A test of the DSM-5 severity scale for alcohol use disorder

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ABSTRACT

Background: For the DSM-5-defined alcohol use disorder (AUD) diagnosis, a tri-categorized scale that designates mild, moderate, and severe AUD was selected over a fully dimensional scale to represent AUD severity. The purpose of this study was to test whether the DSM-5-defined AUD severity measure was as proficient a predictor of alcohol use following a brief intervention, compared to a fully dimensional scale.
Methods: Heavy drinking primary care patients ($N = 246$) received a physician-delivered brief intervention (BI), and then reported daily alcohol consumption for six months using an Interactive Voice Response (IVR) system. The dimensional AUD measure we constructed was a summation of all AUD criteria met at baseline (mean = 6.5; $SD = 2.5$). A multi-model inference technique was used to determine whether the DSM-5 tri-categorized severity measure or a dimensional approach would provide a more precise prediction of change in weekly alcohol consumption following a BI.
Results: The Akaike information criterion (AIC) for the dimensional AUD model (AIC = 7623.88) was four points lower than the tri-categorized model (AIC = 7627.88) and weight of evidence calculations indicated there was 88% likelihood the dimensional model was the better approximating model. The dimensional model significantly predicted change in alcohol consumption ($p = .04$) whereas the DSM-5 tri-categorized model did not.
Conclusion: A dimensional AUD measure was superior, detecting treatment effects that were not apparent with tri-categorized severity model as defined by the DSM-5. We recommend using a dimensional measure for determining AUD severity.

1. Introduction

With the publication of the DSM-5, several evidence-based changes to the alcohol use disorder (AUD) diagnosis have been made. Based on recommendations from researchers, DSM-IV-defined Alcohol Abuse (AA) and Alcohol Dependence (AD) were combined into a single AUD diagnosis, the legal problems criterion was removed, and a craving criterion was added (Hasin et al., 2013).

One change that was widely recommended (Tarter et al., 1992; Muthén, 2006; Helzer et al., 2006a,b, 2007) but not incorporated into the DSM-5 was a fully dimensional diagnostic AUD scale. Such a scale would allow for severity to be measured based on a count of the number of symptoms endorsed. Instead, a tri-categorized severity scale was used that distinguishes between mild, moderate, and severe dependence (American Psychiatric Association, 2013).

Two to three AUD symptoms are considered as mild dependence, 4–5 symptoms define moderate dependence, and 6 or more symptoms are considered severe dependence (American Psychiatric Association, 2013). In addition, while AA and AD were combined to form a single AUD diagnosis, the DSM-5 retains the categorical dichotomous diagnostic structure based on the presence of two or more symptoms. Thus, a categorical diagnostic structure has been retained for both AUD diagnosis as well as the AUD severity measure.

In the original theory of alcohol dependence proposed by Edwards and Gross (1976) the disorder was conceptualized as a dimensional construct. Specifically, Edwards and Gross proposed that alcohol dependence exists on a continuum of severity and emphasized the importance of recognizing alcohol dependence in degrees in both research and clinical work. A dimensional measure that counts the number of criteria an individual meets provides information about diversity in symptom presentation and is valuable for both clinical and research purposes (Hasin et al., 2006; Helzer et al., 2006b).

A dimensional scale is also preferable to a categorical measure because it can substantially increase statistical power; the high

statistical costs of categorizing a quantitative variable have been demonstrated (Cohen, 1983; MacCallum et al., 2002). In this regard, we have previously shown that a dimensional diagnostic measure is superior to a DSM-IV defined dichotomous alcohol dependence diagnosis for predicting change in alcohol consumption following a brief intervention (BI; Fazzino et al., 2014). Dimensional measurement also better accommodates instances of diagnostic comorbidity. With dimensional scales, comorbidity between variables can be discussed in terms of their degree of correlation, compared to categorical designations which would require discussion of individuals meeting criteria for more than one disorder (Goldberg, 2000). Finally, as demonstrated in an international study with clinicians from 64 countries, dimensional constructs of mental disorders better reflected clinicians' conceptualizations of mental disorders than did categorical conceptualizations (Roberts et al., 2012).

While the severity measure was included in the DSM-5 to distinguish between levels of AUD (Hasin et al., 2013), neither the DSM-5 itself nor the article detailing rationale for DSM-5 changes (Hasin et al., 2013) indicates how the severity level cut-off points were derived. Borges et al. (2011) analyzed potential AUD severity cut-off points for the DSM-5 using Item Response Theory and suggested using a dual category severity scale with 2–3 AUD symptoms designating moderate AUD and 4–11 indicating severe AUD. However, the tri-categorized severity scale that was chosen for the DSM-5 does not map directly onto the Borges et al. findings. Despite rigorous statistical evaluation of other changes incorporated in DSM-5 AUD diagnosis, it appears that the specific severity cut points as delineated in the DSM-5 may not have been thoroughly statistically evaluated. Historically, a substantial criticism of DSM-defined categorical disorders is that diagnostic criteria and thresholds have been based on clinical observation or historical convention, not statistical evaluation (Goldberg, 2000; Helzer et al., 2006b; Jones, 2012; Kessler, 2002; Widiger and Simonsen, 2005) which has led to statistical analysis of DSM-defined constructs post hoc. In this regard, it appears that the DSM-5 severity scale represents a continuation of this problem.

It is currently unclear whether the tri-categorized severity measure is as proficient a predictor of alcohol use treatment outcomes as a fully dimensional scale. Due to the categorical nature of the severity scale, we expected that the severity measure would not adequately consider variability in the data that would be necessary to predict alcohol use as precisely as a fully dimensional scale.

The purpose of the current study was to compare goodness of fit of the DSM-5 severity measure to a full dimensional AUD scale for predicting alcohol use following a physician-delivered BI. Specifically, we compared goodness of fit of the tri-categorized severity measure to a full dimensional measure of AUD for predicting first week alcohol consumption following a BI (intercept) and change in weekly alcohol consumption (slope) over four weeks following a BI.

2. Methods

Data used in the current manuscript were obtained from a study that evaluated 6 months of self-monitoring via Interactive Voice Response (IVR) following a BI for alcohol use in a primary care setting (Helzer et al., 2008). The main objective of the original study was to determine if self-monitoring via IVR with or without monthly feedback about alcohol use would produce a greater reduction in alcohol consumption compared to no self-monitoring following a BI. Feedback was provided at the end of each month.

2.1. Participants

Participants were recruited from 15 primary care offices in the Burlington, Vermont metropolitan area. Primary care providers conducted brief interventions with heavy drinking primary care patients and referred patients who were willing to participate in the randomized trial to the research staff. Participants were included in the study if they reported recent (past 3 month) alcohol consumption beyond the NIAAA guidelines for low risk drinking: (1) average daily or weekly alcohol use exceeding 2 drinks per day/14 per week for men or 1 per day/7 per week for women, or (2) 5 or more drinks in one day for men or 4 or more for women (National Institute of Alcohol and Alcohol Abuse, 2005). Both dependent and not dependent individuals as defined by DSM-IV categorical criteria were included in the sample. Exclusion criteria were current (past year) DSM-IV diagnosis of substance dependence other than alcohol, nicotine, or marijuana; a current diagnosis of psychosis; or a recent initiation or change in antidepressant medication that could affect alcohol consumption.

2.2. Procedure

Research personnel first contacted each patient by telephone to describe the study and then scheduled patients interested in participating in the study for an in-person informed consent and assessment at our research office. After a complete description of the study to the subjects, written informed consent was obtained. Detailed study procedures and the full assessment battery were presented previously (Helzer et al., 2008). Participants received a training session during which they were instructed on reporting standard drink volumes and oriented to using the IVR. Participants were provided a toll-free, 24 h access phone number to contact the IVR and were asked to call daily for 6 months. The IVR call was a 2-min questionnaire that assessed alcohol consumption (number of standard servings of beer, liquor, and wine assessed separately), craving intensity, reasons for drinking/abstaining from drinking, questions about psychological status (stress, happiness, anger, sadness), physical health, relationship with partner, partner alcohol use, and whether the participant was intoxicated at the time of the call. All IVR questions inquired about the previous 24 h period (i.e., "yesterday") to ensure a consistent reporting period.

2.3. Predictor variables

Symptoms of AUD were assessed with the Composite International Diagnostic Interview-Substance Abuse Module for DSM-IV (CIDI-SAM; Cottler et al., 1989). The DSM-5 dimensional AUD diagnosis was determined by counting the number of AUD criteria (0–11) met in the past 12 months. DSM-5 defined AUD symptoms included: (1) tolerance, (2) withdrawal, (3) substance taken in larger amounts/longer period than intended, (4) persistent desire or unsuccessful attempts to decrease/control use, (5) great deal of time spent obtaining, using or recovering from effects of alcohol, (6) social, occupational, or recreational activities given up or reduced because of use, (7) use despite knowledge of physical or psychological problems caused or exacerbated by use, (8) recurrent failure to fulfill major role obligations, (9) recurrent use in hazardous situations, (10) craving/strong desire to use the substance, and (11) continued use despite social/interpersonal problems. A dimensional measure using a simple symptom count was chosen over a dimensional scale with weighted criteria because Dawson et al. (2010) previously demonstrated that these two measures are similarly proficient in predicting alcohol use.

The craving criterion in the dimensional and severity scales was approximated because the CIDI-SAM version used in the study did not assess craving. Craving in the IVR was measured using the following prompt: "Rate your urge to drink yesterday on a scale of 0 to 9, with 0 being no urge to drink and 9 being the strongest urge ever to drink." We determined the presence of craving from the first IVR report that participants made the day after they completed their diagnostic interview. We reasoned that if a participant reported craving in the first IVR report, they likely would have reported craving during the diagnostic interview the previous day. In order to assess what score threshold (1–9) to consider positive we used the mean daily craving rating for the sample. Mean craving rating across the 30 days of the study was 3.76 (SD = 2.31). Thus we defined a positive report of craving to be a score of 3 or higher on that first IVR call. In DSM-5 the actual "craving criterion" reads as follows: "Craving, or a strong desire or urge to use alcohol." Therefore, we also operationalized the score threshold as any non-zero craving report in the first IVR call since that seemed to most closely match the actual DSM-5 definition. We used these thresholds to create corresponding dichotomous variables (craving/no craving). Below we report analyses using both definitions.

The DSM-5 AUD severity measure was determined based on DSM-5 specified severity criteria of 2–3 positive symptoms for mild dependence, 4–5 symptoms for moderate dependence, and 6 or more for severe (American Psychiatric Association, 2013).

2.4. Outcome variable

Alcohol use was assessed daily in the IVR survey with the following prompt, using a separate question for each type of alcohol: "How many [beers/drinks containing liquor/glasses of wine] did you have yesterday?" Validity of previous day alcohol consumption reported via the IVR has previously been demonstrated (Searles et al., 1995). The total weekly alcoholic drinks variable was computed by summing the total number of alcoholic drinks reported to the IVR in each 7-day period. First week total alcohol consumption was operationalized as the total number of alcoholic drinks consumed in the first study week (model intercept), and change in alcohol consumption was modeled as the change in total drinks per week (model slope).