VALIDATING COMPETING STRUCTURES OF POST-TRAUMATIC STRESS DISORDERS

by

Elizabeth N. Aslinger

A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science

Department of Psychological Sciences

West Lafayette, Indiana

December 2019

THE PURDUE UNIVERSITY GRADUATE SCHOOL
STATEMENT OF COMMITTEE APPROVAL

Dr. Sean Lane, Chair

Department of Psychological Sciences

Dr. Donald R. Lynam

Department of Psychological Sciences

Dr. Daniel Foti

Department of Psychological Sciences

Approved by:

Dr. David Rollock

Dedicated to the wise and patient advisor, family, colleagues, and friends who have supported me intellectually and personally

ACKNOWLEDGMENTS

I am forever grateful for the contributions of my advisor, Dr. Sean P. Lane, and committee, Drs. Lynam and Foti, whose advice and support made this thesis a surmountable challenge and a formative experience.

TABLE OF CONTENTS

LIST OF TABLES 7
ABSTRACT 9
BACKGROUND 10
Locating PTSD Within a Broader Taxonomy 11
Modeling Approaches 14
PRESENT STUDY: STRUCTURAL AND PREDICTIVE VALIDATION WITH EPIDEMIOLOGICAL DATA 16
Overview 16
METHODS 17
Dataset 17
Participants 17
Procedure 17
Measures 18
AUDADIS-5 18
SF-12 18
Psychiatric Diagnoses 19
Alcohol Use 19
Analytic Plan 20
Structural Analyses 20
Validation Analyses 20
RESULTS 28
Structural Results 28
Factor Analysis Fit 28
Factor Inter-Correlations 58
Associations With External Correlates 58
SF-12 59
Lifetime Diagnoses 60
Mood and Anxiety Disorders 61

Fear and Panic Disorders 62
Personality Disorders 62
Substance Use Disorders 64
Alcohol Use 65
DISCUSSION 66
Dysphoric and Anxious Arousal Factor 67
Negative Affect and Anhedonia Factors 68
The Externalizing Factor 68
CONCLUSION 71
Limitations and Future Directions 73
LIST OF REFERENCES 75

LIST OF TABLES

Table 1. AUDADIS-5 Items Corresponding to DSM–5 Symptoms 21
Table 2. Factors and Content of Competing Dimensional Models 23
Table 3. Descriptive Statistics for Psychosocial Outcome Variables 25
Table 4. Descriptive Statistics for Lifetime Diagnoses 26
Table 5. R-Squared Estimates for Regression Analyses 29
Table 6. R-Squared Estimates for Regression Analyses of Lifetime Depression 30
Table 7. Fit Indices for Exploratory Factory Analyses 31
Table 8. Fit Indices for Confirmatory Factor Analyses 32
Table 9. Standardized Factor Loadings for Confirmatory Factor Analyses 33
Table 10. DSM-5 CFA Model Factor Inter-Correlations 34
Table 11. ICD-11 CFA Model Factor Inter-Correlations 34
Table 12. Dysphoria CFA Model Factor Inter-Correlations 35
Table 13. Dysphoric Arousal CFA Model Factor Inter-Correlations 35
Table 14. Anhedonia CFA Model Factor Inter-Correlations 36
Table 15. Externalizing CFA Model Factor Inter-Correlations 36
Table 16. Hybrid CFA Model Factor Inter-Correlations 37
Table 17. Inter-Correlations Among DSM-5 and ICD-11 CFA Model Factors 37
Table 18. Inter-Correlations Among DSM-5 and Dysphoria CFA Model Factors 38
Table 19. Inter-Correlations Among DSM-5 and Dysphoric Arousal CFA Model Factors 38
Table 20. Inter-Correlations Among DSM-5 and Anhedonia CFA Model Factors 39
Table 21. Inter-Correlations Among DSM-5 and Externalizing CFA Model Factors 39
Table 22. Inter-Correlations Among DSM-5 and Hybrid CFA Model Factors 40
Table 23. Correlations for SF-12 and CFA Factors 41
Table 24. Regression Results for SF-12 and PTSD CFA Factors 43
Table 25. Correlations for Life Diagnoses and CFA Factors 45
Table 26. Odds Ratios for Life Diagnoses and CFA Factors 48
Table 27. Correlations for Drinking and CFA Factors 51

Table 28. Regression Results for Drinking and CFA Factors 54

ABSTRACT

In the present study, we compare factor analytic models of post-traumatic stress disorder (PTSD) in terms of their fit and predictive utility with regard to external correlates such as comorbid diagnoses and other psychosocial outcomes. Competing models were compared and validated in an epidemiological dataset (N = 23,936). Confirmatory factor analyses (CFA) using models from prior literature with four through seven factor solutions were conducted. The seven factor Hybrid model, the six-factor Anhedonia model, and the six-factor Externalizing Behaviors model were the first, second, and third best-fitting models, respectively; however, the inconsistency of associations with external correlates and high factor intercorrelations suggested that higher-factor solutions may sacrifice parsimony for minimal gains in utility. The Anhedonia and Hybrid models' separate Anhedonia and Negative Affect factors (a core difference from other models) demonstrated limited utility in differentially associating with distinct constructs under the internalizing umbrella. Anhedonia and Negative Affect also correlated highly with each other and nearly perfectly with the factors composed of their combined symptoms (e.g. the Externalizing Behaviors model's Numbing factor), suggesting a "lumped" factor would be more parsimonious. The Externalizing Behaviors model showed predictive utility in accounting for externalizing comorbidities as well as differentiating among constructs within the internalizing spectrum; however, it lacked robust associations with externalizing behavioral outcomes such as frequency and quantity of drinking. These results give reason for concern that predominant structural models of PTSD may not be adequate for discriminating among or predicting functional outcomes related to PTSD symptomatology in trauma-exposed populations.

BACKGROUND

The underlying structure of posttraumatic stress disorder (PTSD) is far from definitively established. Identifying a replicable structure and robust correlates of PTSD could facilitate the assessment and treatment of millions of individuals who suffer from this disorder (lifetime prevalence = 8.3%; Burton, Feeny, Connell, and Zoellner (2018)). Establishing a valid latent structure for any disorder and in any population is crucial to the study of risk factors, symptom course, comorbidity patterns, and responsivity (or lack thereof) to treatment modalities related to specific symptom profiles and/or clusters (Armour et al., 2015; Byllesby et al., 2017; Chen, Yoon, Harford, & Grant, 2017; Denson, Marshall, Schell, & Jaycox, 2007; Galea et al., 2002, 2004; Marshall, Schell, & Miles, 2010).

Evaluating models' utility and stability across samples in predicting external correlates could serve to adjudicate among them based on their relative utility in characterizing and measuring psychosocial impairment and risky behaviors (e.g. substance use). A model of PTSD which accounts for the associations among PTSD symptoms, symptom clusters, and outcomes is necessary to measure and qualify psychosocial functioning and points of intervention in various subpopulations (e.g. those with co-occurring psychiatric disorders, those at different levels of severity of overall symptoms or specific factors). Moreover, a model which identifies PTSD symptoms, clusters, or profiles associated with behaviors such as alcohol or substance abuse will aid in the assessment of patient risk and potential points of intervention.

The lack of a clear leader among structural models of PTSD represents a significant barrier to the assessment and treatment of the disorder. Controversy surrounding the PTSD diagnosis often focuses on heterogeneity, artificial comorbidity, and discouraging levels of reliability, sensitivity, and specificity of diagnosis. The DSM model as well as empirical models from the literature have faced criticism from researchers who believe they induce artificial comorbidity through symptom or factor content overlap (King, King, Leskin, & Weathers, 1998). Others argue that common factors across disorders should be represented if they predict useful correlates such as symptom expression, severity, and associated features, if they explain certain observed "true" comorbidities, or if they convey information about shared liabilities (Simms, Watson, & Doebbelling, 2002).

PTSD has been shown to demonstrate dramatic heterogeneity in symptom combinations and comorbidities. Galatzer-Levy and Bryant (2013) have argued that this heterogeneity may

contribute to the inconsistent findings in the literature regarding the correlates, effect sizes, and factor structure of PTSD. When taking into account combinations of commonly co-occurring disorders and symptoms and/or trauma type, researchers have noted that there are over half a million (Galatzer-Levy & Bryant, 2013) to one quintillion (Young, Lareau, & Pierre, 2014) "ways" to have PTSD, given the algorithmically possible combinations of PTSD diagnosis-qualifying symptom profiles and those of commonly co-occurring disorders.

A model which accounts for the associations among reactions to trauma and psychosocial outcomes is necessary to assess patients and establish potential points of intervention. If the structure of PTSD symptomatology and/or the correlates of that structure do not adequately predict and distinguish among different behaviors and domains of functioning, then diagnostic algorithms and risk assessments may unreliably measure and mis-classify individuals (e.g., diagnostic impostors who erroneously receive treatment and diagnostic orphans who do not qualify for treatment despite considerable impairment). Evaluating competing models will help triangulate whether factors/symptoms clusters and/or subtypes differentially predict the external correlates of psychosocial functioning. Such an evaluation will help optimize the assessment and treatment of PTSD patients.

Locating PTSD Within a Broader Taxonomy

In addition to treatment utility, clarifying the latent structure of PTSD could serve to elucidate its place in broader nosological systems. Locating PTSD within dominant clinical (e.g. the DSM–5, the ICD–11) and empirically-derived taxonomies (Kotov et al., 2017) has proved challenging. Nevertheless, past studies have driven substantial changes to the DSM's diagnostic algorithms and the number and content of symptoms and symptom clusters (Forbes et al., 2010; King et al., 1998).

The DSM-IV split PTSD into three symptom clusters, "Intrusions/Reexperiencing" (criterion B), "Avoidance and Numbing" (criterion C), and "Hyperarousal" (criterion D), requiring an individual to display a certain number of symptoms from each cluster in order to receive a diagnosis (American Psychiatric Association, 2000). Multiple studies, however, subsequently found that a four-factor structure better explains variance in PTSD symptomatology than a three-factor one (as was used in the DSM-IV) (Gentes et al., 2014; King et al., 1998; Naifeh, Richardson, Del Ben, & Elhai, 2010; Simms et al., 2002). King and colleagues (1998) posited a four-factor

model which split Avoidance/Numbing into two symptom clusters. Simms and colleagues' model (2002) proposed a model replacing the Numbing factor with a broader Dysphoria factor, which included symptoms falling under the DSM-IV and King models' Hyperarousal factor while constraining Hyperarousal to include a smaller set of symptoms specifically reflecting hypervigilance.

The DSM–5 followed this empirical shift, organizing PTSD symptoms into four clusters by splitting Avoidance from Numbing. Such studies also led to the relocation of PTSD to a newly-created "Trauma- and Stressor-Related Disorders" section in the DSM–5. Following the spirit of this distinction, studies such as Forbes et al. (2010) demonstrated the non-specificity of certain symptoms to the traditional conceptualization of PTSD, leading to the DSM–5 diagnosis requiring the endorsement of a minimum number of symptoms from the Intrusion/Reexperiencing and Avoidance clusters, which had less overlap with other disorders.

Notably, the World Health Organization moved in the opposite direction with its creation of a three-factor, six-symptom diagnosis in its International Classification of Diseases, 11th Revision (ICD–11). ICD–11 symptoms are grouped into three clusters, Reexperiencing/Intrusion, Avoidance, and Hyperarousal. Thus, the ICD–11 does not have a specific mood-related cluster (e.g. DSM–5 negative alternations in cognition/mood, the Dysphoria model's Dysphoria factor). To qualify for an ICD–11 diagnosis of PTSD, an individual must display a symptom within each of those clusters (Organization et al., 2018).

Researchers disagree about whether changes in diagnostic algorithms from the ICD–10 to the ICD–11 have had a substantial and measurable impact on the rate of diagnosis with PTSD (Hansen, Hyland, Armour, Shevlin, & Elklit, 2015). In a sample of hospitalized patients who had suffered an injury ($N = 510$), O'Donnell et al. (2014) found an ICD–11 prevalence of 3.3% compared to 9.0% under the ICD–10; they also found that shifts from the DSM–IV to the DSM–5 seem to have had less of an effect on rates of diagnosis (6.7% under the DSM–5 versus 5.9% under the DSM–IV) and that the DSM–5 yielded higher rates of diagnosis than the ICD–11. Nevertheless, another study, conducted in an international sample across trauma types ($N = 23{,}936$) found similar prevalence rates, namely, 3.0% using the DSM–5 and 4.4% using the ICD–10 (Stein et al., 2014).

Prevalence rates under different diagnostic systems do not themselves tell the full story of the impact of changes in symptoms and clusters. Adding, removing, and reorganizing symptoms can also affect how symptom counts (overall and within particular clusters) and ultimate diagnostic status relate to external correlates and account for different expression of psychopathology (e.g.

comorbidities). For instance, Young et al. (2014) found over 2.7 million possible unique expressions of the co-occurrence of just PTSD and major depressive disorder (MDD). While it is highly unlikely that all these technically possible combinations represent empirically observable profiles, Galatzer-Levy and Bryant (2013) note that the addition of new symptoms and reorganization of symptom clusters in the DSM–5 resulted in an eight-fold increase in the possible expressions of PTSD.

Distinguishing PTSD from other disorders by features beyond its traumatic etiology is complicated by the high overlap in the expression of symptoms of PTSD and other disorders, which co-vary at high rates in the population and complicate assessment when co-occurring in an individual. Evaluating the relationships among prevalence rates and comorbidities ("true" or "artificial") has proved to be a Herculean task in many ways. Why not just include diagnoses of "post-traumatic depression" or "post-traumatic anxiety" or "post-traumatic alcohol use disorder?" Why not just add a "post-trauma" specifier to any disorder that could theoretically exist downstream from and have a causal relationship to PTSD?

Much of what PTSD shares with other disorders – genetic and environmental liabilities, psychosocial and behavioral correlates, etc. – is likely substantively and specifically meaningful with reference to PTSD and therefore worth modeling even though it contributes to comorbidity rates. Determining whether different PTSD models and their components contribute to artificial comorbidity requires much more than examining their association with other psychiatric disorders. Accordingly, conversations about how to optimize diagnosis and reduce artificial comorbidity permeate the body of literature on PTSD.

One area particularly in contention is the question of PTSD's overlap with depression-related constructs. That controversy has led to the inclusion of differing numbers and content of factors (e.g. the Simms et al., 2002 "Dysphoria" model versus the King et al., 1998 Numbing model). Though some argue that symptoms of anxiety and depression in the PTSD diagnosis ought to be removed in order to reduce symptom overlap with mood and anxiety disorders, others have found empirical support for a Dysphoria factor as distinct from hypervigilance (Gootzeit & Markon, 2011; Simms et al., 2002). Simms and colleagues (2002) themselves note that their "Dysphoria" factor likely represents the "General Distress or Negative Affectivity factor" that many disorders share.

Rather than seeing overlap as a liability, some (e.g. Simms and colleagues) see general distress as explaining both an aspect of the risk for developing PTSD after trauma exposure as well

as observed comorbidity patterns (Simms et al., 2002). Others have also argued that because the Dysphoria criterion more strongly predicts trauma history than any other criterion, it includes essential clinical information, for instance, about the probability that individuals with PTSD may respond to treatments for depression and the risk for individuals with PTSD to go on to develop depression or anxiety and vice-versa (Gootzeit & Markon, 2011). The ICD–11 diagnosis, by contrast, eliminates the entirety of the DSM–5's negative alterations in cognition/mood cluster along with all its constituent symptoms.

In sum, studies of the diagnostic specificity of PTSD and its symptoms have yielded mixed results, and their interpretation largely depends on researchers' opinions about the connection between diagnostic specificity and utility. The high symptom overlap with other disorders may or may not be justifiable; regardless, given that PTSD's structure (i.e. how to organize those symptoms under meaningful higher-order constructs) is still in contention, that overlap represents a clear challenge to developing a unified conceptualization of PTSD. What constitutes true and artificial comorbidity is rarely clear, and PTSD has been noted as a particularly "messy" disorder in this regard. The precise steps one should take to reduce this artifice is no easier a determination.

Modeling Approaches

As is the case with many other disorders (Kotov et al., 2017), researchers increasingly have favored dimensional models of PTSD while disputing the number and content of factors as well as the fundamental symptoms included in the diagnosis (American Psychiatric Association, 2013; Armour et al., 2012; Armour, Mullerová, & Elhai, 2016; Elhai et al., 2011; King et al., 1998; Simms et al., 2002; World Health Organization, 2018; Yufik & Simms, 2010). Dimensional models of three through seven factors with a variety of configurations have been supported by ample evidence of good model fit, which calls into question the specific utility of one characterization over another. As for categorical models, some researchers dispute that the subtypes found in categorical analyses meaningfully distinguish among patients or the efficacy of treatment types (Gootzeit & Markon, 2011). Moreover, models and their constituent factors and subtypes have yielded divergent and variable associations with psychosocial, behavioral, and treatment outcomes (Armour, Elklit, Lauterbach, & Elhai, 2014; Armour et al., 2015; Burton et al., 2018; Cyders, Burris, & Carlson, 2011; Powers et al., 2017; Tsai, Armour, Southwick, & Pietrzak, 2015; Wolf et al., 2012), patterns

of comorbidity (Byllesby et al., 2017), and other external correlates (Galatzer-Levy & Bryant, 2013; Simms, 2010; Yufik & Simms, 2010).

Though the DSM–5 symptom clusters and other dominant models such as those of Simms and King seem to favor four-factor solutions, some of the more recent investigations into the structure of PTSD have introduced additional factors. If one subscribes to the characterization of PTSD as a hybrid fear/distress disorder that relates both to anxious-depressive-type disorders as well as more phobic disorders, explicitly modeling fear- and distress-based components seems a reasonable *a priori* decision.

Moreover, several factor analytic studies have posited and found support for five-, six-, and seven-factor models (Armour et al., 2012, 2016; Elhai et al., 2011; Gentes et al., 2014). The five-factor solution retains the "Numbing" factor and splits the Hyperarousal factor into a "Dysphoric Arousal" (distress-based) factor and "Anxious Arousal" (fear-based) factor (Armour et al., 2016; Elhai et al., 2011; Gentes et al., 2014). Despite the five-factor model's superior fit, a four-factor model may still be more parsimonious (Armour et al., 2012). The ICD–11's model clearly favors parsimony, as it includes only six of the 20 DSM–5 symptoms.

Conversations about model selection metrics (e.g. fit, parsimony, predictive utility, discriminant validity, and diagnostic specificity) continue to evolve. Adjudicating among models requires not just establishing their fit to data but critically, validation of the predictive utility of models. Many prior studies have evaluated models based on fit alone with limited (if any) validation analysis. Those which have considered external correlates have often focused on the validation of a particular model (e.g. DSM–5 symptom clusters/factors, the dissociative subtype) or comparing the validity of models within a single population or trauma type.

Validation analyses could help empirically evaluate the correspondence between factors and constructs they purport to represent. For instance, Dysphoric Arousal was intended to reflect a construct that relates more closely to depression than does Anxious Arousal, while Anxious Arousal was intended to relate more strongly to fear and panic; thus, distinct associations along those lines would lend evidence that those factors operate as intended and that splitting DSM–5's Cognition/Mood factor yields incremental predictive utility. The cohesion and utility of constructing these factors in different ways may be evaluated based on factors' ability to associate differentially with external validators in appropriate directions (positively or negatively).

PRESENT STUDY: STRUCTURAL AND PREDICTIVE VALIDATION WITH EPIDEMIOLOGICAL DATA

Overview

The overall aim of the current research is to elucidate the fit and utility of competing factor analytic models of DSM-5 PTSD in predicting psychosocial and behavioral outcomes. In the present study, fit comparison and validation analyses were conducted in an archival epidemiological dataset. Confirmatory factor analyses (CFA) using models from prior literature were conducted in order to investigate past theories about the structure of PTSD. Factor scores of adequately-fitting models were extracted to predict validators related to psychosocial functioning.

METHODS

Dataset

The National Epidemiologic Survey on Alcohol and Related Conditions Wave 3 served as the initial dataset for the present study. NESARC-Wave III (N = 36,309) was a national sample collected by the National Institute on Alcohol Abuse and Alcoholism from 2012 to 2013 (Grant et al., 2015). The NESARC sample was determined using multistage probability sampling, and its response rates (60.1% overall response rate, 72% household response rate; see Grant et al., 2015, for details) were comparable to similar epidemiological studies (e.g. CDC, 2015). NESARC-III is a publicly-available dataset for which we have already requested and received access. For this study, only participants who reported exposure to a qualifying (as defined by the DSM–5) traumatic event were included in analyses (N = 23,936).

Participants

Civilian, non-institutionalized, US-residing participants age 18 and older were recruited by multistage probability selection as a part of a national epidemiological sample. Primary selection units were counties or groups of counties, secondary were census-defined blocks within those primary units, and tertiary units were households from which individuals were randomly selected. The study over-sampled for ethnic and racial minority groups (i.e. Asian-American, Black, and Latinx individuals).

Oversampling was achieved by ensuring a higher selection probability for members of these groups, specifically, by sampling two individuals from households with four or more members belonging to one of the groups (n = 1,661). Approval was obtained through the National Institutes of Health and Westat Institutional Review Boards. Details on this sample can be found elsewhere (Grant et al., 2014).

Procedure

Face-to-face interviews using the Alcohol Use Disorder and Associated Disability Interview Schedule–DSM–5 Version (AUDADIS-5) provided data on substance use, psychiatric disorders, life history and behavior. The AUDADIS-5 was conducted by trained interviewers between April 2012 and June 2013. The AUDADIS-5, a computer-assisted and fully structured interview, was

designed to be validly administered by trained lay interviewers (Grant et al., 2015; Hasin et al., 2015).

Measures

AUDADIS-5

The AUDADIS-5 (Grant et al., 2011) is an interview-based measure of symptoms of DSM–5 disorders. The interview is fully structured, facilitating its use by non-clinician interviewers. DSM–5 criteria for several mood and anxiety disorders are included in the measure – major depressive disorder, bipolar I disorder, bipolar II disorder, persistent depression, generalized anxiety disorder, social anxiety disorder, panic disorder, agoraphobia, specific phobia. Personality disorders assessed included borderline personality disorder, schizotypal personality disorder, and antisocial personality disorder. Substance use disorders in the measure include nicotine and alcohol use disorder, as well as nine additional specific drug use disorders. AUDADIS-5 DSM-based diagnoses of a subset of these disorders were used as external criteria in validation analyses. Items in the PTSD section of the AUDADIS-5 correspond to DSM–5 criteria for the disorder. Descriptive statistics for DSM–5 diagnoses can be found in Table 4 and for drinking outcomes, in Table 3.

Evidence of some level of concordance of the AUDADIS-5 with dimensional measures of PTSD has been found, with reported symptom and component ICCs ranging from 0.53 to 0.69 (Hasin et al., 2015). Moreover, binary diagnoses of PTSD and other disorders by the AUDADIS-5 (which were included as variables in validation analyses) have demonstrated lower thresholds than other measures such as the PRISM-5 (Hasin, Aivadyan, Greenstein, & Grant, 2011) while having high concordance with dimensional measures, suggesting that AUDADIS-5 binary classifications are more inclusive of cases of clinical interest than are captured by other instruments (Hasin et al., 2011).

SF-12

The SF-12 Health Survey is a short-form survey consisting of 12 items taken from the longer-form SF-36 Health Survey (Ware, Kosinski, and Keller, 1996). Each item falls under one of eight domains from the original SF-36, including the physical domains of General Health (GH), Body Pain (BP), Physical Functioning (PF) and Role-Physical (RP) and the mental domains of

Mental Health (MH), Role-Emotional (RE), Vitality (VT), and Social Functioning. The SF-12 also provides composite scores in the form of two indices – the physical component summary and the mental component summary.

Some items ask for dichotomous (e.g. yes/no) responses whereas others are based on Likert scales (e.g. ranging from "none of the time" to "all of the time"). Reliability coefficients for the scales are reported to range from 0.63 to 0.91 with a median of 0.76 (Ware, Kosinski, and Keller, 1996). The SF-12 was scored in accordance with the manual How to Score Version 2 of the SF-12 Health Survey, Lincoln RI: Quality-Metric, Incorporated, 2002. This system results in standardized scores with a range of 0 to 100 and a mean of 50. Within certain limits, missing values were imputed for participants who had partial responses to one or more SF-12 items. Descriptive statistics can be found in Table 3.

Psychiatric Diagnoses

All diagnoses were made according to criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM–5: American Psychiatric Association). For some disorders, separate variables were coded reflecting diagnoses given based purely on symptoms versus those based on symptoms and impairment criteria. For most disorders, lifetime, past year, and current diagnosis were all assessed; however, for personality disorders, only information about lifetime diagnosis was included. Certain mood, anxiety, and substance-induced disorders were coded in two versions, as assessed independently and as assessed using hierarchical diagnosis according to algorithms and exclusion criteria from the DSM–5. Mood and anxiety disorders due to a medical condition were excluded. Descriptive statistics for DSM–5 disorders can be found in Table 4.

Alcohol Use

Alcohol habits were assessed in the NESARC-III dataset using questions related to frequency and quantity of use. Responses to frequency items were re-coded in the NESARC dataset into "bins," each with an associated range of numbers quantifying the number of times an individual consumed alcohol or drank enough to become intoxicated within that time frame (e.g. "Nearly Every Day," "3 To 4 Times a Week," "2 Times a Week," "Once a Week," "2 to 3 Times a Month," "Once a Month," "7 to 11 Times in the Last Year," "3 to 6 Times in the Last Year," "1 or 2 Times in the Last Year,"

"Never in the Last Year.") For the present study, these variables were recoded as ordered responses and treated as continuous outcomes. Quantity of use was assessed in NESARC-III by asking about the number of drinks usually consumed on days when an individual during the past 12 months. In addition to responding according to their experiences in the 12 months preceding the survey, participants responded to this same set of questions using their "period of heaviest drinking" as their reference time period. Descriptive statistics can be found in Table 3.

Analytic Plan

Structural Analyses

Confirmatory factor analyses (CFA) with four, five, six, and seven factor solutions, drawing from prior literature, were conducted (see Table 2). Structural analyses were conducted in Mplus Version 8 (Muthén & Muthén, 2017). The content of candidate models' factors can be found in Table 2. Symptoms used as indicators for factors are listed in Table 1.

Validation Analyses

Validation analyses were conducted in R, aided by the MplusAutomation package (Hallquist & Wiley, 2018; R Core Team, 2018). Factor scores and class membership were used to predict external correlates of function/impairment, measured by (a) self-reported PTSD symptom-related distress, (b) SF-12 norm-based mental health and social functioning scales, (c) diagnoses of related psychiatric disorders, and (d) substance use frequency/quantity (Grant et al., 2014).

Models were evaluated by their ability to yield consistent associations between factors and their related external correlates. (For instance, a factor containing indicators related to externalizing behavior would be expected to be a strong predictor of alcohol use compared to a factor comprised of indicators related to anhedonia.)

Validators (a) and (b) were chosen based on the standard conceptualization of clinical impairment as subjective distress and impairment in social, professional, and other functional domains. Moreover, ample research has established a strong relationship among trauma exposure, social impairment (e.g. insecure attachment, aggression), and physiological and psychological distress (Harford, Yi, & Grant, 2014; Powers et al., 2017).

Table 1. AUDADIS-5 Items Corresponding to DSM–5 Symptoms

B1a	Did you keep remembering the event even though you didn't want to?
B1b	Have distressing memories of the event?
B2	Have distressing dreams about the event?
B3a	Feel that you were reliving (that/that worst) event or that it was happening all over again?
B3b	Did you find yourself acting as if the event was happening again, for example, reacting to sights or sounds like the ones you heard when it happened?
B4	Get very upset when you were reminded of (that/that worst) event?
B5	Have any physical reactions when something reminded you of (that/that worst) event, like breaking out in a sweat, breathing fast, or feeling your heart pounding?
C1	Did you avoid thinking about or feeling anything about (that/that worst) event?
C2a	Avoid conversations or seeing people that had anything to do with the event or reminded you of the event?
C2b	Avoid going places, doing things or objects or situations that might bring back memories of (that/that worst) event?
D1	Did you find that you couldn't remember some important part of it?
D2a	Feel you really couldn't expect the future to turn out the way you expected it to, in terms of your job, family or length of time you would live?
D2b	Feel that the world was a completely dangerous place?
D2c	Feel that no one could ever be trusted?
D2d	Feel that your nerves were completely shot?
D3a	Did you feel you were to blame for the event or what happened after the event?
D3b	Feel that others were to blame for the event or what happened as the result of the event?
D4a	Often feel more frightened than usual?
D4b	Often feel more angry than usual?
D4c	Did you often feel more guilty or ashamed than usual?
D4d	Often feel more horrified than usual?
D5	Find that you were much less interested in activities you usually enjoyed or that you participated much less than usual in such activities?
D6	Did you feel emotionally distant from other people, or cut off from others?
D7a	Feel that you couldn't be positive about yourself?
D7b	Feel as though you couldn't feel positive or loving towards other people like you used to?
E1	Find yourself getting angry, irritable or combative with others more often than usual?
E2	Find that you were more reckless, like speeding, drinking too much, using drugs or doing anything else in which you or someone else could be hurt?

Table 1. continued

E3	Did you find yourself being more watchful or alert even though it probably wasn't necessary?
E4	Find that you were unusually jumpy or easily startled by sudden noises?
E5	Find that you were having difficulty concentrating or keeping your mind on things?
E6	Have trouble falling asleep, staying asleep, or was your sleep so restless, you often woke up tired?

Note. AUDADIS = Associated Disability Interview Schedule, DSM-5 Version. PTSD = Post-Traumatic Stress Disorder.

Table 2. Factors and Content of Competing Dimensional Models

Number of Factors:		4	3	4	5	6		7
	SX	DSM	ICD	DYS	DYSAR	EXT	ANHE	HY
Intrusive memories	B1	In	–	In	In	In	In	In
Nightmares	B2	In	In	In	In	In	In	In
Flashbacks	B3	In	In	In	In	In	In	In
Emotion reactivity	B4	In	–	In	In	In	In	In
Physiological reactivity	B5	In	–	In	In	In	In	In
Thought avoidance	C1	Av	Av	Av	Av	Av	Av	Av
Reminder Avoidance	C2	Av	Av	Av	Av	Av	Av	Av
Amnesia	D1	NACM	–	Dy	NACM	Nu/NACM	NA	NA
Negative beliefs	D2	NACM	–	Dy	NACM	Nu/NACM	NA	NA
Self/Other Blame	D3	NACM	–	Dy	NACM	Nu/NACM	NA	NA
Negative emotions	D4	NACM	–	Dy	NACM	Nu/NACM	NA	NA
Loss of interest	D5	NACM	–	Dy	NACM	Nu/NACM	An	An
Detachment	D6	NACM	–	Dy	NACM	Nu/NACM	An	An
Restricted affect	D7	NACM	–	Dy	NACM	Nu/NACM	An	An

Table 2 continued

Number of Factors:		4	3	4	5	6		7
	SX	DSM	ICD	DYS	DYSAR	EXT	ANHE	HY
Irritability/anger	E1	HA	–	Dy	DA	EB	DA	EB
Self-destructive/reckless	E2	HA	–	Dy	DA	EB	DA	EB
Hypervigilance	E3	HA	HA	HA	AA	AA	AA	AA
Exaggerated startle	E4	HA	HA	HA	AA	AA	AA	AA
Difficulty concentrating	E5	HA	–	Dy	DA	DA	DA	DA
Sleep disturbance	E6	HA	–	Dy	DA	DA	DA	DA

Note. SX = DSM–5 Symptom Criterion. DSM = Diagnostic and Statistical Manual. DYS = Dysphoria Model. DYSAR = Dysphoric Arousal Model. EXT = Externalizing Behaviors Model. ANHE = Anhedonia Model. HY = Hybrid Model. In = Intrusions. AV = Avoidance. NA = Negative Affect. NACM = Negative alterations in cognition and mood. Nu/NACM = Numbing (same content as DSM–5 NACM). HA = Hyperarousal. Dy = Dysphoria. DA = Dysphoric Arousal. AA = Anxious Arousal. EB = Externalizing Behaviors. An = Anhedonia.

Table 3. Descriptive Statistics for Psychosocial Outcome Variables

	Overall		Male		Female	
SF-12	Mean	*SD*	Mean	*SD*	Mean	*SD*
Calm or Peaceful	3.57	1.06	3.69	1.03	3.48	1.08
Down or Depressed	1.87	1.01	1.77	0.96	1.96	1.05
Less Accomplished	1.85	1.13	1.75	1.10	1.93	1.15
Less Careful	1.73	1.05	1.65	1.03	1.78	1.07
Drinking	Mean	*SD*	Mean	*SD*	Mean	*SD*
Maximum Drinks	1.99	4.30	1.96	4.27	2.02	4.31
Drinking Frequency	5.80	4.51	5.75	4.53	5.84	4.51
Usual Drinks	1.50	3.28	1.47	3.25	1.52	3.30
Frequency Binge	0.84	2.36	0.83	2.34	0.85	2.37
Intoxication Frequency	0.34	1.32	0.33	1.31	0.34	1.33

Note. SF-12 = Short Form Health Survey. Drinking variables from the Alcohol Use Disorder and Associated Disability Interview Schedule, DSM-5 Version (AUDADIS-5).

Table 4. Descriptive Statistics for Lifetime Diagnoses

	Overall		Male		Female	
Diagnosis	Count	Percent	Count	Percent	Count	Percent
PTSD	2339	9.8	678	6.5	1661	12.3
MDD	6091	25.4	1921	18.4	4170	30.9
BPD	3841	16.0	1626	15.5	2215	16.4
GAD	2412	10.1	784	7.5	1628	12.1
Phobia	1895	7.9	520	5.0	1375	10.2
Panic	1562	6.5	431	4.1	1131	8.4
AUD	7869	32.9	4268	40.8	3601	26.7
NUD	7514	31.4	3800	36.3	3714	27.6
CD	924	3.9	588	5.6	336	2.5
ASPD	876	3.7	565	5.4	311	2.3

Note. PTSD = Post-Traumatic Stress Disorder. MDD = Major Depressive Disorder. GAD = Generalized Anxiety Disorder. AUD = Alcohol Use Disorder. NUD = Nicotine Use Disorder. BPD = Borderline Personality Disorder. CD = Conduct Disorder. ASPD = Antisocial Personality Disorder. Assessed using the Alcohol Use Disorder and Associated Disability Interview Schedule, DSM-5 Version (AUDADIS -5).

Validators (c) and (d) were chosen based on the strong empirical and theoretical relationship among trauma exposure, PTSD symptoms, substance use, and other psychiatric disorders. Among disorders included in NESARC-III, major depressive disorder (MDD), generalized anxiety disorder (GAD), panic disorder, borderline personality disorder (BPD), conduct disorder, antisocial personality disorder (ASPD), nicotine use disorder, and alcohol use disorder (AUD) were determined to be of particular salience for the purposes of these exploratory analyses.

Identifying components of PTSD shared by anxiety and mood disorders (Simms et al., 2002) or those which relate to externalizing spectra and their correlates (e.g. AUD, personality disorders, and risky behaviors) could explain the heterogeneity of PTSD and its comorbidity with other disorders, both of which have clear clinical consequences. For instance, the relationship between trauma exposure and alcohol misuse is associated with poor prognosis: PTSD's co-occurrence (e.g., 9.8%-61.3% comorbidity; Debell et al., 2014) with Alcohol Use Disorder (AUD) has been tied to poorer treatment outcomes (Hien et al., 2015).

Past research developing and validating this study's candidate theoretical models have compared these disorders to aspects (e.g. factors) of PTSD (c.f. Simms et al. (2002)). Including such analyses in the present study, which also evaluates and integrates findings across multiple candidate structural models and analytic techniques, could clarify theoretical questions about PTSD's place in the taxonomy, for instance, whether it is more closely related to fear or distress, whether components may relate to other spectra (e.g. the Externalizing Behaviors Model and the Hybrid Model; see Table 1), and which components may be common across disorders in certain families of disorders (Simms et al., 2002).

RESULTS

R-Squared estimates are located in Tables 5 and 6. Table 7 contains fit indices from exploratory factor analyses. Fit indices for CFA models can be found in Table 8. Standardized factor loadings for CFA models are located in Table 9. Inter-correlations of factors within models can be found in Tables 10 through 16. Correlations between factors in the DSM–5 model and factors in the candidate empirical and ICD-11 models are located in Tables 17 through 22. Results from the validation analyses can be found in Tables 23 through 28.

Structural Results

Factor Analysis Fit

Each of the one- through eight-factor exploratory factor analyses (EFA) had a comparative fit index (CFI) of 0.97 or higher. All but the one-factor solution had Root Mean Square Error of Approximations (RMSEA) lower than 0.05.

In the confirmatory factor analyses (CFA), the three-factor ICD-11 model could not be compared to other candidate models using fit indices, as it includes different factor indicators (i.e. six symptoms). The Hybrid model fit the data best (BIC = 335,217, AIC = 335,710, LL = 335,710). The six-factor Anhedonia model had the second best fit to data, according to the BIC (335,917), AIC (336,361), and loglikelihood (-167,903).

The six-factor Externalizing model had the third best fit (BIC = 335,917, AIC = 336,361, LL = -167,903), followed by the five-factor Dysphoric Arousal model (BIC = 336,792, AIC = 337,196, LL = -168,346), followed by the four-factor DSM–5 model (BIC = 337,027, AIC = 337,399, LL = -168,468). The four-factor Dysphoria model demonstrated the worst fit among candidate models (BIC = 337,070, AIC = 337,441, LL = -168,489). (See Table 8.)

Table 5. R-Squared Estimates for Regression Analyses

CFA	DSM-5	ICD-11	DYS	DYSAR	EXT	ANHE	HY
SF-12 Calm or Peaceful	0.057	0.048	0.058	0.058	0.058	0.058	0.058
SF-12 Down or Depressed	0.097	0.086	0.097	0.097	0.098	0.097	0.098
SF-12 Less Accomplished	0.066	0.058	0.066	0.066	0.067	0.066	0.067
SF-12 Less Careful	0.049	0.045	0.049	0.049	0.050	0.050	0.050
Maximum Drinks	0.001	0.000	0.000	0.001	0.001	0.001	0.001
Drinking Frequency	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Usual Drinks	0.001	0.000	0.000	0.001	0.001	0.001	0.001
Frequency Binge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Intoxication Frequency	0.000	0.000	0.000	0.000	0.000	0.000	0.001

Note. DSM = Diagnostic and Statistical Manual Model. DYS = Dysphoria Model. DYSAROUS = Dysphoric Arousal Model. EXT = Externalizing Behaviors Model. ANHE = Anhedonia Model. HY = Hybrid Model. CFA = Confirmatory Factor Analysis. SF-12 = Short Form Health Survey. DSM–5 = Diagnostic and Statistical Manual, 5th Edition. ICD–11 = International Classification of Diseases, 11th Revision.

Table 6. R-Squared Estimates for Regression Analyses of Lifetime Depression

CFA	DSM-5	ICD-11	DYS	DYSAR	EXT	ANHE	HY
Life PTSD	0.696	0.495	0.693	0.697	0.699	0.699	0.701
Life MDD	0.082	0.066	0.084	0.083	0.083	0.085	0.085
BPD	0.183	0.149	0.184	0.183	0.184	0.190	0.190
Life GAD	0.111	0.088	0.112	0.112	0.112	0.113	0.113
Life Specific Phobia	0.058	0.048	0.059	0.059	0.059	0.059	0.060
Life Panic	0.121	0.097	0.121	0.121	0.122	0.121	0.122
Life AUD	0.025	0.017	0.025	0.026	0.026	0.031	0.031
Life Nicotine Dependence	0.029	0.022	0.029	0.029	0.029	0.032	0.032
Conduct Disorder	0.084	0.063	0.083	0.084	0.085	0.094	0.094
ASPD	0.086	0.065	0.086	0.086	0.087	0.097	0.097

Note. DSM = Diagnostic and Statistical Manual Model. DYS = Dysphoria Model. DYSAROUS = Dysphoric Arousal Model. EXT = Externalizing Behaviors Model. ANHE = Anhedonia Model. HY = Hybrid Model. CFA = Confirmatory Factor Analysis. SF-12 = Short Form Health Survey. DSM–5 = Diagnostic and Statistical Manual, 5th Edition. ICD–11 = International Classification of Diseases, 11th Revision.

Table 7. Fit Indices for Exploratory Factory Analyses

Model	Parameters	χ^2	Degrees of Freedom	*P*-Value
1-factor	20	15099.181	170	0.0000
2-factor	39	7646.799	151	0.0000
3-factor	57	3820.666	133	0.0000
4-factor	74	2339.706	116	0.0000
5-factor	90	1209.045	100	0.0000
6-factor	105	844.914	85	0.0000
7-factor	119	636.017	71	0.0000
8-factor	132	449.074	58	0.0000
9-factor	144	254.554	46	0.0000
1-factor against 2-factor	4729.499	19	0.0000	
2-factor against 3-factor	2749.797	18	0.0000	
3-factor against 4-factor	1187.999	17	0.0000	
4-factor against 5-factor	938.410	16	0.0000	
5-factor against 6-factor	335.464	15	0.0000	
6-factor against 7-factor	200.581	14	0.0000	
7-factor against 8-factor	177.967	13	0.0000	
8-factor against 9-factor	184.966	12	0.0000	

Note. Gemonin Rotation.

Table 8. Fit Indices for Confirmatory Factor Analyses

	BIC	AIC	LL
DSM-5	337027	337399	-168468
ICD-11	124462	124341	-62155
Dysphoria	337070	337441	-168489
Dysphoric Arousal	336792	337196	-168346
Anhedonia	335917	336361	-167903
Externalizing	335926	336371	-167908
Hybrid	335217	335710	-167548

Note. ICD-11 model fit indices are not comparable to other models, as the ICD-11 model includes different factor indicators (i.e. six symptoms). AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. LL = Loglikelihood. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

Table 9. Standardized Factor Loadings for Confirmatory Factor Analyses

Symptom	Cluster	DSM	ICD	DYS	DYSAR	EXT	ANHE	HY
Intrusive memories	B1	0.86		0.86	0.85	0.86	0.86	0.86
Nightmares	B2	0.84	0.86	0.84	0.84	0.84	0.84	0.84
Flashbacks	B3	0.90	0.93	0.89	0.89	0.89	0.90	0.89
Emotion reactivity	B4	0.84		0.84	0.84	0.84	0.84	0.84
Physiological reactivity	B5	0.86		0.85	0.85	0.85	0.86	0.85
Thought avoidance	C1	0.88	0.87	0.88	0.88	0.88	0.88	0.88
Reminder Avoidance	C2	0.93	0.92	0.93	0.93	0.93	0.93	0.93
Amnesia	D1	0.68		0.67	0.67	0.68	0.67	0.68
Negative beliefs	D2	0.84		0.84	0.84	0.84	0.84	0.84
Self/Other Blame	D3	0.70		0.69	0.70	0.71	0.70	0.72
Negative emotions	D4	0.88		0.88	0.88	0.89	0.88	0.90
Loss of interest	D5	0.87		0.87	0.87	0.88	0.87	0.93
Detachment	D6	0.91		0.90	0.91	0.81	0.91	0.85
Restricted affect	D7	0.91		0.91	0.91	0.92	0.91	0.95
Irritability/anger	E1	0.88		0.88	0.88	0.89	0.95	0.92
Self-destructive/reckless	E2	0.81		0.81	0.81	0.82	0.92	0.82
Hypervigilance	E3	0.76	0.80	0.90	0.92	0.91	0.93	0.91
Exaggerated startle	E4	0.86	0.92	0.86	0.89	0.88	0.85	0.88
Difficulty concentrating	E5	0.92		0.82	0.82	0.93	0.82	0.93
Sleep disturbance	E6	0.88	0.91	0.92	0.93	0.92	0.93	

Note. Geomin rotation. DSM = Diagnostic and Statistical Manual Model. DYS = Dysphoria Model. DYSAROUS = Dysphoric Arousal Model. EXT = Externalizing Behaviors Model. ANHE = Anhedonia Model. HY = Hybrid Model.

Table 10. DSM-5 CFA Model Factor Inter-Correlations

DSM-5	1	2	3	4
INTRUSIONS	1.00			
AVOIDANCE	0.95	1.00		
COGMOOD	0.93	0.94	1.00	
HYPERAROUSAL	0.94	0.93	0.99	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 11. ICD-11 CFA Model Factor Inter-Correlations

ICD-11	1	2	3
INTRUSIONS	1.00		
AVOIDANCE	0.43	1.00	
HYPERAROUSAL	0.47	0.53	1.00

Note. CFA = Confirmatory Factor Analysis. ICD-11 = International Classification of Diseases, 11th Revision.

Table 12. Dysphoria CFA Model Factor Inter-Correlations

Dysphoria	1	2	3	4
INTRUSIONS	1.00			
AVOIDANCE	0.95	1.00		
DYSPHORIA	0.94	0.94	1.00	
HYPERAROUSAL	0.93	0.92	0.98	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 13. Dysphoric Arousal CFA Model Factor Inter-Correlations

Dysphoric Arousal	1	2	3	4	5
INTRUSIONS	1.00				
AVOIDANCE	0.95	1.00			
DYSPHORIA	0.93	0.95	1.00		
DYSPHORIC AROUSAL	0.94	0.93	0.99	1.00	
ANXIOUS AROUSAL	0.93	0.93	0.98	0.98	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 14. Anhedonia CFA Model Factor Inter-Correlations

Anhedonia	1	2	3	4	5	6
INTRUSIONS	1.00					
AVOIDANCE	0.94	1.00				
NEGATIVE AFFECT	0.94	0.95	1.00			
ANHEDONIA	0.92	0.93	0.99	1.00		
DYSPHORIC AROUSAL	0.94	0.93	0.98	0.99	1.00	
ANXIOUS AROUSAL	0.92	0.92	0.98	0.96	0.98	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 15. Externalizing CFA Model Factor Inter-Correlations

Externalizing	1	2	3	4	5	6
INTRUSIONS	1.00					
AVOIDANCE	0.95	1.00				
NUMBING	0.93	0.94	1.00			
EXTERNALIZING	0.91	0.93	0.99	1.00		
DYSPHORIC AROUSAL	0.93	0.91	0.98	0.97	1.00	
ANXIOUS AROUSAL	0.93	0.92	0.97	0.97	0.97	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 16. Hybrid CFA Model Factor Inter-Correlations

Hybrid	1	2	3	4	5	6	7
INTRUSIONS	1.00						
AVOIDANCE	0.95	1.00					
NEGATIVE AFFECT	0.94	0.95	1.00				
ANHEDONIA	0.92	0.93	0.99	1.00			
EXTERNALIZING	0.91	0.93	0.99	0.99	1.00		
DYSPHORIC AROUSAL	0.93	0.91	0.97	0.98	0.97	1.00	
ANXIOUS AROUSAL	0.93	0.92	0.98	0.96	0.96	0.97	1.00

Note. CFA = Confirmatory Factor Analysis.

Table 17. Inter-Correlations Among DSM-5 and ICD-11 CFA Model Factors

ICD-11	DSM-5 In	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	0.646	0.794	0.650	0.627
AVOIDANCE	0.605	0.620	0.703	0.681
HYPERAROUSAL	0.643	0.663	0.750	0.726

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

Table 18. Inter-Correlations Among DSM-5 and Dysphoria CFA Model Factors

Dysphoria	DSM-5 In	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	1.000	0.946	0.933	0.941
AVOIDANCE	0.946	0.999	0.942	0.933
DYSPHORIA	0.938	0.942	0.999	0.997
HYPERAROUSAL	0.929	0.923	0.978	0.987

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition.

Table 19. Inter-Correlations Among DSM-5 and Dysphoric Arousal CFA Model Factors

Dysphoric Arousal	DSM-5 In	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	1.000	0.947	0.933	0.942
AVOIDANCE	0.948	0.999	0.946	0.935
DYSPHORIA	0.933	0.945	1.000	0.993
DYSPHORIC AROUSAL	0.939	0.929	0.992	0.999
ANXIOUS AROUSAL	0.930	0.924	0.976	0.988

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition.

Table 20. Inter-Correlations Among DSM-5 and Anhedonia CFA Model Factors

Anhedonia	DSM-5 In	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	1.000	0.945	0.931	0.940
AVOIDANCE	0.946	0.999	0.944	0.933
NEGATIVE AFFECT	0.937	0.948	0.997	0.990
ANHEDONIA	0.921	0.934	0.996	0.988
DYSPHORIC AROUSAL	0.939	0.928	0.990	0.998
ANXIOUS AROUSAL	0.924	0.920	0.975	0.986

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition.

Table 21. Inter-Correlations Among DSM-5 and Externalizing CFA Model Factors

Externalizing	DSM-5 In	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	1.000	0.946	0.932	0.940
AVOIDANCE	0.946	0.999	0.943	0.932
NUMBING	0.933	0.944	1.000	0.993
EXTERNALIZING	0.914	0.927	0.991	0.988
DYSPHORIC AROUSAL	0.934	0.913	0.979	0.992
ANXIOUS AROUSAL	0.927	0.921	0.975	0.987

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition.

Table 22. Inter-Correlations Among DSM-5 and Hybrid CFA Model Factors

Hybrid	DSM-5 IN	DSM-5 Av	DSM-5 NACM	DSM-5 HA
INTRUSIONS	1.000	0.947	0.933	0.941
AVOIDANCE	0.947	0.999	0.943	0.933
NEGATIVE AFFECT	0.938	0.948	0.997	0.990
ANHEDONIA	0.921	0.933	0.995	0.988
EXTERNALIZING	0.914	0.926	0.990	0.988
DYSPHORIC AROUSAL	0.934	0.912	0.977	0.991
ANXIOUS AROUSAL	0.925	0.920	0.975	0.986

Note. In = Intrusions. AV = Avoidance. NACM = Negative alterations in cognition and mood. HA = Hyperarousal. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition.

Table 23. Correlations for SF-12 and CFA Factors

DSM-5	Calm	Depressed	Less Accomplished	Less Careful
INTRUSIONS	-0.221	0.285	0.237	0.211
AVOIDANCE	-0.222	0.288	0.238	0.210
COGMOOD	-0.239	0.310	0.256	0.222
HYPERAROUSAL	-0.238	0.309	0.255	0.222
ICD-11	Calm	Depressed	Less Accomplished	Less Careful
INTRUSIONS	-0.158	0.213	0.178	0.160
AVOIDANCE	-0.192	0.260	0.213	0.184
HYPERAROUSAL	-0.179	0.229	0.188	0.164
Dysphoria	Calm	Depressed	Less Accomplished	Less Careful
INTRUSIONS	-0.220	0.285	0.237	0.211
AVOIDANCE	-0.222	0.288	0.238	0.211
DYSPHORIA	-0.239	0.310	0.256	0.222
HYPERAROUSAL	-0.231	0.300	0.247	0.216
Dysphoria Arousal	Calm	Depressed	Less Accomplished	Less Careful
INTRUSIONS	-0.221	0.285	0.237	0.211
AVOIDANCE	-0.222	0.287	0.238	0.210
DYSPHORIA	-0.238	0.310	0.255	0.221
DYSPHORIC AROUSAL	-0.239	0.309	0.255	0.221
ANXIOUS AROUSAL	-0.231	0.300	0.247	0.215
Anhedonia	Calm	Depressed	Less Accomplished	Less Careful
INTRUSIONS	-0.220	0.285	0.237	0.211
AVOIDANCE	-0.221	0.288	0.238	0.211
NEGATIVE AFFECT	-0.237	0.307	0.253	0.220

Table 23 continued

Anhedonia	Calm	Depressed	Less Accomplished	Less Careful
ANHEDONIA	-0.239	0.312	0.257	0.223
DYSPHORIC AROUSAL	-0.239	0.310	0.256	0.222
ANXIOUS AROUSAL	-0.231	0.298	0.246	0.215
Externalizing	**Calm**	**Depressed**	**Less Accomplished**	**Less Careful**
INTRUSIONS	-0.220	0.285	0.237	0.211
AVOIDANCE	-0.221	0.288	0.238	0.211
NUMBING	-0.239	0.310	0.256	0.222
EXTERNALIZING	-0.239	0.310	0.255	0.221
DYSPHORIC AROUSAL	-0.237	0.306	0.254	0.220
ANXIOUS AROUSAL	-0.231	0.300	0.247	0.216
Hybrid	**Calm**	**Depressed**	**Less Accomplished**	**Less Careful**
INTRUSIONS	-0.220	0.285	0.237	0.211
AVOIDANCE	-0.221	0.287	0.238	0.210
NEGATIVE AFFECT	-0.237	0.307	0.253	0.220
ANHEDONIA	-0.240	0.312	0.257	0.223
EXTERNALIZING	-0.239	0.310	0.255	0.222
DYSPHORIC AROUSAL	-0.237	0.306	0.255	0.220
ANXIOUS AROUSAL	-0.231	0.298	0.246	0.215

Note. SF-12 = Short Form Health Survey. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

Table 24. Regression Results for SF-12 and PTSD CFA Factors

DSM-5	Calm/Peaceful	Depressed	Less Accomplished	Less Careful
(Intercept)	3.57***	-1.87***	1.85***	1.73***
INTRUSIONS	0.02	-0.02	-0.02	0.03
AVOIDANCE	0.03	-0.03	-0.02	-0.01
COGMOOD	**-0.21****	**0.32*****	**0.20****	0.16*
HYPERAROUSAL	-0.09	0.04	0.12	0.06
ICD-11	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	**-0.07*****	**0.10*****	**0.10*****	**0.08*****
AVOIDANCE	**-0.13*****	**0.17*****	**0.15*****	**0.12*****
HYPERAROUSAL	**-0.09*****	**0.10*****	**0.09*****	**0.07*****
Dysphoria	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	0.02	-0.03	-0.02	0.03
AVOIDANCE	0.02	-0.01	-0.01	0.01
DYSPHORIA	**-0.36*****	**0.45*****	**0.39*****	**0.24*****
HYPERAROUSAL	0.07*	**-0.10****	-0.08*	-0.05
Dysphoric Arousal	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	0.03	-0.04	-0.03	0.02
AVOIDANCE	-0.01	0.00	0.01	0.01
DYSPHORIA	-0.10	**0.22*****	0.11	0.09
DYSPHORIC AROUSAL	**-0.27*****	**0.23*****	**0.31*****	0.18*
ANXIOUS AROUSAL	**0.10****	**-0.10****	**-0.12****	-0.08*
Anhedonia	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	0.06	-0.04	-0.05	0.02
AVOIDANCE	0.00	0.00	0.02	0.02

Table 24 continued

Anhedonia	Calm/Peaceful	Depressed	Less Accomplished	Less Careful
NEGATIVE AFFECT	-0.23*	0.10	0.09	-0.01
ANHEDONIA	0.10	0.13	0.03	0.10
DYSPHORIC AROUSAL	**-0.35*****	0.23*	**0.34****	0.15
ANXIOUS AROUSAL	**0.17****	-0.11	-0.14*	-0.05
Externalizing	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	0.02	-0.02	-0.03	0.03
AVOIDANCE	0.00	-0.01	0.02	0.02
NUMBING	-0.12	**0.22****	0.13	0.06
EXTERNALIZING	-0.10	0.09	0.08	0.10
DYSPHORIC AROUSAL	**-0.15*****	**0.13*****	**0.19*****	0.09*
ANXIOUS AROUSAL	0.08*	**-0.10****	**-0.11****	-0.06
Hybrid	**Calm/Peaceful**	**Depressed**	**Less Accomplished**	**Less Careful**
(Intercept)	3.57***	1.87***	1.85***	1.73***
INTRUSIONS	0.04	-0.03	-0.03	0.03
AVOIDANCE	0.00	-0.01	0.01	0.01
NEGATIVE AFFECT	-0.19*	0.08	0.07	-0.02
ANHEDONIA	0.05	0.15	0.08	0.10
EXTERNALIZING	-0.11	0.08	0.08	0.08
DYSPHORIC AROUSAL	**-0.18*****	0.12*	**0.19*****	0.07
ANXIOUS AROUSAL	0.14*	-0.09	-0.11	-0.05

Note. SF-12 = Short Form Health Survey. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

*p < .05. **p < .01. ***p < .001.

Table 25. Correlations for Life Diagnoses and CFA Factors

DSM-5	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.528	0.284	0.350	0.252	0.174	0.235	0.157	0.170	0.153	0.152
AVOIDANCE	0.544	0.285	0.364	0.252	0.178	0.232	0.162	0.174	0.157	0.156
COGMOOD	0.580	0.306	0.399	0.274	0.182	0.244	0.174	0.188	0.168	0.167
HYPERAROUSAL	0.587	0.302	0.397	0.275	0.181	0.246	0.177	0.188	0.170	0.169
ICD-11	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.467	0.201	0.286	0.187	0.135	0.177	0.113	0.120	0.122	0.121
AVOIDANCE	0.445	0.230	0.321	0.208	0.138	0.193	0.107	0.137	0.121	0.120
HYPERAROUSAL	0.449	0.243	0.306	0.215	0.140	0.184	0.130	0.143	0.125	0.125
Dysphoria	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.529	0.283	0.350	0.252	0.174	0.235	0.157	0.170	0.153	0.152
AVOIDANCE	0.548	0.284	0.365	0.253	0.178	0.232	0.163	0.174	0.158	0.157
DYSPHORIA	0.580	0.306	0.398	0.274	0.181	0.244	0.176	0.188	0.169	0.168
HYPERAROUSAL	0.581	0.291	0.393	0.265	0.182	0.243	0.173	0.188	0.167	0.165

Table 25 continued

Dysphoric Arousal	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.528	0.283	0.349	0.252	0.174	0.234	0.157	0.170	0.153	0.152
AVOIDANCE	0.544	0.284	0.364	0.252	0.178	0.232	0.162	0.175	0.157	0.156
DYSPHORIA	0.577	0.306	0.398	0.273	0.182	0.243	0.174	0.187	0.168	0.167
DYSPHORIC AROUSAL	0.585	0.303	0.396	0.275	0.180	0.246	0.178	0.187	0.170	0.169
ANXIOUS AROUSAL	0.581	0.291	0.391	0.266	0.182	0.243	0.173	0.188	0.167	0.166
Anhedonia	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.530	0.283	0.349	0.252	0.174	0.235	0.157	0.170	0.153	0.152
AVOIDANCE	0.547	0.284	0.365	0.252	0.179	0.232	0.162	0.175	0.157	0.156
NEGATIVE AFFECT	0.578	0.303	0.397	0.272	0.184	0.245	0.173	0.188	0.167	0.167
ANHEDONIA	0.583	0.308	0.400	0.275	0.180	0.242	0.174	0.185	0.167	0.167
DYSPHORIC AROUSAL	0.590	0.303	0.397	0.276	0.180	0.246	0.177	0.186	0.170	0.169
ANXIOUS AROUSAL	0.583	0.290	0.393	0.266	0.183	0.244	0.174	0.189	0.168	0.166
Externalizing	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.530	0.284	0.348	0.253	0.174	0.235	0.156	0.168	0.151	0.150
AVOIDANCE	0.546	0.283	0.366	0.252	0.178	0.232	0.163	0.175	0.158	0.157
NUMBING	0.579	0.305	0.401	0.273	0.182	0.244	0.176	0.189	0.170	0.169

Table 25 continued

Externalizing	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
EXTERNALIZING	0.582	0.299	0.409	0.271	0.179	0.242	0.186	0.195	0.178	0.178
DYSPHORIC AROUSAL	0.585	0.303	0.384	0.276	0.178	0.245	0.169	0.179	0.162	0.161
ANXIOUS AROUSAL	0.584	0.291	0.392	0.267	0.182	0.244	0.172	0.187	0.166	0.164
Hybrid	PTSD	MDD	BPD	GAD	Phobia	Panic	AUD	NUD	CD	ASPD
INTRUSIONS	0.530	0.284	0.348	0.253	0.174	0.235	0.156	0.169	0.151	0.151
AVOIDANCE	0.546	0.283	0.366	0.252	0.178	0.232	0.163	0.175	0.158	0.158
NEGATIVE AFFECT	0.578	0.302	0.399	0.271	0.183	0.245	0.175	0.190	0.169	0.169
ANHEDONIA	0.583	0.307	0.402	0.274	0.180	0.242	0.175	0.186	0.169	0.168
EXTERNALIZING	0.587	0.300	0.410	0.271	0.179	0.243	0.186	0.194	0.178	0.178
DYSPHORIC AROUSAL	0.588	0.303	0.384	0.277	0.178	0.245	0.169	0.178	0.162	0.161
ANXIOUS AROUSAL	0.583	0.290	0.392	0.266	0.183	0.245	0.173	0.188	0.167	0.165

Note. CFA = Confirmatory Factor Analysis. PTSD = Post-Traumatic Stress Disorder. MDD = Major Depressive Disorder. GAD = Generalized Anxiety Disorder. AUD = Alcohol Use Disorder. BPD = Borderline Personality Disorder. CD = Conduct Disorder. ASPD = Antisocial Personality Disorder. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

Table 26. Odds Ratios for Life Diagnoses and CFA Factors

DSM-5	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.13***	0.03***	0.03***
INTRUSIONS	**0.42*** **	**1.16** **	1.04	1.04	**1.30** **	**0.79*** **	**0.86** **	**0.66*** **	0.74*	0.77*
AVOIDANCE	**7.43*** **	0.87*	0.96	**1.26** **	1.09	1.14*	1.07	1.16*	1.37*	1.32*
COGMOOD	**0.21*** **	**2.80*** **	1.52*	1.28	0.97	**0.68** **	1.09	**2.09*** **	0.66	0.75
HYPERAROUSAL	**290.60*** **	0.72*	**1.61** **	1.15	**1.98** **	**2.35*** **	**1.50** **	**1.94*** **	**3.43*** **	**3.07*** **
ICD-11	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.01***	0.31***	0.09***	0.07***	0.05***	0.48***	0.45***	0.14***	0.03***	0.03***
INTRUSIONS	**2.89*** **	**1.20*** **	**1.27*** **	**1.26*** **	**1.35*** **	**1.13*** **	**1.11*** **	**1.40*** **	**1.33*** **	**1.33*** **
AVOIDANCE	**2.52*** **	**1.29*** **	**1.37*** **	**1.25*** **	**1.46*** **	**1.08*** **	**1.16*** **	**1.58*** **	**1.29*** **	**1.29*** **
HYPERAROUSAL	**3.57*** **	**1.37*** **	**1.45*** **	**1.27*** **	**1.38*** **	**1.19*** **	**1.18*** **	**1.47*** **	**1.36*** **	**1.38*** **
Dysphoria	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.12***	0.03***	0.03***
INTRUSIONS	**0.59*** **	1.06	1.05	1.02	**1.35*** **	**0.86** **	**0.87** **	**0.65*** **	0.82	0.84
AVOIDANCE	**4.28*** **	0.95	0.96	**1.26** **	1.02	1.04	1.03	**1.17** **	1.19	1.16
DYSPHORIA	**13.43*** **	**3.07*** **	**2.91*** **	1.11	**1.53*** **	**1.53*** **	**1.35*** **	**3.15*** **	**2.05*** **	**2.22*** **
HYPERAROUSAL	**5.36*** **	**0.65*** **	0.84	**1.37** **	1.30*	1.05	**1.23** **	**1.32*** **	1.15	1.08

Table 26 continued

Dysphoric Arousal	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.13***	0.03***	0.03***
INTRUSIONS	**0.44***	1.11	1.02	1.10	**1.30**	**0.78***	0.87*	**0.67***	0.75*	0.78*
AVOIDANCE	**7.35***	0.94	1.01	1.15	1.07	**1.20**	1.04	1.14	**1.40**	1.34*
DYSPHORIA	**0.38***	**2.25***	1.37	1.57*	1.05	**0.66**	1.20	**2.29***	0.66	0.76
DYSPHORIC AROUSAL	**44.14***	1.26	**2.07***	0.68	1.51	**2.48***	1.07	1.31	**3.14***	**2.90***
ANXIOUS AROUSAL	**3.60***	**0.69***	0.83	**1.44**	1.23	0.95	**1.28***	**1.37***	1.04	1.00
Anhedonia	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.13***	0.03***	0.03***
INTRUSIONS	**0.35***	1.05	0.89	1.06	1.14	**0.71***	**0.83**	**0.64***	**0.62***	**0.63**
AVOIDANCE	**6.72***	0.93	1.01	1.18	1.04	**1.18**	1.04	1.14*	1.38*	1.33*
NEGATIVE AFFECT	**3.24**	**2.10***	**2.83***	1.36	**2.85**	**1.65**	**1.66**	**2.03**	**3.03**	**3.54**
ANHEDONIA	**0.16***	1.10	0.49*	1.10	0.40*	**0.41***	0.70	1.11	**0.24**	**0.23**
DYSPHORIC AROUSAL	**88.21***	1.52*	**3.52***	0.76	**2.48**	**3.45***	1.39	1.60*	**6.00***	**6.08***
ANXIOUS AROUSAL	1.74*	**0.59***	**0.55***	1.36	0.79	0.73*	1.06	1.17	0.61	0.55*
Externalizing	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.13***	0.03***	0.03***
INTRUSIONS	**0.49***	1.00	0.95	1.04	**1.32**	1.04	1.04	**0.82**	1.08	1.12
AVOIDANCE	**6.93***	0.96	1.04	1.19*	1.05	1.07	0.98	1.05	1.20	1.15
NUMBING	0.52*	**4.22***	**2.11***	1.74*	1.16	**0.24***	**0.59**	1.14	**0.25***	**0.27***

Table 26 continued

Externalizing	PTSD	MDD	GAD	Phobia	Panic	AUD	NUD	BPD	CD	ASPD
EXTERNALIZING	**3.06*****	**0.51*****	0.75	0.74	1.06	**5.64*****	**2.65*****	**2.98*****	**7.07*****	**7.17*****
DYSPHORIC AROUSAL	**8.99*****	**1.47*****	**1.93*****	0.87	1.27	0.92	**0.70*****	**0.72*****	0.78	0.74
ANXIOUS AROUSAL	**3.96*****	**0.67*****	0.81*	**1.41****	1.25*	1.09	**1.35*****	**1.50*****	1.30	1.24
Hybrid	**PTSD**	**MDD**	**GAD**	**Phobia**	**Panic**	**AUD**	**NUD**	**BPD**	**CD**	**ASPD**
(Intercept)	0.00***	0.30***	0.08***	0.07***	0.05***	0.48***	0.44***	0.13***	0.03***	0.03***
INTRUSIONS	**0.40*****	0.96	0.86	1.02	1.19	0.98	1.00	**0.80****	0.97	1.00
AVOIDANCE	**6.52*****	0.97	1.03	1.20*	1.03	1.04	0.97	1.05	1.15	1.10
NEGATIVE AFFECT	2.50*	**2.45*****	**2.95*****	1.45	**2.56****	0.89	1.16	1.31	1.34	1.52
ANHEDONIA	**0.34****	1.59*	0.76	1.16	0.51*	**0.33*****	**0.55****	0.93	**0.24*****	**0.23*****
EXTERNALIZING	**2.96*****	**0.56*****	0.83	0.76	1.17	**5.45*****	**2.71*****	**2.97*****	**7.17*****	**7.35*****
DYSPHORIC AROUSAL	**11.55*****	**1.63*****	**2.46*****	0.93	**1.66****	0.99	0.77*	0.75*	0.94	0.92
ANXIOUS AROUSAL	**2.47*****	**0.61*****	**0.60****	1.33	0.88	0.91	1.17	1.39*	0.94	0.86

Note. Estimates are odds ratios. CFA = Confirmatory Factor Analysis. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. PTSD = Post-Traumatic Stress Disorder. MDD = Major Depressive Disorder. GAD = Generalized Anxiety Disorder. AUD = Alcohol Use Disorder. BPD = Borderline Personality Disorder. CD = Conduct Disorder. ASPD = Antisocial Personality Disorder. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

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

Table 27. Correlations for Drinking and CFA Factors

DSM-5	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
INTRUSIONS	0.001	-0.012	0.001	-0.003	-0.006
AVOIDANCE	0.003	-0.009	0.002	-0.002	-0.004
COGMOOD	0.004	-0.009	0.003	0.000	-0.003
HYPERAROUSAL	0.006	-0.009	0.005	0.001	-0.002
ICD-11	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
INTRUSIONS	0.003	-0.001	0.002	-0.005	0.001
AVOIDANCE	0.003	-0.004	0.002	0.002	-0.005
HYPERAROUSAL	0.005	-0.004	0.003	-0.003	0.004
Dysphoria	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
INTRUSIONS	0.000	-0.012	0.000	-0.003	-0.006
AVOIDANCE	0.003	-0.008	0.003	-0.001	-0.003
DYSPHORIA	0.004	-0.009	0.004	0.000	-0.002
HYPERAROUSAL	0.007	-0.009	0.006	0.002	-0.001

Table 27 continued

Dysphoric Arousal	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
INTRUSIONS	0.000	-0.012	0.000	-0.003	-0.007
AVOIDANCE	0.003	-0.009	0.002	-0.002	-0.004
DYSPHORIA	0.004	-0.010	0.003	0.000	-0.003
DYSPHORIC AROUSAL	0.006	-0.009	0.005	0.002	-0.002
ANXIOUS AROUSAL	0.007	-0.009	0.007	0.002	-0.001
Anhedonia	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
INTRUSIONS	0.000	-0.012	0.000	-0.004	-0.006
AVOIDANCE	0.003	-0.009	0.002	-0.002	-0.004
NEGATIVE AFFECT	0.004	-0.009	0.004	-0.001	-0.002
ANHEDONIA	0.003	-0.010	0.002	0.000	-0.003
DYSPHORIC AROUSAL	0.005	-0.010	0.005	0.002	-0.002
ANXIOUS AROUSAL	0.008	-0.009	0.007	0.002	0.000
Externalizing	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
INTRUSIONS	0.000	-0.012	0.000	-0.003	-0.006
AVOIDANCE	0.003	-0.009	0.002	-0.002	-0.004

Table 27 continued

Externalizing	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
NUMBING	0.004	-0.009	0.003	0.000	-0.002
EXTERNALIZING	0.005	-0.008	0.005	0.001	-0.001
DYSPHORIC AROUSAL	0.006	-0.009	0.005	0.002	-0.001
ANXIOUS AROUSAL	0.007	-0.010	0.007	0.002	0.000
Hybrid	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
INTRUSIONS	0.000	-0.012	0.000	-0.003	-0.006
AVOIDANCE	0.003	-0.009	0.002	-0.002	-0.004
NEGATIVE AFFECT	0.004	-0.009	0.004	-0.001	-0.002
ANHEDONIA	0.003	-0.010	0.003	0.000	-0.003
EXTERNALIZING	0.005	-0.008	0.005	0.001	-0.002
DYSPHORIC AROUSAL	0.006	-0.010	0.005	0.002	-0.002
ANXIOUS AROUSAL	0.008	-0.009	0.007	0.002	0.000

Note. CFA = Confirmatory Factor Analysis. MAXDRINKS = Maximum number of drinks. DRINKFREQ = Frequency of drinking. USUALAMT = Usual number of drinks on an occasion. BINGE = Binging frequency (> 4 drinks for women, >5 drinks in a day for men). INTOX = Frequency of intoxication. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

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

Table 28. Regression Results for Drinking and CFA Factors

DSM-5	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
(Intercept)	1.99***	5.80***	-1.50***	0.84***	0.34***
INTRUSIONS	**-0.31****	-0.21	**-0.22****	-0.13*	-0.08*
AVOIDANCE	0.18	0.15	0.13	0.06	0.04
COGMOOD	**-0.82****	-0.26	**-0.66****	-0.30*	-0.14
HYPERAROUSAL	**0.96*****	0.26	**0.75*****	0.37*	0.18*
ICD-11	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	0.00	0.01	0.00	-0.01	0.00
AVOIDANCE	0.00	-0.02	0.00	0.01	-0.01
HYPERAROUSAL	0.02	-0.01	0.01	-0.01	0.01
Dysphoria	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	-0.20*	-0.17	-0.13	-0.09	-0.06*

Table 28 continued

Dysphoria	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
AVOIDANCE	0.07	0.11	0.04	0.01	0.02
DYSPHORIA	-0.17	0.04	-0.15	-0.04	-0.03
HYPERAROUSAL	0.32*	-0.02	0.25*	0.12	0.07
Dysphoric Arousal	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	**-0.31****	-0.23*	**-0.22****	-0.14*	-0.08*
AVOIDANCE	0.19	0.19	0.14	0.06	0.04
DYSPHORIA	**-0.75****	-0.36	**-0.62****	-0.29*	-0.13
DYSPHORIC AROUSAL	0.70*	0.42	0.55*	0.30	0.12
ANXIOUS AROUSAL	0.19	-0.07	0.16	0.06	0.05
Anhedonia	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	**-0.38****	-0.33*	**-0.27****	-0.12	**-0.10****

Table 28 continued

Anhedonia	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
AVOIDANCE	0.17	0.17	0.12	0.06	0.04
NEGATIVE AFFECT	0.27	0.56	0.15	-0.21	0.12
ANHEDONIA	-0.98*	-0.89	-0.73*	-0.06	-0.25
DYSPHORIC AROUSAL	0.98*	0.81	0.75*	0.23	0.21
ANXIOUS AROUSAL	-0.06	-0.39	-0.02	0.10	-0.02
Externalizing	**MAXDRINKS**	**DRINKFREQ**	**USUALAMT**	**BINGE**	**INTOX**
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	-0.23*	-0.18	-0.14	-0.11	-0.07*
AVOIDANCE	0.16	0.16	0.11	0.05	0.03
NUMBING	-0.88*	-0.49	**-0.79****	-0.26	-0.17
EXTERNALIZING	0.46	0.35	0.47*	0.10	0.09
DYSPHORIC AROUSAL	0.27	0.16	0.18	0.15	0.05
ANXIOUS AROUSAL	0.25	-0.04	0.20	0.08	0.06

Table 28 continued

Hybrid	MAXDRINKS	DRINKFREQ	USUALAMT	BINGE	INTOX
(Intercept)	1.99***	5.80***	1.50***	0.84***	0.34***
INTRUSIONS	-0.29*	-0.25*	-0.18*	-0.10	-0.08*
AVOIDANCE	0.14	0.15	0.10	0.05	0.03
NEGATIVE AFFECT	0.14	0.42	0.02	-0.21	0.09
ANHEDONIA	-0.88*	-0.79	-0.70*	-0.03	-0.23
EXTERNALIZING	0.46	0.39	0.46*	0.07	0.10
DYSPHORIC AROUSAL	0.41	0.33	0.27	0.11	0.09
ANXIOUS AROUSAL	0.04	-0.29	0.05	0.11	0.00

Note. CFA = Confirmatory Factor Analysis. MAXDRINKS = Maximum number of drinks on an occasion. DRINKFREQ = Frequency of drinking. USUALAMT = Usual number of drinks on an occasion. BINGE = Binging frequency (> 4 drinks for women, >5 drinks in a day for men). INTOX = Frequency of drinking to intoxication. DSM-5 = Diagnostic and Statistical Manual, 5th Edition. ICD-11 = International Classification of Diseases, 11th Revision.

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

Factor Inter-Correlations

CFA factors correlated highly both within and across models. Within each model, factor correlations all exceeded 0.9 (see Table 10 through Table 16). Except for the ICD-11 factors, candidate CFA models' factors correlated with all DSM–5 factors at 0.9 or higher (see Table 18 through Table 22). ICD-11 factors correlated with DSM–5 factors at 0.8 or higher (see Table 17).

For CFA models including Anhedonia, Numbing, and/or Negative Affect factors, those factors correlated with DSM–5's Cognitive/Mood symptom cluster at 0.995 or higher (see Table 20, Table 21, and Table 22). DSM–5's Cognitive/Mood factor nearly perfectly correlated with the Dysphoria model's Dysphoria factor ($r = 0.999$). Each other correlation between the Dysphoria and DSM–5 models' comparable factors (e.g. DSM–5 model's Intrusions factor and Dysphoria model's Intrusions factor) was 0.92 or higher (see Table 18).

In CFA models, Anxious Arousal and Dysphoric Arousal's correlations with each other in the candidate models ranged from 0.97 to 0.98. Across models with Anxious Arousal and Dysphoric Arousal factors, those factors correlated with DSM–5 Hyperarousal at 0.986 or higher. In the Anhedonia and Hybrid models, which split DSM–5's Cognitive/Mood factor into Anhedonia and Negative Affect factors, those factors correlated with each other at 0.99. Anhedonia correlated with DSM–5's Cognitive/Mood factor at 0.995 in the Hybrid model and 0.996 in the Anhedonia model. Anhedonia correlated with DSM–5's Cognitive/Mood factor at 0.997 in both models. The Externalizing Behaviors model's Numbing factor also correlated highly with Hybrid and Anhedonia model factors of Negative Affect ($r = 0.997$) and Anhedonia ($r = 0.996$).

Associations With External Correlates

CFA models with higher number of factors tended to explain the most variance in life diagnoses as well as SF-12 outcomes, while the ICD-11 CFA factors explained the least variance (see table 6). The ICD-11 explained 50% of variance in life PTSD, and other models accounted for 69% to 70% of the variance. While higher-factor solutions explained 8% to 9% of the variance in major depressive disorder, the ICD-11 explained 7%. The ICD-11 explained 9% and 10% of variance in life GAD and panic disorder, respectively, while other models explained 11% to 12% of the variance in those disorders. A relatively higher percentage of variance (2.5% to 3.2%) in life nicotine and alcohol use disorder (AUD) was explained by models other than the ICD-11, which

accounted for 1.7% to 2.2% of variance. The ICD-11 explained 15% of the variance in BPD while other models explained 18% to 19%. ICD-11 factors explained 6.3% and 6.5% of the variance in conduct disorder and ASPD, respectively, while other models' factors accounted for 8.3% to 9.4% and 8.6% to 9.7%, respectively.

Regression analyses with candidate models' factors as predictors explained similar amounts of variance in SF-12 outcomes, with the ICD-11 model tending to explain less variance (see Table 5). While other models explained 5.7% to 5.8% of variance in calm/peaceful feelings, the ICD-11 models' factor explained 4.8%. The ICD-11 model explained 4.5% of variance in reported carelessness while other models explained 4.9% to 5%. Models other than the ICD-11 explained 6.6% to 6.7% of reported lower day-to-day accomplishment while the ICD-11 explained 5.8%. The ICD-11 model explained 8.6% of the variance in down/depressed feelings while other models explained 9.7% to 9.8% of the variance. None of the models explained more the 0.1% of the variance in drinking frequency, intoxication frequency, usual number of drinks, or maximum number of drinks.

SF-12

CFA model correlations with SF-12 variables ranged from 0.16 to 0.31 in magnitude (see Table 23). All CFA model factor correlations with SF-12 outcomes were in expected directions (i.e. negative for calm/peaceful feelings, positive for depressed, less accomplished, and less careful feelings/behavior). Correlations within models differed across factors and outcomes by 0.102 or less.

Correlations between ICD-11 factors and SF-12 Less Careful ranged from 0.16 to 0.19 and ranged from 0.21 to 0.22 for other models' factors. Non-ICD-11 models also shared the same ranges of correlations between their factors and SF-12 Depressed (factor correlations from 0.28 to 0.31), Less Accomplished (0.24 to 0.26), and Less Careful (0.21 to 0.22). In the ICD-11 model, correlations with SF-12 Depressed ranged from 0.21 to 0.26, Less Accomplished ranged from 0.18 to 0.21, and Less Careful ranged from 0.16 to 0.18.

ICD-11 CFA factors showed consistent but small associations with SF-12 variables. Intrusions and Avoidance showed similar magnitudes of prediction with each other and across different outcomes ($B = 0.07$ to 0.1, $p < 0.001$). The associations of ICD-11 Avoidance with SF-12 down/depressed ($B = 0.17$, $p < 0.001$), less accomplished ($B = 0.15$, $p < 0.001$), less careful

($B = 0.12$, $p < 0.001$), and less calm/peaceful ($B = -0.13$, $p < 0.001$) were larger than those of other ICD-11 factors.

The Cognitive/Mood factor in the DSM–5 model was associated with feeling more depressed ($B = 0.32$, $p < 0.001$) and less accomplished ($B = 0.20$, $p < 0.001$). The Dysphoria model's Dysphoria factor was also associated with feeling more depressed ($B = 0.45$, $p < 0.001$) and less accomplished ($B = 0.39$, $p < 0.001$), and it was also associated with being less careful in daily activities ($B = 0.24$, $p < 0.001$). The Dysphoric Arousal model's Dysphoria factor and the Externalizing model's Numbing factor were only associated with feeling more depressed ($B = 0.22$, $p < 0.001$; $B = 0.22$, $p < 0.01$).

Negative Affect and Anhedonia factors in the Anhedonia and Externalizing models did not yield any significant effects for SF-12 variables. Externalizing factors in the Hybrid and Externalizing Behaviors models did not significantly predict any SF-12 outcomes. Other than in the ICD-11 model, Intrusions and Avoidance did not significantly associate with SF-12 outcomes. In the Dysphoric Arousal and Externalizing models, Anxious Arousal showed *negative* associations with feeling down/depressed and less accomplished ($B = -0.10$ and -0.11, $p < 0.01$), and in the Dysphoric Arousal model, it also predicted *more* calm/peaceful feelings ($B = 0.10$, $p < 0.01$). In the Anhedonia model, Anxious Arousal only predicted feeling more calm/peaceful ($B = 0.17$, $p < 0.01$), and in the Hybrid model, demonstrated no significant associations.

Lifetime Diagnoses

Models with four or more factors showed higher correlations with lifetime diagnoses than did the ICD-11 factors (see Table 25). These models shared similar ranges of factor correlations with life diagnoses of PTSD ($r = 0.53$ to 0.58 or 0.59), MDD ($r = 0.28$ to 0.30 or 0.31), GAD ($r = 0.25$ to 0.27 or 0.28), specific phobia ($r = 0.17$ to 0.18), and panic disorder ($r = 0.23$ to 0.24 or 0.25). Non-ICD models also shared similar ranges of factor correlations across substance use disorders (nicotine and alcohol), ASPD, and conduct disorder (with minimum correlations between 0.15 and 0.17 and maximum correlations ranging from 0.17 to 0.19 across models and outcomes). Correlations of non-ICD factors with BPD ($r = 0.35$ to 0.40 or 0.41) were greater than those with ASPD.

ICD-11 model factor correlations with life diagnosis of PTSD ranged from 0.44 to 0.47, with MDD, from 0.20 to 0.24, with BPD, from 0.29 to 0.32, with GAD, from 0.19 to 0.22, with

specific phobia, from 0.14 to 0.14, and with panic disorder, from 0.18 to 0.19. Correlations of ICD-11 factors with substance use disorders (nicotine and alcohol), ASPD, and conduct disorder ranged from 0.11 to 0.14. Like with other models, ICD-11 factors correlated more highly with BPD (r = 0.29 to 0.32) than with ASPD.

In regression analyses, with some exceptions, most CFA factors predicted higher odds of a lifetime PTSD diagnosis (see Table 26). Notably, however, in every candidate model except the ICD-11, higher levels on the Intrusions factor predicted *lower* odds of life PTSD diagnosis (OR = 0.35 to 0.59). Moreover, the DSM–5 Cognitive/Mood factor (OR = 0.21, $p < 0.001$, the Dysphoric Arousal model's Dysphoria factor (OR = 0.38, $p < 0.001$), and the Anhedonia factor in both the Anhedonia model (OR = 0.16, $p < 0.001$) and the Hybrid model (OR = 0.34, $p <$0.01) predicted *lower* odds of lifetime PTSD (see Table 26). All factors in the ICD-11 model predicted higher odds of all disorders included in the analyses.

Mood and Anxiety Disorders

ICD-11 factors (Intrusions, Avoidance, and Hyperarousal) predicted higher odds of MDD (OR = 1.20, 1.29, and 1.37, $p < 0.001$) and GAD (OR = 1.27, 1.37, 1.45, $p < 0.001$). Higher odds of generalized anxiety disorder (GAD) were predicted by the Dysphoria factor in the Dysphoria model (OR = 2.91, $p < 0.001$). The Dysphoric Arousal factor predicted higher odds of GAD in the Dysphoric Arousal, Anhedonia, Externalizing Behaviors, and Hybrid models (OR = 2.07, 3.52, 1.93, and 2.46, respectively, $p < 0.001$). Anxious Arousal predicted lower odds of GAD in the Anhedonia and Hybrid models (OR = 0.59, $p < 0.001$ and OR = 0.61, $p < 0.01$) but did not significantly predict GAD in the Dysphoric Arousal or Externalizing Behaviors models.

Higher odds of major depressive disorder (MDD) were predicted only by the Dysphoria factor in the Dysphoria (OR = 3.07, $p < 0.001$) and Dysphoric Arousal models (OR = 2.25, $p <$ 0.001), and only by Negative Affect in the Anhedonia model (OR = 2.10, $p < 0.001$). In addition to the Hybrid model's Negative Affect factor (OR = 2.45, $p < 0.001$), the Hybrid model's Dysphoric Arousal (OR = 1.63, $p < 0.001$) predicted higher odds of MDD (OR = 1.63, $p <$ 0.001). In addition to the Externalizing Behavior model's Numbing factor (OR = 4.22, $p <$ 0.001), Dysphoric Arousal (OR = 1.47, $p < 0.001$) predicted higher odds of MDD (OR = 1.63, $p < 0.001$). Both Intrusions and Cognitive/Mood in the DSM–5 model predicted higher odds of MDD (OR = 1.16, $p < 0.01$ and OR = 2.80, $p < 0.001$). Lower odds of MDD were predicted by

Hyperarousal in the Dysphoria model ($OR = 0.65$, $p < 0.001$) and by Anxious Arousal in the Dysphoric Arousal, Anhedonia, Externalizing, and Hybrid models ($OR = 0.69$, 0.59, 0.67, and 0.61, $p < 0.001$).

Fear and Panic Disorders

ICD-11 factors (Intrusions, Avoidance, and Hyperarousal) predicted higher odds of specific phobia disorder (OR = 1.26, 1.25, and 1.27, p < 0.001) and panic disorder ($OR = 1.35$, 1.46, 1.38, $p < 0.001$). Higher odds of panic disorder were predicted by the Dysphoria factor in the Dysphoria model ($OR = 1.53$, $p < 0.001$). Both Negative Affect and Dysphoric Arousal predicted higher odds of panic disorder in the Anhedonia ($OR = 2.85$ and 2.48, $p < 0.01$) and Hybrid ($OR = 2.56$ and 1.66, $p < 0.01$) models. Anxious Arousal was the only predictor of specific phobia in the Externalizing Behaviors model ($OR = 1.41$, $p < 0.01$). The Intrusions factors in the DSM–5 ($OR = 1.30$, $p < 0.01$), Dysphoria ($OR = 1.35$, $p < 0.001$), and Dysphoric Arousal ($OR = 1.30$, $p < 0.01$) models also were associated with higher odds of panic disorder.

Anxious Arousal was the only significant predictor of specific phobia in the Dysphoric Arousal ($OR = 1.44$, $p < 0.01$) and Externalizing Behaviors ($OR = 1.41$, $p < 0.01$) models. While Avoidance was the only significant phobia predictor in the DSM–5 model ($OR = 1.26$, $p < 0.01$), both Avoidance ($OR = 1.26$, $p < 0.01$) and Hyperarousal ($OR = 1.37$, $p < 0.01$) in the Dysphoria model predicted specific phobia. The Anhedonia and Hybrid models yielded no significant predictions of specific phobia.

Personality Disorders

The Hyperarousal factor in DSM–5 and ICD-11 models predicted higher odds of CD (DSM–5 $OR = 3.43$, $p < 0.001$; ICD-11 $OR = 1.36$, $p < 0.001$), ASPD (DSM–5 $OR = 3.07$, $p < 0.001$; ICD-11 $OR = 1.38$, $p < 0.001$), and BPD (DSM–5 $OR = 1.50$, $p < 0.01$; ICD-11 $OR = 1.18$, $p < 0.001$). In the Dysphoria model, Hyperarousal predicted BPD ($OR = 1.23$, $p < 0.01$), but not CD or ASPD.

The Dysphoria and Hyperarousal factors in the Dysphoria model predicted higher odds of BPD ($OR = 1.35$, $p < 0.001$ and $OR = 1.23$, $p < 0.01$, respectively) while only the Dysphoria factor predicted CD ($OR = 2.05$, $p < 0.001$) and ASPD ($OR = 2.22$, $p < 0.001$). In the Dysphoric

Arousal model, the Dysphoric Arousal factor (rather than Dysphoria) predicted CD ($OR = 3.14$, $p < 0.001$) and ASPD ($OR = 2.90$, $p < 0.002$), and only Anxious Arousal predicted higher odds of BPD ($OR = 1.28$, $p < 0.001$). The Anhedonia model's Dysphoric, but not Anxious, Arousal factor predicted higher odds of CD (OR - 6.00, $p < 0.001$) and ASPD ($OR = 6.08$, $p < 0.001$). Neither Anxious nor Dysphoric Arousal predicted BPD in the Anhedonia model.

In the Externalizing Behaviors model and Hybrid model, neither Dysphoric Arousal nor Anxious Arousal predicted higher odds of CD or ASPD. Dysphoric Arousal in the Externalizing Behaviors model was associated with lower odds of BPD ($OR = 0.70$, $p < 0.001$), and Anxious Arousal, with higher odds of BPD ($OR = 1.35$, $p < 0.001$). Neither Anxious nor Dysphoric Arousal in the Hybrid Model significantly predicted BPD.

The Externalizing factor in the Externalizing Behaviors model and Hybrid model predicted higher odds of personality pathology. The Externalizing factor in the Externalizing Behaviors model and the Hybrid model predicted higher odds of conduct disorder (CD) and antisocial personality disorder (ASPD) in regression analyses ($OR = 7.17$ and $OR = 7.35$, $p < 0.001$) and showed a significant, albeit smaller ($OR = 2.65$ to 2.71, $p < 0.001$), effect for borderline personality disorder (BPD).

While the DSM–5's Cognitive/Mood factor did not predict odds of lifetime BPD, CD, or ASPD diagnosis, the Dysphoria model's Dysphoria factor predicted higher odds of BPD, CD, and ASPD (OR - 1.35, 2.05, and 2.22, respectively, $p < 0.001$). The Dysphoria factor in the Dysphoric Arousal model did not predict BPD, CD, or ASPD.

The Hybrid model's Anhedonia factor and the Externalizing Behavior model's Numbing factor predicted lower odds of BPD ($OR = 0.55$ and 0.59, respectively, $p < 0.01$), CD ($OR = 0.24$ and 0.25, respectively, $p < 0.001$), and ASPD ($OR = 0.23$ and 0.27, respectively, $p < 0.001$). The Anhedonia model's Anhedonia factor also predicted lower odds of ASPD and CD ($OR = 0.23$ and 0.24, respectively, $p < 0.01$) but did not significantly associate with BPD. The Anhedonia's Negative Affect factor predicted higher odds of BPD, CD, and ASPD ($OR = 1.66$, 3.03, and 3.54, respectively, $p < 0.01$), but the Negative Affect factor in the Hybrid model did not associate with BPD, CD, or ASPD.

The Intrusions factor predicted lower ODDS of BPD in the DSM–5 model and Dysphoria model ($OR = 0.86$ and 0.87, $p < 0.01$) as well as in the Anhedonia model ($OR = 0.93$, $p < 0.001$). Only in the Anhedonia model did Intrusions predict lower odds of CD and ASPD ($OR = 0.62$, p

< 0.001 and $OR = 0.63$, $p < 0.01$, respectively). Higher odds of BPD, CD, and ASPD were predicted by ICD-11 Intrusions ($OR = 1.11, 1.33, 1.33$, $p < 0.001$) and by ICD-11 Avoidance ($OR = 1.16, 1.29, 1.29$, $p < 0.001$). The Dysphoric Arousal model's Avoidance factor predicted higher odds of CD ($OR = 1.40$, $p < 0.01$) but not ASPD or BPD. Intrusions and Avoidance factors in the Externalizing Behaviors and Hybrid models did not significantly associate with BPD, CD, or ASPD, nor did the Intrusions factor in the Dysphoric Arousal model nor the Avoidance factor in the DSM–5, Dysphoria, and Anhedonia models.

Substance Use Disorders

Intrusions predicted higher odds of AUD in the DSM–5 ($OR = 1.30$, $p < 0.01$), ICD-11 ($OR = 1.35$, $p < 0.001$), Dysphoria ($OR = 1.35$, $p < 0.001$), Dysphoric Arousal (OR - 1.30, $p < 0.01$), and Externalizing Behaviors ($OR = 1.32$, $p < 0.01$), but not in the Anhedonia or Hybrid models. Avoidance predicted higher odds of NUD in the ICD-11 (OR - 1.13, $p < 0.001$), Dysphoric Arousal ($OR = 1.20$, $p < 0.01$), and Anhedonia ($OR = 1.18$, $p < 0.01$) models. Only in the ICD-11 model did Avoidance predict lifetime AUD ($OR = 1.46$, $p < 0.001$). Avoidance did not significantly predict odds of NUD or AUD in the DSM–5, Dysphoria, Externalizing Behaviors, and Hybrid models.

Hyperarousal in the DSM–5 and ICD-11 models, but not in the Dysphoria model, predicted higher odds of NUD (DSM–5 $OR = 2.35$, $p < 0.001$; ICD-11 $OR = 1.19$, $p < 0.001$) and AUD (DSM–5 $OR = 1.98$, $p < 0.01$; ICD-11 $OR = 1.38$, $p < 0.001$).

Anxious Arousal did not significantly associate with odds of AUD or NUD in any models containing that factor (i.e. Dysphoric Arousal, Anhedonia, Externalizing Behaviors, and Hybrid models). The Anhedonia model's Dysphoric Arousal factor was associated with higher odds of both AUD ($OR = 2.48$, $p < 0.01$) and NUD ($OR = 3.45$, $p < 0.001$). Dysphoric Arousal predicted higher odds of AUD, but not NUD, in the Hybrid model ($OR = 1.66$, $p < 0.01$) and predicted higher odds of NUD, but not AUD, in the Dysphoric Arousal model ($OR == 2.48$, $p < 0.001$). Dysphoric Arousal predicted neither AUD nor NUD in the Externalizing Behaviors model.

In the Hybrid model, Negative Affect and Dysphoric Arousal predicted higher odds of AUD ($OR = 2.56$ and 1.66, respectively, $p < 0.01$), but in the Externalizing Behaviors model, only Intrusions predicted AUD. In both the Externalizing Behaviors model and the Hybrid model, the Externalizing factor predicted higher odds of NUD ($OR = 5.64$ and 5.45, respectively, $p < 0.001$).

Lower odds of NUD (but not AUD) were predicted by The Hybrid model's Anhedonia factor (*OR* = 0.33, $p < 0.001$) and the Externalizing Behaviors model's Numbing factor (*OR* = 0.24, $p < 0.001$).

Alcohol Use

Raw correlations with drinking outcomes were low in magnitude and often negative. Correlations in CFA models ranged from -0.012 to 0.008 in CFA models (see Table 27).

The seven-factor Hybrid CFA model, four-factor Dysphoria, and three-factor ICD-11 CFA models did not significantly ($p < .01$) predict any drinking outcomes (see Table 28). The DSM–5 model had *negative* associations between Intrusions and maximum number of drinks and usual number of drinks (*B* = -0.31 and -0.22, respectively, $p < 0.01$). Maximum and usual number of drinks were also predicted by the DSM–5 Cognitive/Mood factor (*B* = -0.82 and -0.66, $p < 0.01$). The Dysphoric Arousal model displayed the same pattern, with negative associations between Intrusions and maximum number of drinks and usual number of drinks (*B* = -0.31 and -0.22, respectively, $p < 0.01$) and between Dysphoria and the same outcomes (*B* = -0.75 and -0.62, $p < 0.01$). The six-factor Externalizing model's Numbing factor predicted fewer typical number of drinks (*B* = -0.79, $p < 0.01$). The Anhedonia model's Intrusions factor negatively associated with maximum number of drinks (*B* = -0.38, $p < 0.01$), usual number of drinks (*B* = -0.27, $p < 0.01$), and frequency of intoxication (-0.10, $p < 0.01$).

DISCUSSION

Models with six or more factors tended to yield better fit statistics.[1] The Hybrid model fit the data best, followed by the six-factor Anhedonia model. The Externalizing Behaviors model had the third best fit, followed by the Dysphoric Arousal model. The four-factor DSM-5 and Dysphoria models demonstrated the second worst and worst fit. CFA models with higher number of factors tended to explain the most variance in life diagnoses as well as SF-12 outcomes, while the ICD–11 CFA factors explained the least variance.

Results from validation analyses, however, cast doubt on the utility of one model over any other in terms of prediction. Models explained the most variance in PTSD, as expected. R-Squared estimates almost all fell within one to two percentage points of each other for other diagnostic and SF-12 outcomes, suggesting similar predictive utility for comorbidities and psychosocial functioning. In particular, models other than the ICD–11 tended to explain amounts of variance that fell above the ICD–11 but within 0.1% of each other.

Thus, while these results yielded evidence that four and higher factor solutions were (at least quantitatively) preferable to the ICD–11 model in terms of predictive utility, the study did not find evidence supporting any one of those models over the others. Moreover, the relatively low number of indicators in the ICD-11 model compared to the other models means that, simply in mathematical terms, it has less of an opportunity to explain variance. Arguably, this fact and these results highlight the benefit of including more than six indicators in the diagnosis. Nevertheless, it is striking that the ICD-11 explained as much variance as it did with only six indicators. To the extent that one values the simplicity of clinical models, the ICD-11's performance relative to its parsimony could be considered a point in its favor.

The high intercorrelations among factors calls into question the distinguishability of these constructs. Factors correlated highly with each other within models as well as with DSM-5 model factors. Mood-related factors (i.e. Anhedonia, Numbing, Negative Affect, and Dysphoria), correlated nearly perfectly with DSM-5's Cognitive/Mood symptom cluster at ($\geq$ 0.995). Moreover, the 0.99 correlation between Anhedonia and Negative Affect factors along with their lack of distinguishable or theoretically consistent associations suggests that splitting the DSM-5's

[1]The ICD-11 could not be compared based on fit indices as it contained different indicators.

Cognitive/Mood cluster in this way sacrifices parsimony without adding predictive utility. Anxious Arousal and Dysphoric Arousal CFA also shared high factor correlations with each other (0.97 to 0.98) and with DSM-5 Hyperarousal at ($\geq$0.986), providing further evidence that collapsing the two into one factor may be more parsimonious.[2]

In summary, correlations and regression analyses often did not yield expected effects or suggested associations counter to those anticipated by theory. Moreover, factors did not differentially associate with different outcomes: Where effects could be found in regression analyses, they were not consistent or substantial enough to support one candidate model over any other. Moreover, in models that "split" factors from lower-factor solutions, those factors did not consistently associate with expected outcomes, let alone differentially predict outcomes most salient to the constructs among which the factors were create to distinguish. Nevertheless, the Externalizing Behaviors model, which had separate Dysphoric and Anxious Arousal factors and included an Externalizing factor (though did not split Negative Affect and Anhedonia), showed some evidence of incremental utility above and beyond the first (Hybrid) and second (Anhedonia) best-fitting models.

Dysphoric and Anxious Arousal Factor

Results from structural and validation analyses provided little support for splitting Hyperarousal into Dysphoric and Anxious Arousal in most cases. Dysphoric Arousal, Anxious Arousal, and Hyperarousal displayed high intercorrelations among each other within and across models as well as yielded similar patterns of associations with external outcomes (at the level of raw correlations). Consistent with past studies, (e.g. Armour et al. (2012)), Dysphoric and Anxious Arousal demonstrated high correlations with each other within each model (ranging from 0.97 to 0.98). All models containing both factors yielded correlations between them and DSM-5 Hyperarousal that ranged from 0.991 to 0.999.

While Anxious Arousal was meant to reflect panic and phobia and relate most closely to fear-based disorders, Dysphoric Arousal was intended to reflect relate to distress-based disorders and outcomes such as depression and anxiety. In all models that had separate Anxious and Dysphoric Arousal factors, the Dysphoric Arousal factor predicted higher odds of GAD; however,

[2]Further discussion of the (scant) evidence for the utility splitting various factors can be found below in this section.

Dysphoric Arousal only accounted for unique variance in MDD in the Externalizing Behaviors and Hybrid models.

Anxious Arousal predicted higher odds of lifetime specific phobia in the Dysphoric Arousal and Externalizing Behaviors models. Dysphoric Arousal predicted higher odds of MDD and GAD in the Externalizing Behaviors model and the Hybrid model but only predicted GAD in the Anhedonia and Dysphoric Arousal models. This pattern could suggest that the predictive utility of splitting Dysphoric and Anxious Arousal may depend on the inclusion of a separate Externalizing factor.

Dysphoric and Anxious Arousal thus did not consistently relate to external correlates of the constructs they were created to reflect. They did, however, demonstrate relatively better performance in models that created an Externalizing factor out of two symptoms formerly under Dysphoric Arousal.

Negative Affect and Anhedonia Factors

Negative Affect and Anhedonia, which reflect the Hybrid and Anhedonia models' splitting of DSM-5 Cognition/Mood Symptoms, correlated highly with each other highly and with external outcomes in nearly identical patterns. Anhedonia tended to predict lower odds of personality and substance use disorders; however, it did not predict higher odds of any disorders, including those to which it could be expected to relate (e.g. MDD).

This pattern of results could be interpreted as consistent with a conceptualization of Anhedonia as more closely relating to withdrawal, numbing, or inhibitory processes rather than provoking any particular active pathological response; however, Anhedonia also predicted lower odd of PTSD, which calls into question its inclusion as a separate latent indicator of PTSD. Negative Affect (but not Anhedonia) predicted life MDD and GAD. Negative Affect did not, however, account for unique variance in down/depressed feelings in the SF-12 in the Hybrid or Anhedonia models. Indeed, neither Anhedonia nor Negative Affect significantly associated with psychosocial outcomes in the SF-12 survey or with drinking behaviors in either model.

The Externalizing Factor

The two models that included the Externalizing factor differed in that the Hybrid model split the Externalizing Behaviors model's Numbing symptom cluster (a factor with the same content as

DSM-5 Cognitive/Mood cluster) into Negative Affect and Anhedonia. These models both demonstrated expected patterns of associations between the Externalizing factor and externalizing diagnoses (i.e. substance use and conduct/personality disorders). They also yielded some expected associations between Dysphoric Arousal and distress-based disorders.

Both the Externalizing Behavior and Hybrid models' Externalizing factor predicted higher odds of conduct and personality pathology (i.e. borderline and antisocial personality disorders and conduct disorder) as well as substance use (i.e. nicotine and alcohol use disorder) with similar magnitudes of association. It is, however, worth noting that the DSM-5's original Hyperarousal cluster also yielded those associations with externalizing disorders. Moreover, the Externalizing factor did not predict any psychosocial outcomes in the SF-12, nor did it predict drinking frequency or quantity. Nevertheless, both the Hybrid model's Anhedonia factor and the Externalizing model's Numbing factor predicted lower odds of substance use disorders, conduct disorder, and antisocial personality disorder, which could indicate the ability of these structures to account differentially for externalizing or antagonistic and internalizing or withdrawn responses.

The Externalizing Behaviors model's Numbing factor accounted for more unique variance in MDD than did the Hybrid and Anhedonia models, whose separate Anhedonia factor did not significantly predict any internalizing disorders. Moreover, the Externalizing Behaviors model's Numbing factor accounted for unique variance in MDD and GAD (with twice as strong of an effect for MDD) and in SF-12 down/depressed feelings while also predicting lower odds of externalizing disorders and lower typical quantity of drinking. The Externalizing model's Dysphoric Arousal factor also predicted down/depressed feelings as well as negatively associated with calm/peaceful feelings, while its Anxious Arousal factor predicted specific phobia.

Thus, in the Externalizing Behaviors model, Numbing related most strongly to outcomes that capture low positive affect (rather than anxious-depression or high negative affect), while its Dysphoric Arousal related to both these depression-related constructs. Moreover, the relationship of the Externalizing Behavior model's Anxious Arousal factor to a fear-based disorder (specific phobia) provided some evidence for its validity compared to the Hybrid and Anhedonia models. The Hybrid and Anhedonia models' Anxious Arousal factor did not correlate to any fear-based disorder and, in the Anhedonia and Dysphoric Arousal models, actually predicted higher levels of calm/peaceful feelings. These results provide evidence that the Externalizing Behaviors model, which does not split Negative Affect and Anhedonia, manages not only to account for externalizing comorbidities but

also to distinguish among mood-related outcomes with its Numbing, Dysphoric Arousal, and Anxious Arousal factors. Notably, the Externalizing Behaviors model's Numbing factor correlated with Hybrid and Anhedonia model factors of Negative Affect and Anhedonia at 0.996 or higher, providing further evidence for its parsimony.

Despite its superior comparative performance in those respects, however, the Externalizing Behaviors model also demonstrated several weaknesses. Its Anxious Arousal factor failed to associate with other expected outcomes (e.g. less calm/peaceful feelings, panic disorder). Moreover, the Externalizing Behaviors model's Externalizing factor did not predict any drinking or SF-12 psychosocial outcomes.

Indeed, all candidate models showed minimal associations with alcohol-related outcomes based on raw correlations as well as regression analyses. Models accounted for little variance in substance use diagnoses (1.7% to 2.8%) and drinking behaviors (0% to 0.1%). Factors from the two models which included an Externalizing factor (which one would expect to correlate to risky behaviors), did not yield any associations with frequency or quantity of drinking.

Other models performed similarly poorly in their characterization of alcohol use. The ICD–11, Dysphoria, and Hybrid models did not account for unique variance in any drinking outcomes. In other models, nearly all associations ran counter to theory. Intrusions predicted lower drinking quantity (i.e. usual and maximum amounts) in the DSM-5, Dysphoric Arousal, and Anhedonia models. DSM-5's Hyperarousal factor predicted higher usual and maximum amounts of drinking; however, its Cognition/Mood symptoms factor predicted lower usual and maximum drinking quantity. Thus, candidate models did not consistently or robustly associate with drinking outcomes in directions expected by theory.

CONCLUSION

Models with higher numbers of factors tended to demonstrate better fit; however, given these weaknesses in predictive utility and discriminability, it is important to avoid giving undue weight to minor improvement in indices of fit-to-data. The extremely high correlations among factors within and across models shows strong evidence that factors might be collapsed to yield more parsimonious and stable models. Moreover, beyond the evidence that there is no clear reason to choose one model over the other in terms of their predictive utility, many candidate models separately displayed unexpected or weak patterns of association. When factors cannot account for unique variance among external correlates in theoretically-justified patterns, it calls into question not just the comparative strengths of the models but also the absolute utility of any of these existing structures for assessment, research, and treatment.

Viewed in conjunction with the lack of distinguishable associations of different factors with distinct outcomes, high factor intercorrelations suggest that "splitting" symptoms to yield higher factor solutions may compromise parsimony more than contribute to predictive or descriptive utility. The Anxious and Dysphoric Arousal factors correlated highly with each other and with the DSM-5 Hyperarousal cluster, and they did not consistently associate more strongly with the expected distress- or fear-based disorders. With regard to splitting Negative Affect and Anhedonia, not only did the Hybrid and Anhedonia models' Anhedonia factor correlate nearly perfectly with factors lumping those symptoms, but also the factor did not significantly predict MDD or any other internalizing disorder.

In some respects, the Externalizing model did seem to perform better than other models in differentially accounting for fear and distress as well as externalizing outcomes; however, because the DSM-5's Hyperarousal cluster also associated with externalizing disorders, to the extent that the Externalizing factor does not provide incremental utility in externalizing associations (i.e. the main theoretical goal for its creation), it may be, to some degree, redundant.

Surprisingly, the Hybrid and Anhedonia models, which split Negative Affect and Anhedonia, demonstrated relative weakness in predicting and distinguishing among constructs under the internalizing spectrum. As would be expected, the Hybrid and Anhedonia models' Negative Affect factor strongly predicted MDD and GAD; however, the Externalizing Behavior model's Numbing factor also strongly predicted GAD and accounted for much more unique variance in MDD than did

the other models' Negative Affect and Anhedonia factors. Moreover, the Externalizing Behaviors model demonstrated an appreciably stronger relationship between its Numbing factor and MDD than between Numbing and GAD (as is consistent with theory), yielded relatively more expected associations between Anxious and Dysphoric Arousal and external correlates, and predicted psychosocial outcomes in the SF-12.

Thus, while both the Hybrid and Externalizing Behaviors models demonstrated distinguishable associations among internalizing and externalizing factors and diagnostic outcomes, the Externalizing Behaviors model more robustly predicted and more clearly discriminated among several internalizing outcomes. Taken along with the validation results, the high correlation between Numbing and the factors created by splitting it provides further evidence for the utility and parsimony of the Externalizing Behaviors model compared to the first (Hybrid) and second (Anhedonia) best-fitting models. Nevertheless, the Externalizing Behaviors model demonstrated some of the same weaknesses as the Hybrid model: While the Externalizing factor strongly and consistently predicted diagnoses falling under the externalizing spectrum, it did not predict associated behaviors such as drinking frequency or amount, lower accomplishment, or less careful behavior.

Indeed, a particularly striking weakness of all the candidate models was in their characterization of outcomes related to the externalizing spectrum other than life diagnoses. For instance, while some factors predicted higher odds of AUD, factors displayed negligible associations with drinking behaviors. Considering the high co-occurrence of substance use and other externalizing disorders and PTSD and the negative implications of these comorbidities for prognosis and treatment, the absence of a model of PTSD which accounts for differences in risky alcohol use is a major concern.

Further investigation of the reason underlying the inability of current structural models of PTSD to predict relevant outcomes consistently and robustly is therefore a clear priority. Identifying a model which maximizes discriminant and predictive utility will allow for more targeted research by highlighting profiles and/or clusters of PTSD symptoms which most strongly relate to outcomes of interest or which potentially reflect substantively meaningful subpopulations (e.g. PTSD subtypes, symptom profiles associated with certain comorbidities). These results may help identify theoretically interesting associative pathways at the structural level which have yet to be studied using longitudinal or experimental methods.

Limitations and Future Directions

It is important to note some limitations in this study's data set and design. For instance, it is possible that the use of continuous measures (as opposed to the binary, DSM-5 symptom-based indicators available in the archival NESARC dataset) could have facilitated more reliable and robust estimation of models and more informative validation analyses. Moreover, future studies that include an expanded set of psychosocial indicators are needed to provide evidence that these associations (or lack thereof) generalize to similar correlates as measured by different instruments. Nevertheless, the nationally representative nature of this sample mitigates these limitations and lends confidence to the generalizability of these results.

External factors also limited this study and, critically, may continue to limit PTSD research more broadly. An insufficient number of symptoms to support the estimation of additional factors or other measurement artefacts could limit the ability of these factors to associate with expected outcomes. Many factors in these models are measured by a small number of indicators. In higher-factor solutions especially, many factors are measured by only two symptoms. Indeed, the Avoidance factor is measured by only two indicators in each of the candidate models.

Moreover, the parallel wording of many of these items may also drive their correlation with each other, regardless of the extent to which some underlying construct drives a "true" association. For instance, the Avoidance factor is measured by indicators with parallel structure (listing different objects of avoidance) that are asked consecutively to each other in the AUDADIS-5 interview, and several Intrusions indicators contain similar wording (e.g. "distressing memories about the event", "distressing dreams about the event"). Other symptom clusters also contain indicators with closely parallel structure and/or wording.

Thus, though this study failed to find convincing empirical evidence of the utility of splitting certain factors, the inability of the factors as measured in these specific candidate models, given the current set of PTSD symptoms in the DSM-5, does not necessarily disprove the utility of distinguishing among the constructs the factors were created to represent. It is clearly possible (and arguably probable) that the factors as measured by these indicators do not reflect their intended underlying constructs. Whether it is preferable to develop a model which maximizes associations with other disorders to explain comorbidities, that minimizes those associations to reflect diagnostic uniqueness and specificity, or somewhere in-between remains an area of contention. In order to proceed more rigorously with such debates, it is critical to develop symptom clusters that

measure their intended underlying constructs and thus correlate with expected outcomes. In order to confront this challenge, it will be necessary to reevaluate the optimal breadth of indicators and to assess them in a psychometrically rigorous way (e.g. reverse coding, reducing parallel wording and structure). Further research is needed to identify better measurement instruments and novel candidate structures that might be incorporated into future diagnostic algorithms for clinical use.

Another area of future research could involve the inclusion of additional analytic approaches. While this study focused on factor analytic models, given the evidence of the dimensionality of other disorders (Kotov et al., 2017), categorical distinctions, such as dissociative and complex subtypes, have also been proposed (Armour et al., 2014; Burton et al., 2018; Powers et al., 2017; Tsai et al., 2015; Wolf et al., 2012) and incorporated into DSM-5 (American Psychiatric Association, 2013) and ICD–11 specifiers (World Health Organization, 2018). Others have explored bifactor models, which distinguish between general and specific factors (Byllesby et al., 2017; Law, Allan, Kolnogorova, & Stecker, 2019; Marshall et al., 2010) and factor mixture models (FMM), which model heterogeneity by estimating subtypes defined by factor scores (Chen et al., 2017; Palm, Strong, & MacPherson, 2009).

Establishing validated structural models could lay the groundwork for future longitudinal and experimental studies (a) by identifying reliable and valid models and by highlighting salient cross-sectional relationships whose underlying processes are worth investigating. Moreover, clarifying our understanding of processes underlying existing PTSD-related symptoms and impairment may aid the creation of more optimal sets of indicators, which in turn may facilitate the identification of novel structures.

LIST OF REFERENCES

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychological Association.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, DC: American Psychological Association. doi: 10.1176/appi.books.9780890425596.744053

Armour, C., Elhai, J. D., Richardson, D., Ractliffe, K., Wang, L., & Elklit, A. (2012). Assessing a five factor model of PTSD: Is dysphoric arousal a unique PTSD construct showing differential relationships with anxiety and depression? *Journal of Anxiety Disorders, 26*(3), 368-376. doi: 10.1016/j.janxdis.2011.12.002

Armour, C., Elklit, A., Lauterbach, D., & Elhai, J. D. (2014). The DSM-5 dissociative-PTSD subtype: Can levels of depression, anxiety, hostility, and sleeping difficulties differentiate between dissociative-PTSD and PTSD in rape and sexual assault victims? *Journal of Anxiety Disorders, 28* (4), 418-426. Retrieved from https://linkinghub.elsevier.com/retrieve/pii/S0887618514000024 doi: 10.1016/j.janxdis.2013.12.008

Armour, C., Mullerová, J., & Elhai, J. D. (2016). A systematic literature review of PTSD's latent structure in the Diagnostic and Statistical Manual of Mental Disorders: DSM-IV to DSM-5. *Clinical Psychological Review, 44*, 60-74. doi: 10.1016/j.cpr.2015.12.003

Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid anhedonia and externalizing behaviors model. *Journal of Psychiatric Research, 61*, 106-113. Retrieved from http://dx.doi.org/10.1016/j.jpsychires.2014.10.012. doi: 10.1016/j.jpsychires.2014.10.012

Burton, M. S., Feeny, N. C., Connell, A. M., & Zoellner, L. A. (2018). Exploring evidence of a dissociative subtype in PTSD: Baseline symptom structure, etiology, and treatment efficacy for those who dissociate. *Journal of Consulting and Clinical Psychology, 86*(5), 439-451. doi: 10.1037/ccp0000297

Byllesby, B. M., Elhai, J. D., Tamburrino, M., Fine, T. H., Cohen, G., Sampson, L., Shirley, E., Chan, P. K., Liberzon, I., Galea, S., & Calabrese, J. R. (2017). General distress is more important than PTSD's cognition and mood alterations factor in accounting for PTSD and depression's comorbidity. *Journal of Affective Disorders*, *211*, 118-123. Retrieved from http://dx.doi.org/10.1016/j.jad.2017.01.014 doi: 10.1016/j.jad.2017.01.014

Chen, C. M., Yoon, Y.-H., Harford, T. C., & Grant, B. F. (2017). Dimensionality of DSM-5 posttraumatic stress disorder and its association with suicide attempts: Results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. *Social Psychiatry and Psychiatric Epidemiology*, *52*(6), 715-725. Retrieved from http://link.springer.com/10.1007/s00127-017-1374-0 doi: 10.1007/s00127-017-1374-0

Cyders, M. A., Burris, J. L., & Carlson, C. R. (2011). Disaggregating the relationship between posttraumatic stress disorder symptom clusters and chronic orofacial pain: Implications for the prediction of health outcomes with PTSD symptom clusters. *Annals of Behavioral Medicine*, *4*(1), 1-12. doi: 10.1007/s12160-010-9221-5

Denson, T. F., Marshall, G. N., Schell, T. L., & Jaycox, L. H. (2007). Predictors of posttraumatic distress 1 year after exposure to community violence: The importance of acute symptom severity. *Journal of Consulting and Clinical Psychology*, *75*(5), 683-692. doi: 10.1037/0022-006X.75.5.683

Elhai, J. D., Biehn, T. L., Armour, C., Klopper, J. J., Frueh, B. C., & Palmieri, P. A. (2011). Evidence for a unique PTSD construct represented by PTSD's D1-D3 symptoms. *Journal of Anxiety Disorders*, *25*(3), 340-345. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0887618510002124 doi: 10.1016/j.janxdis.2010.10.007

Forbes, D., Parslow, R., Creamer, M., O'Donnell, M., Bryant, R., McFarlane, A., Silove, D., & Shalev, A. (2010). A longitudinal analysis of posttraumatic stress disorder symptoms and their relationship with Fear and Anxious-Misery disorders: Implications for DSM-V. *Journal of Affective Disorders*, *127*(1-3), 147-152. doi: 10.1016/j.jad.2010.05.005

Galatzer-Levy, I. R., & Bryant, R. A. (2013). 636,120 ways to have posttraumatic stress disorder. *Perspectives on Psychological Science*, *8*(6), 651-662. Retrieved from http://journals.sagepub.com/doi/10.1177/1745691613504115 doi: 10.1177/1745691613504115

Galea, S., Ahern, J., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., & Vlahov, D. (2002). Psychological sequelae of the September 11 terrorist attacks in New York City. *The New England Journal of Medicine*, *346*(13), 982-987. Retrieved from http://www.nejm.org/doi/abs/10.1056/NEJMsa013404http://www.ncbi.nlm.nih.gov/pubmed/11919308 doi: 10.1056/NEJMsa013404

Galea, S., Vlahov, D., Tracy, M., Hoover, D. R., Resnick, H., & Kilpatrick, D. (2004). Hispanic ethnicity and post-traumatic stress disorder after a disaster: Evidence from a general population survey after September 11, 2001. *Annals of Epidemiology*, *14*(8), 520-531. Retrieved from https://linkinghub.elsevier.com/retrieve/pii/S1047279704000419 doi: 10.1016/j.annepidem.2004.01.006

Gentes, E. L., Dennis, P. A., Kimbrel, N. A., Rissling, M. B., Beckham, J. C., Workgroup, V. M-A. M., & Calhoun, P. S. (2014). DSM-5 posttraumatic stress disorder: Factor structure and rates of diagnosis. *Journal of Psychiatric Research*, *59*, 60-67. Retrieved from http://dx.doi.org/10.1016/j.jpsychires.2014.08.014 doi: 10.1016/j.jpsychires.2014.08.014

Gootzeit, J., & Markon, K. (2011). Factors of PTSD: Differential specificity and external correlates. *Clinical Psychology Review*, *31*(6), 993-1003. Retrieved from http://linkinghub.elsevier.com/retrieve/pii/S0272735811001048 doi: 10.1016/j.cpr.2011.06.005

Grant, B. F., Amsbary, M., Chu, A., Sigman, R., Kali, J., Sugawana, Y., Jiao, R., Ren, W., & Zhang, H. (2014). *Source and accuracy statement: National epidemiologic survey on alcohol and related conditions-III (NESARC-III)*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Grant, B. F., Goldstein, R. B., Smith, S. M., Jung, J., Zhang, H., Chou, S. P., Pickering, R. P., Ruan, W. J., Huang, B ., Saha, T. D., Aivadyan, C., Greenstein, E., & Hasin, D. S. (2015). The alcohol use disorder and associated disabilities interview schedule-5 (AUDADIS-5): Reliability of substance use and psychiatric disorder modules in a general population sample. *Drug and Alcohol Dependence*, *148*, 27-33. doi: 10.1016/j.drugalcdep.2014.11.026

Hallquist, M. N., & Wiley, J. F. (2018). Mplusautomation: An r package for facilitating large-scale latent variable analyses in m plus. *Structural Equation Modeling: A Multidisciplinary Journal*, *25*(4), 621-638.

Hansen, M., Hyland, P., Armour, C., Shevlin, M., & Elklit, A. (2015). Less is more? Assessing the validity of the icd-11 model of ptsd across multiple trauma samples. *European Journal of Psychotraumatology, 6*(28766). doi: 10.3402/ejpt.v6.28766

Harford, T. C., Yi, H-ye., & Grant, B. F. (2014). Associations between childhood abuse and interpersonal aggression and suicide attempt among U.S. adults in a national study. *Child Abuse and Neglect, 38*(8), 1389-1398. doi: 10.1016/j.chiabu.2014.02.011

Hasin, D., Aivadyan, C., Greenstein, E., & Grant, B. (2011). *Psychiatric research interview for substance use and mental disorders, diagnostic and statistical manual of mental disorders, (prism-5) version*. New York, NY: Columbia University, Department of Psychiatry.

Hasin, D. S., Shmulewitz, D., Stohl, M., Greenstein, E., Aivadyan, C., Morita, K., Saha, T., Aharonvich, E., Jung, J., Zhang, H., Nunes, E. V., & Grant, B. F. (2015). Procedural validity of the AUDADIS-5 depression, anxiety and post-traumatic stress disorder modules: Substance abusers and others in the general population. *Drug and Alcohol Dependence*, *152*, 246-256. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25939727http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC5089368 doi: 10.1016/j.drugalcdep.2015.03.027

Hien, D. A., Rudnick Levin, F., Ruglass, L. M., López-Castro, T., Papini, S., Hu, M. C., Cohen, L. R., & Herron, A. (2015). Combining seeking safety with sertraline for PTSD and alcohol use disorders: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 83*(2), 259-269. doi: 10.1037/a0038719

King, D. W., King, L. A., Leskin, G. A., & Weathers, F. W. (1998). Confirmatory factor analysis of the clinician-administered PTSD scale: Evidence for the dimensionality of posttraumatic stress disorder. *Psychological Assessment, 10*(2), 90-96. doi: 10.1037/1040-3590.10.2.90

Kotov, R., Krueger, R. F., Watson, D., Achenbach, T. M., Althoff, R. R., Bagby, R. M., Brown, T. A., Carpenter, W. T., Caspi, A., Clark, L. A., Eaton, N. R., Forbes, M. K., Forbush, K. T. Goldberg, D., Hasin, D., Hyman, S. E., Ivanova, M. Y., Lynam, D. R., Markon, K., . . . Zimmerman, M. (2017). The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. *Journal of Abnormal Psychology, 126*(4), 1-48. doi: 10.1037/abn0000258

Law, K. C., Allan, N. P., Kolnogorova, K., & Stecker, T. (2019). An examination of PTSD symptoms and their effects on suicidal ideation and behavior in non-treatment seeking veterans. *Psychiatry Research, 274*, 12-19. Retrieved from https://doi.org/10.1016/j.psychres.2019.02.004 doi: 10.1016/j.psychres.2019.02.004

Marshall, G. N., Schell, T. L., & Miles, J. N. V. (2010). All PTSD symptoms are highly associated with general distress: ramifications for the dysphoria symptom cluster. *Journal of Abnormal Psychology, 119*(1), 126-135. Retrieved from www.apa.org/pubs/journals/abn. doi: 10.1037/a0018477

Muthén, L., & Muthén, B. (2017). *Mplus (version 8)*[computer software].(1998-2017). Los Angeles, CA: Muthén & Muthén.

Naifeh, J. A., Richardson, J. D., Del Ben, K. S., & Elhai, J. D. (2010). Heterogeneity in the latent structure of PTSD symptoms among Canadian veterans. *Psychological Assessment, 22*(3), 666-674. doi: 10.1037/a0019783

O'Donnell, M. L., Alkemade, N., Nickerson, A., Creamer, M., McFarlane, A. C., Silove, D., Bryant, R. A., & Forbes, D. (2014). Impact of the diagnostic changes to post-traumatic stress disorder for dsm-5 and the proposed changes to icd-11. *The British Journal of Psychiatry, 205*(3), 230-235.

Palm, K. M., Strong, D. R., & MacPherson, L. (2009). Evaluating symptom expression as a function of a posttraumatic stress disorder severity. *Journal of Anxiety Disorders, 23*(1) 27-37. doi: 10.1016/j.janxdis.2008.03.012

Powers, A., Fani, N., Carter, S., Cross, D., Cloitre, M., & Bradley, B. (2017). Differential predictors of DSM-5 PTSD and ICD-11 complex PTSD among African American women. *European Journal of Psychotraumatology, 8*(1), 1338914. doi: 10.1080/20008198.2017.1338914

R Core Team. (2018). R: *A language and environment for statistical computing* [Computer software manual]. Vienna, Austria. Retrieved from https://www.R-project.org/

Simms, L. J. (2010). On comparing competing structural models of PTSD: Comments on Miller et al. *Journal of Traumatic Stress, 23*(5), 639-641. Retrieved from http://doi.wiley.com/10.1002/jts.20567 doi: 10.1002/jts.20567

Simms, L. J., Watson, D., & Doebbelling, B. N. (2002). Confirmatory factor analyses of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *Journal of Abnormal Psychology*, *111*(4), 637-647. Retrieved from http://doi.apa.org/getdoi.cfm?doi=10.1037/0021-843X.111.4.637 doi: 10.1037/0021-843X.111.4.637

Stein, D. J., McLaughlin, K. A., Koenen, K. C., Atwoli, L., Friedman, M. J., Hill, E. D., Maercker, A., Petukhova, M., Shahly, V., van Ommeren, M. Alonso, J., Borges, G., de Girolamo, G., de Jonge, P., Demyttenaere, K., Florescu, S., Karam, E. G., Kawakami, N., Matschinger, H., . . . Kessler, R. C.(2014). Dsm-5 and icd-11 definitions of posttraumatic stress disorder: Investigating "narrow" and "broad" approaches. *Depression and Anxiety, 31*(6), 494-505.

Tsai, J., Armour, C., Southwick, S. M., & Pietrzak, R. H. (2015). Dissociative subtype of DSM-5 posttraumatic stress disorder in U.S. veterans. *Journal of Psychiatric Research, 66-67*, 67-74. doi: 10.1016/j.jpsychires.2015.04.017

Wolf, E. J., Miller, M. W., Reardon, A. F., Ryabchenko, K. A., Castillo, D., & Freund, R. (2012). A latent class analysis of dissociation and posttraumatic stress disorder: Evidence for a dissociative subtype. *Archives of General Psychiatry, 69*(7), 698-705. doi: 10.1001/archgenpsychiatry.2011.1574

World Health Organization. (2018). *ICD-11 Beta Draft*. World Health Organization. doi: 10.1002/2013GL058769

World Health Organization. (2018). *International statistical classification of diseases and related health problems (11th revision)*. https://www.who.int/classifications/icd/en/

Young, G., Lareau, C., & Pierre, B. (2014). One quintillion ways to have PTSD comorbidity: Recommendations for the disordered DSM-5. *Psychological Injury and Law*, *7*(1), 61-74. Retrieved from http://link.springer.com/10.1007/s12207-014-9186-y. doi: 10.1007/s12207-014-9186-y

Yufik, T., & Simms, L. J. (2010). A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. *Journal of Abnormal Psychology*, *119*(4), 764-776. doi: 10.1037/a0020981