THE ROLE OF GENDER IN PROPOSED DSM-5 ALCOHOL USE DISORDER CRITERIA

By

Amanda Victoria Metze

A Thesis submitted to the faculty of the Graduate School of Western Carolina University in partial fulfillment of the requirements for the degree of Master of Arts in Clinical Psychology.

Chair: Leonardo Bobadilla
Assistant Professor
Psychology Department

Committee Members: Norman Hoffmann, Psychology
David McCord, Psychology

March 2012

ACKNOWLEDGEMENTS

I would like to thank Dr. Norman Hoffmann for allowing me access to his database, and sharing his wealth of knowledge about substance use disorders, without which I would not have a thesis. I'd also like to extend a big thank you to committee member Dr. David McCord, for bringing a fresh pair of eyes to the document. And last, but certainly not least, I extend my deepest gratitude to my thesis chair, Dr. Leonardo Bobadilla, for guiding me through this arduous journey, from beginning to end.

TABLE OF CONTENTS

Page
List of Tables iv
Abstract v
Introduction 6
Literature Review 7
Prevalence of Alcohol Use 7
Evolution of the Alcohol Dependence and Alcohol Use Disorder Concept 7
Evolution of Diagnostic Nomenclature 10
DSM-II 10
DSM-III 11
DSM-III-R 12
DSM-IV/IV-TR 13
Proposed DSM-5 14
Abuse and Dependence: Separate Diagnoses? 14
Problems with Abuse Diagnosis 14
Support for Dimensional Conceptualization 15
Diagnostic Orphans 17
Support for Categorical Conceptualization 19
Gender and Alcohol Dependence 20
Purpose 24
Hypotheses 24
Methods 26
Participants 26
Measures 26
Procedure 27
Results 28
Discussion 35
References 41
Appendix A 47
Appendix B 48

LIST OF TABLES

Table

1. Proportion of Males within DSM-IV-TR Categories and DSM-5 Classification 29
2. Proportion of Females within DSM-IV-TR Categories and DSM-5 Classification 29
3. Proportion of Males within DSM-IV-TR Categories and DSM-5 Classification (Diagnostic Orphans) 30
4. Proportion of Females within DSM-IV-TR Categories and DSM-5 Classification (Diagnostic Orphans) 30
5. Crosstabulation of Gender and Use to Relieve Emotional Distress 31
6. Mean Number of Abuse Items Endorsed as a function of Age 32
7. Proportion of Alcohol Abuse Diagnoses between Age Groups 34

ABSTRACT

The high prevalence of alcohol related fatalities and the large population of individuals at risk or diagnosed with alcohol use disorders make understanding the disorders a public health priority. As the publication of the Diagnostic and Statistical Manual of Mental Disorders-fifth edition (DSM-5; n.d.) approaches, a substantial amount of research has focused on how to best conceptualize disorders. Currently, the DSM-IV-TR conceptualizes alcohol use disorders as two categorical diagnoses: abuse and dependence. However, recent research suggests that the diagnostic criteria may be better represented as a continuum. An issue that could inform the debate is whether problematic alcohol use presents itself differently in males and females. Previous research has utilized populations representative of both genders, but little to no research has explicitly focused on the role that gender plays in the nosology of alcohol use disorder. The present study examined the role of gender in the proposed DSM-5 alcohol use disorder diagnostic scheme using a corrections population. Results indicated that there was agreement between dependence categories in the DSM-IV-TR and severe alcohol use categories in the proposed DSM-5 for both genders. The results also indicated that gender differences exist in severity of diagnosis, which could impact treatment decisions. Overall, the proposed DSM-5 may have more clinical justification for diagnosis. The inclusion of an additional criterion was also explored. Results indicated that a "use to relieve emotional distress" criterion may be warranted.

INTRODUCTION

The Diagnostic and Statistical Manual of Mental Disorders is currently the official classification system for mental illness diagnosis used in the United States. The American Psychiatric Association is considering changes regarding nosology of the alcohol use disorder and other substance use disorder diagnoses. As the publication for the fifth edition of the DSM approaches, questions regarding the compatibility of current DSM-IV-TR criteria and the proposed DSM-5 criteria for alcohol use disorder become critically important, as well as how the shift from a categorical classification to a dimensional one will affect diagnosis.

Controversy surrounds the current categorical diagnostic classification of alcohol use disorder, and while many studies have explored the validity of the DSM-IV-TR alcohol dependence and alcohol abuse diagnoses, little has been done regarding gender differences in the presentation of the disorder. Exploring these differences may lead to better understanding of the disorder, and could potentially provide insight into upcoming changes to the official nosology and inform treatment decisions.

LITERATURE REVIEW

Alcohol abuse and dependence are among the most prevalent and concerning public health issues. Estimates show that slightly more than half of the population (130.6 million people) aged 12 or older used alcohol in the past year, nearly one quarter engaged in binge drinking (nearly five or more drinks on the same occasion), and 6.8% engaged in heavy alcohol use (five or more drinks on the same occasion on each of five or more days in the past 30 days) (Substance Abuse and Mental Health Services Administration [SAMHSA], Office of Applied Studies, 2009). Overuse of alcohol (including dependence and abuse) is responsible for approximately 85,000-100,000 deaths per year and is the third leading cause of preventable deaths in the United States. (Mokdad, Marks, Stroup, & Gerberding, 2004).

The heavy societal toll of alcohol abuse creates a dire need to understand the presentation of the phenomenon. This search for understanding has led researchers to propose various typologies of problematic alcohol use and its classification in diagnostic manuals. However, controversy still surrounds the current classification scheme, and with impending changes to the official nosology, research into the conceptualization of the disorder is required in order to understand and potentially inform changes to the diagnostic classification.

Evolution of the Alcohol Dependence and Alcohol Use Disorder concept

In 1960, Elvin Morton Jellinek published "The Disease Concept of Alcoholism," a book widely regarded as the first account to describe severe alcohol use as a disease. Jellinek distinguished between five different types of alcoholism: Alpha, beta, gamma, delta, and epsilon. According to Jellinek, gamma and delta subtypes were both

characterized by physical alcohol dependence and a loss of control over the ingestion of alcohol. The gamma subtype represents the most common form of dependence in the current diagnostic formulation and these drinkers are proposed to be able to abstain from alcohol consumption, but when they do consume alcohol, suffer a loss of control. The delta cluster is similar, but individuals who fit in this category are unable to abstain from alcohol consumption. The alpha, beta, and epsilon subtypes characterize less serious forms of alcohol use, defined by psychological symptoms, such as use to relieve distress, or physical symptoms, like cirrhosis of the liver, without loss of control regarding drinking.

In 1976, Edwards and Gross developed the "alcohol dependence syndrome" theory which posited that dependence stems from biological, social, and behavioral components. The syndrome, as defined by Edwards and Gross contained a number of elements: a narrowing in the repertoire of drinking (i.e., an individual may drink depending on a variety of external and internal cues, but as dependence progresses, the individual will drink the same no matter the cues), salience in drink seeking behavior (i.e., the individual gives priority to alcohol intake despite negative consequences), increased tolerance to alcohol, repeated withdrawal symptoms, repeated relief or avoidance of withdrawal symptoms by further drinking, subjective awareness of a compulsion to drink, and reinstatement of the syndrome after abstinence. Importantly, the model suggested that the more of these elements are present in an individual, the more severe the disorder.

The next notable theory about alcohol dependence was proposed by Cloninger, Bohman, and Sigvardsson (1981) which, similar to Jellinek, subtyped alcohol

dependence. This model is notable for its incorporation of the heritability and genetics of alcohol dependence. Using data from a study of Swedish adoptees and their biological parents, Cloninger and his colleagues formulated two subtypes of alcohol dependent individuals. Type I, consists of individuals who have late onset (25 years or older) alcohol dependence, and it is strongly influenced by social and environmental factors. The individuals in this group tend to use alcohol to self-medicate due to high levels of anxiety, but seem to be protected from more serious alcoholism by higher levels of cautiousness and inhibition, which sometimes prevents them from drinking excessively (Cloninger, 1987). In addition, Type I responds better to treatment, and men and women can be equally susceptible to this type of alcohol dependence.

Conversely, Type II alcohol dependence is characterized by an earlier onset of drinking problems (before age 25), and these individuals are thought to inherit their problems from their fathers. This subtype primarily affects men who are unable to abstain, and drink heavily for pleasure rather than for self-medication. Furthermore, Type II alcohol dependent individuals tend to be more antisocial, commit more alcohol-related antisocial acts, and respond poorly to treatment (Cloninger, Bohman, & Sigvarddson,1981).

A decade later, Babor, Hofman, DelBoca, and Hesselbrock (1992) performed a cluster analysis of 321 alcohol dependent individuals in treatment centers with the goal to create more homogenous groups to improve treatment outcomes. Based on the results of this analysis, a two cluster model characterized by Type A and Type B alcoholics was proposed. Type A alcoholics are characterized by later onset, fewer childhood risk factors, less severe dependence, fewer physical and social consequences, less previously

occurring treatment for alcohol problems, and less distress in work and familial domains. Type B alcoholics are characterized by more childhood and familial risk factors, earlier onset, greater severity for dependence, polydrug use, more chronic treatment history (despite their younger age), and more life stress.

The Type A alcoholic is similar to Cloninger's Type I alcoholic as both are characterized by later onset and less severe outcomes. However, unlike Cloninger's model, the Type A alcoholic does not seem to suffer from anxiety disorders and/or loss of control over drinking like the Type 1 alcoholic sub-type. The Type B alcoholic is similar to the Type 2 alcoholic subtype but contains males and females, rather than just males. Babor's model has been duplicated and supported. For example, in an evaluation of the Type A and Type B clusters, Schuckit et al. (1995) found similar groupings in a sample of 1539 (512 women) dependent individuals, with robust results even after controlling for anti-social personality disorder and early onset (before age 25) alcohol dependence.

Evolution of Diagnostic Nomenclature

As the aforementioned research efforts were underway, the official psychiatric nosology was also making progress in cataloguing problematic alcohol use as a disorder. Diagnostic criteria for alcoholism first appeared in the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-II; American Psychiatric Association, 1968). The DSM-II distinguished four types of problems: Episodic Heavy Drinking (intoxication four or more times a year), Habitual Excessive Drinking (intoxication more than 12 times a year and being under the influence at least once a week), Alcohol Addiction (characterized by physical withdrawal and inability to go even a day without alcohol), and Other (unspecified) alcoholism. The framers of the DSM-II (1968) did not

use empirical data to classify these distinctions but rather they were rationally derived (Schuckit, Nathan, Helzer, & Woody, 1991).

In response to the lack of empirical basis for diagnosis in the DSM-II, Feighner, Robins, Guze, Woodruff, Winokur, & Muñoz (1972) outlined recommendations for making appropriate psychiatric diagnoses including requiring a research base for the alcoholism diagnostic criteria. In addition to an empirical research base, the Feighner criteria for alcoholism emphasized that the disorder should be composed of multiple groupings of symptoms with a strong emphasis placed on severe medical consequences, social consequences, and an inability to control use. Thus, the DSM-III (1980) saw a shift from using rationally derived criteria, to the use of empirically supported data. The new manual also gave substance use disorders their own section, and separated the concept of alcoholism into alcohol dependence and abuse (Schuckit, Nathan, Helzer, & Woody, 1991). Alcohol dependence was defined as a pattern of pathological use or impaired social or occupational functioning with evidence of either tolerance or withdrawal, similar to Edwards and Gross's (1976) alcohol dependence syndrome. In contrast, alcohol abuse incorporated the same symptoms as dependence, but only in the absence of tolerance or withdrawal. Finally, the DSM-III prioritized the syndrome, meaning that dependence was (and still is) considered to be a more severe syndrome that supersedes the diagnosis of abuse.

According to a review by Rounsaville (1987) there were several problems with the DSM-III's criteria for alcohol use disorder, the first of which were inconsistent relationships between abuse and dependence; particularly the perceived overlap between the criteria used for the two disorders. Rounsaville (1987) also noted that there was an

inappropriate emphasis placed on tolerance and withdrawal as criteria for dependence, since tolerance was difficult to define, and withdrawal can be a subjective experience. For instance, tolerance and withdrawal vary widely from individual to individual. Two dependent individuals may be experiencing withdrawal and have completely different subjective experiences, further making tolerance and withdrawal difficult to quantify. Finally, Rounsaville noted that alcoholism was viewed too simplistically; Alcoholism is not just a syndrome defined by tolerance and withdrawal, but is comprised of many other behaviors and symptoms that needed to be recognized.

With the above criticisms in mind, revisions were started for the DSM-III-R (APA, 1987). In a review of the revision process of all editions of the DSM, Schuckit et al. (1991) noted that the theory of alcohol dependence proposed by Edwards and Gross (1976) became attractive to the framers of the DSM-III-R because it provided an underlying theory on which to base the dependence diagnosis, diminished the emphasis on withdrawal and tolerance, and emphasized the loss of control and inability to moderate drinking, which are prevalent traits among those with alcohol dependence. Edwards and Gross' theory also suggested that the more symptoms of alcohol dependence a person reports, the more severe the disorder, lessening the need for an abuse diagnosis. However, to appease researchers and clinicians who believed that the dependence syndrome did not capture every aspect of the disorder, the abuse category was placed back in the manual, using two items from the dependence diagnostic criteria: continued use despite problems and recurrent use in hazardous situations (Schuckit et al., 1991).

The DSM-IV (APA,1994) work group sought to address the controversial abuse diagnosis category, and to provide further empirical evidence for the dependence

diagnostic criteria. Alcohol use disorder as it is currently defined in the Diagnostic and Statistical Manual of Mental Illness-Fourth Edition (DSM-IV; APA, 1994) and the most recent revision, the DSM-IV-Text Revision (DSM-IV-TR; APA, 2000), consists of two separate classifications, alcohol abuse and alcohol dependence. Abuse and dependence are viewed as two separate hierarchical diagnoses, and abuse can only be diagnosed in the absence of dependence. Alcohol dependence is described as an increasing loss of control over drinking despite negative consequences and it is diagnosed when three or more of seven criteria are endorsed over the course of a year. Abuse is characterized by recurrent risky drinking and the behaviors and consequences that follow risky drinking. It is diagnosed if one or more of the criteria is endorsed over the course of a year (Full list of symptoms for each diagnosis listed in appendix A).

A major criticism of the DSM-IV-TR (APA, 2000) is that the current classification of the disorder is categorical while Edwards and Gross' (1976) influential theory of the alcohol dependence syndrome is dimensional in nature. As mentioned previously, Edward and Gross' proposed alcohol dependence syndrome included a number of symptoms including salience of drink seeking behavior, tolerance, and withdrawal and suggested that these symptoms existed on a continuum. As the publication of the fifth edition of the DSM approaches, continuum or dimensional models of alcohol use disorder have come to the front again as the best way to conceptualize the disorder.

The DSM-5 is in the beginning stages of development and the American Psychiatric Association has released information regarding the proposed revision for alcohol use disorder (APA, 2012). The revised DSM proposes to remove the legal

problems criteria from the abuse diagnosis, add craving to the criteria, and merge the remaining three abuse criteria with the dependence criteria. Finally, and consistent with various research proposals (e.g., Hasin & Beseler, 2009; Lynskey & Agrawal, 2007; Saha, Chou, & Grant, 2006), it conceptualizes the disorder along a continuum rather than separate abuse and dependence categories. Also, and similar to Edwards and Gross' alcohol dependence syndrome, the new criteria suggest that as more symptoms are endorsed by an individual, the more severe the disorder (Appendix A). The proposed DSM-5 criteria have set two thresholds distinguishing Moderate Alcohol Use Disorder (MAUD; two to three criteria endorsed) and Severe Alcohol Use Disorder (SAUD; four plus criteria endorsed).

Abuse and Dependence: Separate diagnoses or part of the same continuum?

As summarized above, the DSM-IV-TR alcohol use disorder diagnosis has been controversial, and one of the main areas of debate has been whether alcohol abuse warrants a separate diagnosis or if it may be better conceptualized as part of a continuum within a dimensional structure of the alcohol dependence syndrome. The concept of alcohol dependence has robust support (Hasin & Paykin, 1999; Hasin, Van Rossem, McCloud, & Endicott, 1997). Hasin et al. (1997) explored differences in the course of DSM-IV-TR alcohol abuse and dependence in a sample of 876 community drinkers (46% female; 45% age 29 or younger) and found that they differed significantly from each other over time. Individuals with alcohol dependence at the start of the study were likely to remain in this category at follow-up. On the other hand, individuals with an abuse diagnosis at baseline more commonly fell in the no diagnosis category, or endorsed the same abuse criterion, (driving under the influence i.e., "hazardous use") at follow-up.

One of the reasons the alcohol use disorder construct may appear to be categorical could be the influence age has on the abuse diagnosis. For example, driving under the influence tends to decrease with age and maturity and taking into the consideration the youth of the sample, this behavior, while problematic, may not warrant an abuse diagnosis if no other problems are present. Schuckit et al (2001) found similar results over a longer time frame with little movement from abuse to dependence or dependence to abuse over a 5 year period, suggesting more support for the dependence than the abuse diagnosis.

In another study examining this issue, Harford and Muthén (2000) examined the factor structure of 22 symptoms assessing alcohol abuse and dependence within a sample of 5,984 current and heavy drinkers (2,593 female). The results provided support for two dimensions underlying the DSM-IV-TR symptoms, but the dependence factor drew items from the abuse diagnosis and vice versa. The authors reported two factors named Factor 1 and Factor 2. Factor 1, defined as alcohol dependence, was represented by items related to five of the DSM-IV-TR dependence criteria: tolerance, withdrawal, unsuccessful efforts to cut down on drinking, reduced activities in favor of drinking, and psychological/physical problems, and also included the abuse items continuing to drink despite social problems and failure to fulfill role obligations. These items suggest an underlying theme related to a loss of control, which is considered to be the defining factor of the dependence concept. Alternatively, Factor 2, defined as alcohol abuse, was represented by items related to DSM-IV-TR abuse criteria (drinking in hazardous situations), a dependence criterion (drinking larger amounts over a longer period of time), plus one withdrawal symptom item related to being sick or vomiting after drinking.

According to the DSM-IV-TR, alcohol abuse is diagnosed only in the absence of dependence and is characterized by using alcohol in hazardous conditions. Harford and Muthén's results (2000) suggest a separate abuse category, but the symptom items that defined the abuse factor reflect circumstances that define single episodes of heavy drinking as opposed to consistent and frequent patterns of heavier use over time.

Alcohol dependence is met in the DSM-IV-TR when three of the seven criteria are endorsed over the course of a year. In an effort to examine this three item threshold, and whether it matches the 3 part diagnostic model (no diagnosis, abuse, and dependence) of the DSM-IV-TR, Langenbucher et al. (2004) used Item Response Theory to evaluate the performance characteristics of diagnostic criteria for substance use disorders in a sample of 321 (18.6% female) individuals in a variety of inpatient and outpatient treatment centers. Results suggest that dependence items were well represented among criteria indicative of a milder disorder, and abuse criteria often tapped a more severe range of pathology. The items seemed to parse into two classes of less severe vs. more severe cases. For alcohol, the criterion more indicative of a severe problem was an abuse criterion: failure to fulfill role obligations, and the item indicative of a less severe problem was a dependence criterion: physical or psychological problems. Further support for the notion that abuse criteria may be misclassified comes from Kahler and Strong (2006), who found that abuse-related items such as hazardous use indicated higher severity than some of the dependence items. The above findings, in conjunction with other research, indicate that a hierarchical ordering between abuse and dependence may not be the best way to conceptualize alcohol use disorder (Kahler & Strong, 2006).

Similarly, other researchers have found that DSM-IV-TR alcohol abuse and dependence criteria are arrayed along a continuum of severity. Saha, Chou, and Grant, (2006), using Item Response Theory, explored the validity of the current DSM dependence criteria as distinct from abuse using a sample of 22,526 current drinkers from the National Epidemiologic Survey on Alcohol and Related Conditions, a nationally representative sample of the USA (approximately 57% female). Criteria information curves identified dependence criteria that were well represented on the less severe range of the continuum, and abuse criteria that tapped the more severe range of the continuum. Dependence items representing a milder disorder were: time spent using, withdrawal, tolerance, and setting rules for drinking. Additionally, an alcohol abuse criterion assessing neglect of roles, along with a dependence criterion assessing activities given up in favor of drinking, were the most indicative of severe drinking problems than any other DSM-IV-TR alcohol related disorders symptoms. These results suggest that the current layout of the criteria does not match their purported severity indicators. Abuse is a less severe disorder than dependence; however, one abuse criterion is shown to be more indicative of a severe disorder. Conversely, some dependence criteria appear to be more indicative of a milder disorder.

The DSM-IV-TR conceptualization of alcohol use disorder has also been criticized for its failure to capture individuals who endorse one or two dependence criteria, but no abuse criteria, and therefore do not receive a diagnosis. These individuals are known as “diagnostic orphans” (Hasin & Paykin, 1998), and research suggests they are at an increased risk of developing alcohol dependence, and are more likely to experience adverse life events and poorer physical health than individuals with alcohol

abuse (McBride, Adamson, Bunting, & McCann, 2009 ab). For example, a longitudinal study investigating the three year course of diagnostic orphans in the general population (47.2% female) found that at the end of the first year half of the sample reverted to a no diagnosis status, one-fifth of the diagnostic orphans remained orphans, and almost 23% moved into one of the two current alcohol use disorder diagnoses (McBride & Adamson, 2010). At the end of the second year, only one-third progressed to no diagnosis, and a larger percentage of the orphans progressed to dependence than abuse. In addition, diagnostic orphans endorsing two criteria were at a higher risk of progressing to dependence than those endorsing one criterion. Similarly, Harford, Yi, and Grant (2010) investigated the five-year course of alcohol use disorder in "diagnostic orphans" with similar results. In addition, tolerance, and drink more/longer were indicative of a milder problem, and the two most common dependence criteria endorsed by orphans, with or without any abuse criteria present (Harford et al., 2010). This research suggests that important subgroups of alcohol users are being ignored by the current diagnostic criteria.

As seen above, a significant body of research suggests that the abuse category does not have as strong empirical support as the dependence category and perhaps a single dimensional conceptualization would better capture alcohol use disorder. Indeed, the two diagnostic categories in the current model are highly correlated (Lynskey & Agrawal, 2007), suggesting that a one-factor model provided the most parsimonious representation of the inter-relationships between abuse and dependence criteria. Similarly, Hasin and Beseler (2009), using a sample of 27,324 lifetime drinkers from the National Epidemiologic Survey on Alcohol and Related Conditions (approximately 57% female), found that DSM-IV-TR lifetime alcohol dependence criteria can be used to

represent a linearly increasing continuum of liability using two important risk factors for alcohol use disorders: family history of alcoholism and early age of drinking onset. When both alcohol dependence criteria and alcohol abuse criteria were combined, similar results were found suggesting that alcohol abuse and dependence criteria work in a similar manner to dependence criteria alone and they lie on a single underlying continuum.

In contrast, some research suggests that combining a categorical and dimensional approach would be preferred to choosing one over the other. In a study using a population of 1,193 male prison inmates exploring whether the alcohol use disorder construct is categorical or dimensional in nature, Walters (2008) found that DSM-IV-TR diagnostic criteria for alcohol dependence and abuse possessed a taxonic structure. These findings provide evidence that the DSM-5 should not abandon the categorical approach altogether as it is possible that alcohol use disorders are distinct from other forms of mental illness thus implying a taxonic boundary, but individuals diagnosed with the disorder may fall along a continuum, with distinctions in the severity of their disorder (Walters, 2008). Furthermore, while the disorder itself may be categorical, certain features of the disorder, such as symptom severity, may be dimensional in nature. (Helzer, Bucholz, Beirut, Regier, Schuckit, & Guth, 2006). In a sample of 4,920 current drinkers from a nationally representative sample of Australians, Slade, Grove, and Teesson (2009) used taxometric analysis to confirm that alcohol dependence consistently has a single latent dimension underlying its symptoms, but research did not support dimensionality for alcohol abuse. These findings are consistent with Walters' (2008) and

indicate that combining alcohol dependence and abuse criteria should be approached with caution.

Many of the aforementioned studies have utilized populations representative of males and females; however, very few examined the taxometrics of the disorder by gender. The role of gender in alcohol use disorders may be an important component to consider when determining how to conceptualize the disorder. As Saha et al. (2006) noted, the alcohol use disorder criteria seems to indicate a common construct for each sex but appears to work in different ways. For instance, Saha, et al.'s (2006) examination of the severity indexes of the alcohol use disorder criteria, found that different items indicated greater degrees of severity for men than for women. Furthermore, typology research has found significant differences in the presentation of the disease in males and females (e.g., Cloninger et al., 1981). For instance, females tended to have a later age of onset, were more receptive to treatment, and were more likely to use to alleviate symptoms of anxiety, compared to males who tended to have an earlier age of onset, engaged in more antisocial acts while under the influence, and were less likely to respond to treatment. However, recent research has paid little attention to the specific role gender plays. This overlooked component could shed some light on the current controversies surrounding the proposed revision of the diagnosis on the DSM-5.

Gender and Alcohol Dependence

As described above, differences in alcohol use disorder exist among men and women. Cloninger et al.'s (1981) typological research found that there were two main subtypes of alcohol users. Of the two, Type II, the more severe variant, was essentially limited to male users. Notably, later research found that a similar subtype to Cloninger et

al.'s. (1981) Type II alcohol user does exist in women, though in lower numbers. These findings suggest that the presentation of symptoms for alcohol dependence may differ between men and women. For example, Strong, Caviness, Anderson, Brown, and Stein (2010) examined individual differences in the severity of alcohol use along a single severity continuum in a population of incarcerated females. Results revealed lifetime problems related to risky, hazardous drinking among females were best explained in terms of social and familial consequences. In particular, three of the five most informative items assessing hazardous alcohol use related to negative familial or relationship related consequences. In contrast, previous studies have shown that in the general population, physical fighting is often an indicator of a severe alcohol problem (Kahler & Strong, 2006; Krueger et al., 2004). While in Strong et al.'s (2010) sample of incarcerated females over 83% endorsed physical fighting, it was more indicative of a mild alcohol problem.

Also, examination of the alcohol use disorder criteria endorsed by female DUI offenders revealed that for women convicted of one DUI, severity of dependence, and drinking problems were much greater than of males convicted of one DUI (McCutcheon et al, 2009). Specifically, females convicted of one DUI were much more likely to endorse drinking despite negative social and interpersonal consequences. And as might be expected, if the female had multiple DUIs in her history, she was much more likely to endorse periods dominated by drinking, unsuccessful attempts to quit, tolerance to alcohol, and withdrawal symptoms.

Perhaps more striking is research that proposes that the DSM-IV-TR diagnosis of alcohol abuse is empirically supported for men but not women, or additional items are

needed to distinguish the disorder in women (Hasin et al., 1997; Lynskey, Nelson, Elliot, Neuman, Bucholz, & Madden, 2005). For example, while examining the course of alcohol use disorder, Hasin et al. (1997) found that 41% of males diagnosed with alcohol abuse still met criteria at follow-up compared to only 14% of the females. A study exploring differences in the manifestation of alcohol use disorders by Lynskey et al., (2005) found that in a sample of heavy drinkers four different class structures existed that fully represented the sample of users including men and women. However, among men there was a fifth class that was comprised of abuse symptoms that was not found for women suggesting that alcohol abuse may be a distinct component of alcohol use disorder in men.

Another important area to consider are gender differences in reasons for alcohol use because underlying motives to use may not be the same for males and females. For instance, Cloninger et al. (1981) found that Type I alcoholics tended to use alcohol as a coping mechanism to relieve stress and anxiety, which in addition to gender, was one of the factors important in differentiating between Type I and Type II alcoholics. More recent research suggests that alcohol use is more prevalent among females experiencing severe psychological distress in both non-forensic and forensic settings (Patrick et al., 2011;Velasquez, Sternberg, Mullen, Carbonari, & Kan, 2007; Tsai, O'Connor, Floyd, & Velasquez, 2009).

Finally, another reason to examine gender differences in the presentation of diagnostic criteria is that they may prove useful in determining the best way to conceptualize alcohol use disorder. Previous research indicates that the course of alcohol dependence may be different in women. Some researchers have proposed a

"telescoping effect" (Schuckit, Daeppen, Tipp, Hesselbrock, & Bucholz, 1998) which predicts a later onset for problem use of alcohol among women, which then progresses to dependence more quickly, and is followed by a shorter time to seek treatment (Hernandez-Avila, Rounsaville, & Kranzler, 2004; Randall, Roberts, Del Boca, Carroll, & Connors, 1999; Schuckit et al., 1998). However, in a study designed to examine evidence for gender differences in the course of alcohol dependence while women tended to have a later age of onset, they did not show a shorter time to dependence, or to seeking treatment (Keyes, Martins, Blanco, & Hasin, 2010). This finding challenges the notion of a gender-specific course of alcohol disorders, and makes it apparent that differences in problem drinking between the genders needs to be further investigated.

PURPOSE

There is strong support for the diagnosis of alcohol dependence in the DSM-IV-TR, however, the abuse diagnosis remains problematic. The proposed revision to the DSM-5 alcohol use disorder diagnosis seeks to address the current inconsistencies, but there is some evidence suggesting that differences in the manifestation of alcohol use disorders between genders should be investigated further as they may contribute to the manifestation of the disorder and could better inform upcoming changes in the nosology and future treatment for these disorders.

The current study explored differences in the manifestation of alcohol use disorders between genders and determine whether these differences affect a shift from a categorical to a dimensional conceptualization of the disorder.

Hypotheses:

1. Based on the American Psychiatric Association's (APA, 2012) proposed changes to the DSM, and the similarities to the current DSM diagnostic criteria for alcohol use disorder, it was hypothesized that DSM-IV-TR and DSM-5 will appear compatible for individuals with a diagnosis of dependence when they are converted to the new "severe" category regardless of gender. Based on studies showing that diagnostic orphans may be at risk for more serious alcohol problems (McBride et al., 2009 ab), that diagnostic orphans are more likely to be diagnosed with dependence at follow up in longitudinal studies (McBride & Adamson, 2010), and the change in symptom threshold for diagnosis proposed for the DSM-5, I hypothesized the most significant discrepancies in diagnosis will be for those diagnosed with DSM-IV-TR

abuse, or those who are known as “diagnostic orphans” (i.e. endorses 1-2 dependence criteria and no abuse criteria).

2. Based on findings that women with severe alcohol use also tend to be experiencing severe psychological distress (Patrick et al., 2011; Velasquez et al., 2009; Tsai, et al., 2009)) it was expected that women will be more likely to endorse items related to use to relieve emotional distress compared to men.
3. Based on findings that alcohol problems may progress more quickly to dependence (Schuckit et al.,1998), and that women with legal problems tend to endorse more dependence criteria than men with the same legal problems (McCutcheon et al., 2009), it was hypothesized that women will report more symptoms of severe alcohol use disorder than their male counterparts.
4. Based on research showing that the abuse diagnosis may be empirically validated in men, but not for women (Lynskey et al.,2005), and that over the course of time men tend to retain their abuse diagnosis compared to females who do not (Hasin et al., 1997), it was hypothesized that males will be more likely to endorse more DSM-IV-TR abuse symptoms than females.
5. Based on research suggesting that the abuse diagnosis is made up of symptoms and behaviors more likely to decrease with maturity and age (Hasin et al, 1997), it was hypothesized there will be a significant difference between age groups in their rate of endorsing abuse criteria, with younger people endorsing more abuse criteria than their older counterparts.

METHODS

Participants

Participants for this study are incoming male and female inmates between the ages of 18 and 65 housed in the Minnesota Department of Corrections. Data were derived from routine clinical assessments of state prison inmates over a 2 ½ year period. Demographic data is presented in Appendix B.

Measure

Data were derived from an automated version of the Substance Use Disorder Diagnostic Schedule-IV (SUDDS-IV; Hoffman & Harrison, 1995) adapted for correctional applications. The SUDDS-IV covers the DSM-IV-TR criteria for substance use disorders with multiple questions for most of the criteria. However, the structured interview also contains additional questions that address concepts consistent with the new compulsion to use criterion proposed for the DSM-5 ("Has the desire to use alcohol or drugs ever been so strong that you could not resist using?") and another item addresses preoccupation with use ("Have you ever found yourself preoccupied with wanting to use alcohol or drugs?"). Another item covers using alcohol to relieve emotional discomfort (Have you ever used alcohol or drugs to relieve emotional discomfort, such as sadness, anger, or boredom?). Responses in the affirmative to these general questions are then followed up with clarifications as to whether the response refers to alcohol and/or other specific drugs. For the purposes of this study, only individuals with alcohol use disorder responses were considered.

The SUDDS-IV internal consistency reliability analyses revealed that the Cronbach Alpha coefficient for the 24 items defining ''dependence'' was 0.96. The

Alpha coefficient for the 14 ‘‘abuse’’ items was 0.89, also suggesting good internal consistency.

Procedure

The SUDDS measure is a computer prompted interview and was administered by certified addictions counselors. The counselors asked the questions as they appear on the screen and record the inmates’ responses on laptop computers.

RESULTS

Hypothesis 1:

As expected, there was a significant proportion of compatibility between DSM-IV-TR alcohol use disorder diagnoses and proposed DSM-5 alcohol use disorder diagnoses for males, χ^2 (4, n= 6871) = 8231.46, p <.05 (Table 1 for percentage breakdowns). Results indicated a significant proportion of compatibility between DSM-IV-TR alcohol use disorder diagnoses and proposed DSM-5 alcohol use diagnoses for females as well, χ^2 (4, n= 801) = 1077.47, p <.05 (Table 2 for percentage breakdowns). As expected, the no diagnosis group and the dependence group have near perfect agreement with 97% or more of the DSM-IV cases in the no diagnosis and alcohol dependence categories falling into the respective no diagnosis and severe alcohol use disorder diagnoses of the proposed DSM-5 designations.

As hypothesized, there were significant changes in diagnosis for individuals known as 'diagnostic orphans' for males, χ^2 (12, n = 6871) = 9294.61, p < .05, and females, χ^2 (12, n = 801) = 1223.25, p < .05. Tables 3 and 4 provide a more detailed breakdown of the DSM-IV designations to include consideration of the diagnostic orphans.

Table 1

Proportion of Males within DSM-IV-TR Categories and DSM-5 Classification

DSM-IV-TR Category	DSM-5 Proposed Diagnostic Classification			
	No Diagnosis	Moderate SUD	Severe SUD	χ^2
No Diagnosis	97.0%	3.0%		8231.46***
	(3626)	(111)		
Abuse	32.3%	47.9%	19.8%	
	(359)	(532)	(220)	
Dependence		1.7%	98.3%	
		(35)	(1988)	

Note. *** = $p \leq .001$. Number of individuals in sample falling in category presented in parentheses below percentages.

Table 2

Proportion of Females within DSM-IV Categories and DSM-5 Classification

DSM-IV-TR Category	DSM-5 Proposed Diagnostic Classification			
	No Diagnosis	Moderate SUD	Severe SUD	χ^2
No Diagnosis	97.9%	2.1%		1077.47***
	(467)	(10)		
Abuse	30.5%	54.9%	14.6%	
	(25)	(45)	(12)	
Dependence		0.4%	99.6%	
		(1)	(241)	

Note. *** = $p \leq .001$. Number of individuals in sample falling in category presented in parentheses below percentages.

Table 3

Proportion of Males within DSM-IV-TR Categories and DSM-5 Classification (Diagnostic Orphans)

DSM-IV-TR Category	DSM-5 Proposed Diagnostic Classification			
	No Diagnosis	Moderate SUD	Severe SUD	χ^2
Diagnostic Orphan	79.0%	21.0%	0%	9294.61***
	(417)	(111)	(0)	
Abuse Only	75.9%	24.1%	0%	
	(344)	(109)	(0)	
Abuse + Orphan	0.4%	64.3%	33.4%	
	(15)	(423)	(220)	

Note. *** = $p \leq .001$. Expected frequency of sample falling in category presented in parentheses below percentages.

Table 4

Proportion of Females within DSM-IV-TR Categories and DSM-5 Classification (Diagnostic Orphans)

DSM-IV-TR Category	DSM-5 Proposed Diagnostic Classification			
	No Diagnosis	Moderate SUD	Severe SUD	χ^2
Diagnostic Orphan	78.7%	21.3%	0%	1223.25***
	(37)	(10)	(0)	
Abuse Only	85.2%	14.8%	0%	
	(23)	(4)	(0)	
Abuse + Orphan	3.6%	74.5%	21.8%	
	(2)	(41)	(12)	

Note. *** = $p \leq .001$. Expected frequency of individuals in sample falling in category presented in parentheses below percentages.

Hypothesis 2:

As expected, a significant association was found in the number of males and females endorsing the use to relieve emotional distress criterion, with females endorsing this criterion more, χ^2 (1, *n*= 3537) = 1077.47, *p* = .00 (Table 5 for percentage breakdowns).

Table 5

Crosstabulation of Gender and Use to Relieve Emotional Distress Criterion

Gender	Use to Relieve Emotional Distress		
	No	Yes	χ^2
Female	13.6%	86.4%	41.22***
	(44)	(280)	
Male	30.6%	69.4%	
	(982)	(2231)	

Note. *** = $p \leq .001$. Expected frequency of individuals in sample falling in category presented in parentheses below percentages.

A Mann-Whitney U test was used to determine if there was a statistically significant difference in the amount of males and females endorsing this criterion. As hypothesized, a statistically significant difference was found, with females endorsing "use to relieve emotional distress", (*Md*= 1, *n* = 803), *U* = 2361131.50, *z* = -8.65, *p* < .05, more than males (Md= 1, *n* = 7018).

Hypothesis 3:

A Mann-Whitney U test was used to examine the likelihood that women were endorsing more symptoms of DSM-5 alcohol use. As hypothesized, there was a statistically significant difference in the amount of women endorsing four or more

symptoms, which influences the severity designation for diagnosis as proposed by the DSM-5, (*Md*= 14, *n*=242) compared to men (*Md* =10, *n* = 2068), *U* = 197728, *z* = -5.36, $p < .05$.

Hypothesis 4:

A Mann-Whitney U test was conducted to assess for differences in the number of DSM-IV-TR abuse symptoms reported by males compared to females. Contrary to hypothesis, there was not a statistically significant difference in the number of abuse symptoms reported by males (*Md* = 7, *n* =1145) compared to females (*Md* = 6, *n* = 82), *U*= 41786, *z* = -1.71, $p > .05$.

Hypothesis 5:

A one-way between subjects ANOVA was conducted to compare the effect of age (18-24, 25-29, 30-34, and 35 +) on DSM-IV-TR alcohol abuse items endorsed. There was not a significant effect found for age on alcohol abuse items endorsed, $F(3,7827) = 2.34$, $p > .05$, indicating that younger individuals are not endorsing more abuse items as hypothesized (see Table 6 for means and standard deviations).

Table 6

Mean Number of Abuse Items Endorsed as a function of Age (with Standard Deviations in parentheses)

	Age			
Dependent Variable	18-24	25-29	30-34	35 +
Alcohol Abuse items endorsed	2.60 (3.62)	2.57 (3.86)	2.31 (3.76)	2.41 (3.86)

A chi-square test for association was conducted post-hoc to determine if there was a significant difference in the proportion of those diagnosed with abuse and those not diagnosed with abuse between age categories. Results indicate that there is a difference in the proportion, χ^2 (3, n=5113) =85.06, p <.05 (Table 7 for percentage breakdowns).

Table 7

Proportion of Alcohol Abuse Diagnoses between Age Groups

Age Groups	Alcohol Abuse Diagnosis		
	No	Yes	χ^2
18-24	77.8%	22.2%	85.06***
	(1253)	(358)	
25-29	82.7%	17.3%	
	(760)	(159)	
30-34	86.9%	13.1%	
	(728)	(110)	
35 +	89%	11%	
	(1553)	(192)	

Note. *** = $p \leq .001$. Expected frequency of individuals in sample falling in category presented in parentheses below percentages.

DISCUSSION

Gender differences in the manifestation of alcohol use disorders has been studied, but not in relation to how it affects the classification of the disorder in the DSM. The impending publication of the DSM-5 presents a unique opportunity to explore some of the purported differences in alcohol use disorder across gender, and has the potential to influence changes in the current diagnostic schema.

Compatibility of DSM-IV-TR and DSM-5 diagnosis by Gender

The change in the diagnostic scheme from the DSM-IV-TR to the DSM-5 demonstrated modestly different results for those with no current diagnosis or those with a current dependence diagnosis. In general, approximately 97% of both males and females with no diagnosis were still identified as not having an alcohol use disorder. Overall, there do not appear to be any major differences in the pattern of DSM-IV-TR diagnostic classification to proposed DSM-5 classification between males and females. Similarly, almost all of those with a current dependence diagnosis fell into the DSM-5 classification of Severe Alcohol Use Disorder (SAUD). As predicted, more variability was seen among individuals with an abuse diagnosis. Around 30% of both males and females will no longer have a diagnosis, and almost half of the males, and a little more than half the females diagnosed with abuse, will now have a moderate alcohol use disorder diagnosis. It is likely that the variability among those currently receiving an abuse diagnosis is attributable to either the removal of legal problems as an abuse criterion or to the consideration of one or two dependence criteria in conjunction with the abuse criteria.

Notably, a significant proportion of both males and females with an abuse diagnosis will be diagnosed with severe alcohol use disorder. Individuals with a current abuse diagnosis that now fall into the SAUD category are individuals endorsing abuse criteria as well as one or two dependence criteria. In addition, inclusion of the new criterion of compulsion to use may also contribute to shifting the abuse diagnosis into the more severe range.

The few cases with no current diagnosis who received a diagnosis of Moderate Alcohol Use Disorder (MAUD) are accounted for by the so-called diagnostic orphans, who are positive on two DSM-IV dependence criteria but no abuse criteria. About one in five of the diagnostic orphans are positive on two dependence criteria which places them into the MAUD designation. The only individuals who meet current dependence criteria who fall into the MAUD designation are those who were positive on only three of the dependence criteria and none of the abuse criteria.

It is possible that those currently meeting abuse diagnosis plus some dependence symptoms are more likely to manifest a more severe condition than the current criteria indicate. In addition, it is also possible that individuals who do not meet a diagnosis, but still endorse one or two dependence criteria (diagnostic orphans) may be overlooked by the current DSM-IV-TR criteria. This is in concordance with previous research suggesting that individuals who endorse one or two dependence criteria are more likely to experience adverse life events and poorer physical health than individuals with an alcohol abuse diagnosis (Hasin & Paykin, 1998; McBride et al., 2009 ab). In short, it may be that the DSM-5 has more clinical justification for diagnosis, as it works similarly across gender and better captures distress and impairment required for a psychiatric diagnosis.

Gender and Use to Relieve Emotional Distress

Previous research indicates that there may be gender differences in motivation to use alcohol, and as such it may be beneficial to consider including criteria in the diagnostic classification system that reflects those differences. In particular, women in severe psychological distress tend to abuse alcohol at higher rates compared to those that are not in psychological distress (Patrick et al., 2011; Velasquez et al., 2009; Tsai, et al., 2009). Results from this study indicate that women abuse alcohol at higher rates to relieve emotional distress and that a significant proportion of females endorsed this criterion, suggesting that its inclusion may be useful in diagnosis of the disorder, particularly in forensic settings. It is also possible that including the alcohol use to relieve distress criterion as a specifier might be useful in determining how to treat the individual diagnosed with the disorder.

Gender Differences in Severity

Results from previous research suggest that the severity of alcohol use disorder differs in males and females. This study supported findings that women with legal issues tend to endorse more symptoms of alcohol dependence than men with similar legal problems, suggesting that antisocial behavior among women may be an indicator of worse alcohol problems among women. Previously, it has been noted that women with alcohol use disorder show rapid physical decline, increased symptom development, greater gender role conflict, and in general, less positive outcome expectancies for alcohol than men with alcohol use disorder (Nolen-Hoeksema & Hilt, 2006). Therefore, by the time females are engaging in rule breaking behaviors, their disorder may have reached a more severe level. The impact a severe alcohol use diagnosis has on treatment

decisions compared to moderate alcohol use diagnosis remains to be seen, but overall, DSM-5 may have more clinical justification as it makes distinctions based on severity.

Gender Differences in Alcohol Abuse

Contrary to previous findings documenting gender specific differences in the rate of DSM-IV-TR alcohol abuse diagnosis, this study found no differences in the amount of abuse criteria endorsed by males and females. It is well documented that almost twice as many men meet criteria for alcohol abuse compared to women in prison samples (Fazel, Bains, & Doll, 2006). Previous studies have also shown that abuse may exist in men, but not in women (Lynskey et al., 2005). It is possible that the similarities in abuse symptom count exist since all individuals in this study come from a correctional setting, and therefore would be more likely to endorse the legal problems criterion.

Age and Abuse

Previously, researchers have proposed that the abuse diagnosis be dropped from the DSM because it is composed of symptoms and behaviors that tend to decrease with age and maturity (Hasin et al, 1997). Results from this study do not indicate that there is any significant difference in age and number of abuse symptoms endorsed.

However, if you disregard the abuse symptom count and simply examine the proportion of individuals diagnosed with alcohol abuse by age, there does appear to be a significant difference. Findings confirm that a larger proportion of individuals diagnosed with alcohol abuse fall in the 18-24 year old range and the proportion of those diagnosed with abuse thereafter decreases as age increases. This is in concordance with previous research, and seems to indicate that removal of the abuse diagnosis may be reasonable for the DSM-5, particularly considering that little movement from the abuse diagnosis to the

dependence diagnosis has been observed over time (Schuckit et al., 2001). It is also probable that the age difference observed in the abuse diagnosis is the reason that the disorder does appear to be categorical, and when the abuse diagnosis is removed, the disorder takes a more dimensional construct.

Conclusions

Overall, there do not seem to be significant gender differences in diagnostic agreement between the DSM-IV-TR and proposed DSM-5. As hypothesized, most of the discrepancy in diagnosis is found for individuals currently diagnosed with abuse. Both genders will have individuals who lose their abuse diagnosis due to the removal of the legal problems criterion, and both genders will have individuals diagnosable if they have positive findings on at least two criteria (diagnostic orphans).

In addition, with the exception of gender differences found in symptom count and alcohol use to relieve emotional distress, males and females of all ages tend to report similar numbers of abuse items. This indicates that while males may more frequently be diagnosed with alcohol abuse, females may not be receiving as much attention for symptoms indicative of abuse. Potentially, behaviors exhibited by females are not as drastic as males, or are likely to be ignored until they become more serious. In short, there seems to be more clinical justification for the DSM-5 conceptualization of the alcohol use disorder. The use of severity indications will capture individuals endorsing two or more symptoms, and will specify whether the individual has a moderate alcohol use disorder or a severe alcohol use disorder, thus eliminating the need for an abuse diagnosis.

One gender specific inclusion to the criteria that may be beneficial to improve diagnosis and mold treatment decisions is the addition of a use to relieve emotional distress criterion. This item was endorsed by a significant number of females with alcohol problems, as well as a large percent of males.

Future Research

Future research might focus on specific differences in diagnostic classification, such as treatment implications for individuals diagnosed with moderate alcohol use disorder vs. those diagnosed with severe alcohol use disorder. Previous research has shown that some symptoms of alcohol use disorder are indicative of more severe problems, so further research into severity indicators of specific criteria may be warranted.

Limitations

The current study is not without limitations. Forensic populations are known to have higher rates of alcohol use disorders, which may influence the ability to generalize the results to a clinical or general population. The study utilizes an instrument primarily based on the DSM-IV-TR and thus does not cover the new compulsion criteria as thoroughly as it might. Results may be skewed if poly-substance use or addiction exists. Potentially, the symptoms of one substance use disorder may have exacerbated the symptoms of another. Or it is possible that the individual could have been confused about which substances were causing the symptoms.

References

American Psychiatric Association (1968, 1980, 1987, 1994, 2000). *Diagnostic and Statistical Manual of Mental Disorders*. American Psychiatric Association,Washington, DC.

American Psychiatric Association, DSM-5 Development (2012). R00 Alcohol Use Disorder. Retrieved from http://www.dsm5.org/ProposedRevision/Pages/proposedrevision.aspx?rid=452.

Babor, T. F., Hofmann, M. I., DelBoca, F. K., & Hesselbrock, V. (1992). Types of alcoholics, I. Evidence for an empirically derived typology based on indicator of vulnerability and severity. *Archives of General Psychiatry, 49*, 599–608.

Cloninger, C .R., Bohman, M., & Sigvardsson, S. (1981). Inheritance of alcohol abuse: Cross fostering analysis of adopted men. *Archives of General Psychiatry, 38*, 861-868.

Edwards, G. & Gross, M. M. (1976). Alcohol dependence: provisional description of a clinical syndrome. *British Medical Journal*, *1*, 1058-1061.

Fazel, S., Bains, P., & Doll, H. (2006). Substance abuse and dependence in prisoners: A systematic review. *Addiction, 101*, 181-191.

Feighner, J.P., Robins, E., Guze, S.B., Woodruff, R.A., Winokur, G., & Munoz, R. (1972). Diagnostic criteria for use in research. *Archives of General Psychiatry, 26*, 57-63.

Harford, T., & Muthén, B. O. (2001). The dimensionality of alcohol abuse and dependence: A multivariate analysis of DSM-IV symptom in the National Longitudinal Survey on Youth. *Journal of Studies on Alcohol, 62*(2), 150-157.

Hasin, D. & Beseler, C. (2009). Dimensionality of lifetime alcohol abuse, dependence and binge drinking. *Drug and Alcohol Dependence, 101*, 53-61.

Hasin, D. & Paykin, A. (1998). Dependence symptoms but no diagnosis: diagnostic 'orphans' in a community sample. *Drug and Alcohol Dependence, 50*, 19–26.

Hasin, D., Paykin, A., Endicott, J., & Grant, B. (1999). The validity of DSM-IV alcohol abuse: Drunk drivers vs all others. *Journal of Studies on Alcohol, 60*, 746-755.

Hasin, D., Van Rossem, R., McCloud, S., & Endicott, J. (1997). Differentiating DSM-IV alcohol dependence and abuse by course: Community heavy drinkers. *Journal of Substance Abuse, 9*, 127-135.

Helzer, J.E., Bucholz, K.K., Bierut, L.J., Regier, D.A., Schuckit, M.A., & Guth, S.E. (2006). Should DSM-V include dimensional diagnostic criteria for alcohol use disorders?. *Alcoholism: Clinical and Experimental Research, 30*(2), 303-310.

Hernandez-Avila, C.A., Rounsaville, B.J., & Kranzler, H.R. (2004). Opiod-, cannabis- and alcohol-dependent women show more rapid progression to substance abuse treatment. *Drug and Alcohol Dependence, 74*(3), 265-272.

Hoffmann, N. G. & Hoffmann, T. D. (2003). Construct validity for alcohol dependence as indicated by the SUDDS-IV. *Journal of Substance Use and Misuse, 38* (2), 293-306.

Jellinek, E.M. (1960). *The disease concept of alcoholism.* New Brunswick: Hillhouse Press.

Kahler, C.W., & Strong, D.R. (2006). A Rasch model analysis of DSM-IV alcohol abuse and dependence items in the National Epidemiological Survey on Alcohol and

Related Conditions. *Alcoholism: Clinical and Experimental Research, 30,* 1165–75.

Keyes, K.M., Martins, S.S., Blanco, C. & Hasin, D.S. (2010). Telescoping and gender differences in alcohol dependence: New evidence from two national surveys. *The American Journal of Psychiatry, 167*(8), 969-976.

Krueger, R.F., Nichol, P.E., & Hicks B.M. (2004). Using latent trait modeling to conceptualize an alcohol problems continuum. *Psychological Assessment, 16,* 107–119.

Langenbucher, J.W., Labouvie, E., Martin, C., Sanjuan, P.M., Bavly, L., Kirisci, L., & Chung, T. (2004). An application of item response theory analysis to alcohol, cannabis, and cocaine criteria in DSM-IV. *Journal of Abnormal Psychology, 113*(1), 72-80.

Lynskey, M.T., & Agrawal, A. (2007). Psychometric properties of DSM-IV assessments of illicit drug abuse and dependence. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 37*(9), 1345-1355

Lynskey, M.T., Nelson, E.C., Neuman, R.J., Bucholz, K.K., Madden, P.A.F., Knopik, V.S., Slutske, W., Whitfield, J.B., Martin, N.G., & Heath, A.C. (2005). Limitations of DSM-IV operationalizations of alcohol abuse and dependence in a sample of australian twins. *Twin Research and Human Genetics, 8*(6), 574-584.

McBride, O., & Adamson, G. (2010). Are subthreshold alcohol dependence symptoms a risk factor for developing DSM-IV alcohol use disorders? A three-year prospective study of ‘diagnostic orphans’ in a national sample. *Addictive Behavior, 35,* 586-592.

McBride, O., Adamson, G., Bunting, B.P., & McCann, S. (2009a). Characteristics of DSM-IV alcohol diagnostic orphans: Drinking patterns, physical illness, and negative life events. *Drug and Alcohol Dependence, 99*, 272-279.

McBride, O., Adamson, G., Bunting, B.P., & McCann, S. (2009b). Diagnostic orphans: Comparing self-report lifetime course to groups with DSM-IV alcohol abuse and dependence. *Addictive Behaviors, 34*, 86-91.

McCutcheon, V.V., Heath, A.C., Edenberg, H.J., Grucza, R.A., Hesselbrock, V.M., Kramer, J.R., Bierut, L.J., & Bucholz, K.K. (2009). Alcohol criteria endorsement and psychiatric and drug use disorders among DUI offenders: Greater severity among women and multiple offenders. *Addictive Behaviors, 34*, 432-439.

Mokdad, A.H., Marks, J.S., Stroup, D.F., & Gerberding, J.L. (2004). Actual causes of death in the United States, 2000. *Journal of the American Medical Association, 291*(10), 1238-1245.

Nolen-Hoeksema, S., & Hilt,L. (2006). Possible contributors to the gender differences in alcohol use and problems. *Journal of General Psychology, 133*, 357-374.

Patrick, M. E., Schulenberg, J. E., O'Malley, P. M., Maggs, J. L., Kloska, D. D., Johnston, L. D., & Bachman, J. G. (2011). Age-Related Changes in Reasons for Using Alcohol and Marijuana From Ages 18 to 30 in a National Sample. *Psychology of Addictive Behaviors*. doi: 10.1037/a0022445

Randall, C. L., Roberts, J.S., Del Boca, F.K., Carroll, K.M., Connors, G.J., & Mattson, M.E. (1999). Telescoping of landmark events associated with drinking: A gender comparison. *Journal of Studies on Alcohol, 60*(2), 252-260.

Rounsaville, B. (1987). *An evaluation of the DSM-III substance use disorders*. New York: Cambridge University Press.

Saha, T.D., Chou, S.P., & Grant B.F. (2006). Toward an alcohol use disorder continuum using item response theory: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychological Medicine, 36,* 931-941.

Schuckit, M.A., Daeppen, J.B., Tipp, J.E., Hesselbrock, M., & Bucholz, K.K. (1998). The clinical course of alcohol-related problems in alcohol dependent and nonalcohol dependent drinking with women and men. *Journal of Studies on Alcohol, 59*(5), 581-590.

Schuckit, M.A., Nathan, P.E., Helzer, J.E., & Woody, G.E. (1991). Evolution of the DSM diagnostic criteria for alcoholism. *Alcohol Health and Research World, 15*(4), 278-283.

Schuckit, M. A., Smith, T. L., Danko, G. P., Bucholz, K. K., Reich, T., & Bierut, L. (2001). Five-year clinical course associated with DSM-IV alcohol abuse or dependence in a large group of men and women. *American Journal of Psychiatry, 158*(7), 1084-1090.

Schuckit, M.A., Tipp, J.E., Smith, T.L., Shapiro, E., Hesselbrock, V.M., Bucholz, K.K, Reich, T, & Nurnberger, J.I. (1995). An evaluation of type a and b alcoholics. *Addiction, 90,* 1189-1203.

Slade,T., Grove, R., & Teesson, M. (2009). A taxometric study of alcohol abuse and dependence in a general population sample: Evidence of dimensional latent structure and implications for DSM-V. *Addiction, 104,* 742-751.

Strong, D.R., Caviness C., Anderson B., Brown R.A., & Stein, M. (2010). Assessing the severity of hazardous drinking and related consequences among incarcerated women. *Alcoholism: Clinical and Experimental Research, 34*(5), 907-914.

Substance Abuse and Mental Health Services Administration. (2010). *Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings* (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4586Findings). Rockville, MD.

Tsai, J., Floyd, L.R., O'Connor, M.J., & Velasquez, M.M. (2009). Alcohol use and serious psychological distress among women of childbearing age. *Addictive Behaviors, 34*, 146-153.

Velasquez, M.M., von Sternberg, K., Mullen, P.D., Carbonari, J.P., & Kan, L.Y. (2007). Psychiatric distress in incarcerated women with recent cocaine and alcohol abuse. *Women's Health Issues, 17*, 264-272.

Walters, G.D. (2008). The latent structure of alcohol use disorders: A taxometric analysis of structured interview data obtained from male federal prison inmates. *Alcohol & Alcohol Dependence*, 43, 326–33.

Appendix A

DSM-IV-TR Alcohol Use Disorder Criteria and Proposed DSM-5 Alcohol Use Disorder Criteria

DSM-IV-TR Alcohol Abuse Criteria	DSM-IV-TR Alcohol Dependence Criteria	Proposed DSM-5 Alcohol Use Disorder Criteria
Role Failure	Tolerance	Tolerance
Hazardous Use	Withdrawal	Withdrawal
Legal Problems	Unplanned Use	Unplanned Use
Social problems	Setting rules for use	Setting rules for use
	Time spent using	Time spent using
	Activities given up	Activities given up
	Physical/Psychological complications	Physical/Psychological complications
		Failure to fulfill role obligations
		Hazardous Use
		Social/Interpersonal problems
		Craving or compulsion to use

Appendix B

Demographic data for Incarcerated Males and Females

	Male (N=6871)	Female (N=801)
Ethnicity		
Asian	1.6%	<1%
African American	31.5%	21.5%
Hispanic	6.8%	2.7%
Native American	7.7%	13.2%
White/Caucasian	50.9%	57.7%
Bi-racial/Other	1.6%	4.2%
Marital Status		
Never Married	68.8%	56.1%
Married	12.3%	12.4%
Separated	4.0%	6.6%
Divorced	14.4%	23%
Widowed	<1%	2%
Education		
No HS Grad	35.6%	34.3%
HS Grad	52.9%	47.8%
Voc/Tech	7.4%	10.7%
Associate Degree	2.8 %	3.7%

BA/BS	1.1%	2.9%
MA/MS	<1%	<1%
Doctorate	<1%	<1%
Employment		
Full Time	50.5%	32%
Part Time	14.9%	13.6%
Unemployed	15.6%	1.7%
Not working by choice	18.9%	52.6%
Job Type		
White collar	9.2%	34.6%
Skilled blue collar	24.0%	7.5%
Laborer/Temp	34.5%	15.2%
Other/unknown	32.3%	42.7%
Personal Income		
None-10K	57.5%	63.2%
$10,001-20K	22.2%	21.1%
$20,001-30K	11.3%	10.2%
More than $30,000	9.1%	5.4%