.64	0.355
D_R_2	0.04	0.02	0.02	0.05	**0.37**	**0.58**	0.08	0.81	0.187
P_H_6	-0.01	-0.02	0.02	0.04	0.06	-0.03	**0.84**	0.74	0.262
P_H_1	-0.10	-0.02	0.02	0.02	-0.04	0.08	**0.84**	0.72	0.277
P_C_4	0.03	0.02	0.06	0.06	-0.16	-0.02	**0.81**	0.64	0.363
P_LL_3	0.02	0.08	0.02	0.10	-0.06	-0.04	**0.77**	0.65	0.349
P_H_2	-0.03	0.13	0.02	-0.04	-0.02	0.12	**0.72**	0.64	0.358

Table 42 *continued*

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Communality	Variance
P_C_3	0.00	0.12	-0.03	0.05	0.09	0.05	**0.70**	0.67	0.333
P_R_1	0.08	-0.10	-0.06	0.02	0.13	0.05	**0.69**	0.59	0.414
P_LL_5	0.12	-0.04	0.03	-0.08	0.14	0.08	**0.69**	0.63	0.366
P_C_2	0.12	0.17	-0.09	0.01	-0.14	-0.05	**0.62**	0.43	0.569
P_R_3	0.01	-0.05	-0.07	0.03	**0.33**	0.07	**0.59**	0.63	0.372
P_N_2	0.03	-0.02	0.00	-0.03	**0.35**	0.09	**0.56**	0.62	0.376
P_N_3	0.06	-0.02	-0.06	0.11	0.28	0.06	**0.47**	0.51	0.493

Note. The first letter in the item name refers to the purported factor: A: Alcohol, D: Drug, S: Smoking, G: Gambling, B: Binge Eating, P: Pornography/Sexual behavior, V: Videogames. The second letter refers to the purported *DSM*-5 criterion: R: relationship, N: neglect, C: craving. H: health problems, LL: using more or over a longer period of time than was intended. The number refers to the sequence within each category. For example, S_H_5 identifies the 5th smoking item related to health problems. The lightest shading indicates all factor loadings above .5 and the slightly darker shading indicates factor loadings ranging from .30 to .49. The estimation method used was weighted least squares and the factor rotation was oblimin.

Appendix F: Final Item Loadings

Table 43

Factor Loading for Items and Latent Factors

	Factor Loading
Alcohol	
Drinking is like a slippery slope; I end up drinking more than I wanted to.	0.922
My drinking has caused a disagreement or two.	0.901
Because I was drinking, I wasn't able to get as many things done at home, work, or school.	0.931
I probably think about drinking more than most people do.	0.927
It's hard to cut down, even though I know drinking isn't good for my health.	0.932
Drugs	
I worry about my health because of my drug use.	0.923
With drugs, I can get carried away and use a lot more than I wanted to.	0.971
My drug use prevents me from getting too close to people.	0.968
My responsibilities can fall through the cracks because of my drug use.	0.936
There are times that I feel a strong urge to use drugs.	0.907
Smoking	
At certain times of the day, I find myself really wanting a cigarette.	0.987
Sometimes my cravings for cigarettes are powerful.	0.987
When I get stressed, I can smoke a lot more than I planned	0.996
Sometimes I feel driven to smoke.	0.976
I still smoke even though people tell me it's bad for my health.	0.984
Gambling	
I sometimes gamble more than I planned.	0.918
Time gets away from me when I am gambling.	0.862
If I lose a lot of money, I can feel down for several days	0.971
I may skip out on certain things so I can go gamble.	0.973
Gambling has caused problems for me with my friends/family.	0.966
Binge eating	
Sometimes my cravings for certain foods are overpowering.	0.895
Being unable to control my eating can cause some stress in my relationships.	0.898
I think I am less happy because of my binge eating.	0.980
I can feel so upset from binge eating that I don't get to things that I said I would.	0.963
I tend to lose control when I eat, despite my good intentions.	0.967

Table 43 *continued*

Hypersexuality	Factor Loading
I can feel a strong desire to engage in sexual activity.	0.812
When it comes to sex/porn, I almost always want more.	0.912
I find myself thinking about how good it would feel to look at pornography or engage in other sexual behaviors.	0.946
Porn and sex can make me feel better, but it can also make me feel worse.	0.849
I am very preoccupied by sexual thoughts and/or desires.	0.927
Video gaming	
Other people think my video-gaming is excessive	0.957
I lose track of time when I am playing video games.	0.908
Video games can make me less motivated to get other things done.	0.910
I neglect my physical health such as being active because of video games.	0.934
Sometimes it's hard to get video games off of my mind.	0.947
ADDICTION	
Alcohol	0.702
Drugs	0.909
Smoking	0.579
Gambling	0.741
Binge eating	0.451
Porn/Sexual behaviors	0.550
Video games	0.588