

AXIS I DISORDERS, DUAL-DIAGNOSIS, AND HEALTH-RELATED QUALITY OF LIFE:
RESULTS FROM THE NATIONAL EPIDEMIOLOGIC SURVEY ON ALCOHOL AND
RELATED CONDITIONS (NESARC)

By

BRANDY RENEE HENSON

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To the Faculty of Washington State University:

The members of the Committee appointed to examine the dissertation of
BRANDY RENEE HENSON find it satisfactory and recommend that it be accepted.

Chair

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Abstract

By Brandy Renee Henson, PhD
Washington State University
AUGUST 2007

Chair: Dennis G. Dyck

This investigation examined the relationship between Axis I disorders, dual-diagnosis and health-related quality of life. This study includes data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant, Moore, & Kaplan, 2003). The aim of this study is to provide information on the independent impact of mood disorders, anxiety disorders, alcohol use disorders and dual-diagnosis on HRQoL. Results revealed that mood disorders, anxiety disorders, alcohol use disorders, and dual-diagnosis are associated with diminished HRQoL. These results support previous research that found that psychopathology is associated with diminished HRQoL. The results of this study validate previous results and conclusions about psychological disorders, including dual-diagnosis, and HRQoL by replicating findings in a large, non-clinical, representative sample of U.S. adults. Finally, the results of this study extend the literature on HRQoL and psychological disorders by using DSM-IV diagnostic criteria that excluded substance and medically induced disorders, controlling for demographic characteristics, medical disorder diagnoses, personality disorders, and examining several Axis I disorders in one study.

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Dedication

This dissertation is dedicated to my mom and dad who provided both financial and even more emotional support

INTRODUCTION

Interest in the concept of health-related quality of life (HRQoL) has grown in popularity over the last decade. HRQoL indices have been used to estimate the impact or burden of diseases/disorders on functioning and well-being, compare outcomes of different treatment modalities, compare the sick and the well, monitor outcomes in clinical practice, monitor the health of a population, and inform policy and healthcare administration. There exists a unique opportunity to examine the impact of anxiety disorders, mood disorders, alcohol use disorders, and dual-diagnosis on HRQoL with the availability of the National Institute on Alcohol Abuse and Alcoholism's National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant, Moore, & Kaplan, 2003) dataset. The NESARC survey is the first epidemiological study to assess DSM-IV substance use disorders, independent mood and anxiety disorders, and HRQoL as measured by the SF-12v2 in a nationally representative sample of the U.S adult population.

Health-Related Quality of Life

HRQoL is a concept that developed out of consumer dissatisfaction with healthcare. There was a consumer movement to expand the traditional view of health that focuses on morbidity and mortality, which neglects a person's subjective experience or day-to-day functioning, to include a more holistic definition of health. This holistic approach was based on the World Health Organization's (WHO) definition of health. The WHO defined health as encompassing physical, mental and social well-being, not merely the absence of disease (WHO, 1948; as cited in Quilty, Van Ameringen, Mancini, Oakman, & Farvolden, 2003).

Although there is no consensus on the definition of HRQoL, it is generally described as the elements of an individual's physical, emotional, social, functional, and spiritual well-being (Guyatt, Feeny, & Patrick, 1993). Specifically, HRQoL refers to those aspects of quality of life that are related to health and healthcare and avoids abstract and philosophical concepts (Mendlowicz & Stein, 2000). Furthermore, HRQoL is a subjective perception of an individual's own quality of life and therefore is exclusively based on the evaluation by the person himself or herself (Namjoshi & Buesching, 2001).

Measures of Health-Related Quality of Life

Measures of HRQoL can be classified as either generic or disorder-specific instruments. Generic instruments are designed to measure "global" quality of life; they attempt to measure all of the important domains of HRQoL (Guyatt, Feeny, & Patrick, 1993). Generic measures may be very useful in studies that attempt to document the range of disability in a general population or a specific patient group. The other approach to measuring HRQoL focuses on aspects of health status that is specific to the disorder under investigation. Disorder specific instruments include only the important aspects of HRQoL that are relevant to the patients being studied. Generic measures allow comparisons across diseases, disorders, and populations, while specific measures allow the detection of small, meaningful differences in specific conditions to which generic instruments may be unable to measure (Mendlowicz & Stein, 2000). Given the breadth of disorders reviewed in this paper, it is neither practical nor realistic to review all of the disorder-specific measures of HRQoL (for review see; IsHak, Burt, & Sederer, 2002). There are also many generic instruments to measure quality of life and HRQoL; it is beyond the scope of this paper to review each instrument (for review see Bech, 1993; Bowling, 1991; Katschnig, Freeman, Sartorius, 1997; McDowell & Newell, 1987). The literature reviewed here will focus

on published studies that used the SF-36 or other Medical Outcomes Study (MOS) derived forms in order to aid in comparison across psychiatric disorders and study methodology. This will limit the definition of HRQoL and scope of the studies reviewed; however, most studies of HRQoL have been assessed with MOS measures (Cramer, Polit, Torgersen, & Kringlen, 2005; Lehman, 1997) and comparison across disorders is possible.

Medical Outcome Study (MOS) Derived Forms

MOS Short Form-36 (SF-36). The SF-36 (Medical Outcomes Trust, Boston MA) is a practical, multi-purpose, generic, short-form health survey. The 36-item questionnaire consists of eight scales, four that comprise the Physical Component Summary (PCS) score (Physical Functioning, Role Limitations due to Physical Problems, Pain, and General Health Perceptions) and four that comprise the Mental Component Summary (MCS) score (Vitality, Social Functioning, Role Limitations due to Emotional Problems, and Mental Health). On each scale the scores range from 0-100 with higher scores indicating better health and a mean of 50 for the general population. The psychometric properties of the SF-36 have been studied extensively. Many reliability coefficient estimates have exceeded 0.80 (Ware et al., 1993). Internal consistency estimates for the MCS and the PCS have exceeded 0.90 (Ware, Kosinski, Keller, 1994). Reliability estimates consistently exceeded recommended standards for group level analysis across 24 different patients groups (Ware et al., 1993; Ware, Kosinski, Keller, 1994). There have been numerous published studies on the content, criterion, concurrent, construct, and predictive validity of the SF-36 (Ware et al., 1993). A shorter version of the SF-36, the SF-12, is a 12-item questionnaire that includes the eight scales contained in the SF-36. Some studies used an earlier version of the SF-36 is called the SF-20. This measure consists of 20 items that

include measures of role functioning, social functioning, mental health, pain, health perception, and physical health (Stewart, Hays, & Ware, 1988).

Health-Related Quality of Life in Individuals With Anxiety Disorders

Panic Disorder

There have been several studies that investigated HRQoL in patients with panic disorder. Sherbourne, Wells, and Judd (1996) compared the HRQoL of patient with panic disorder to patients with other major chronic medical illnesses or depression. Participants included 433 patients with current panic disorder and nearly 10,000 outpatients with depression or medical disorders. The authors measured HRQoL using the MOS 20-item and the 36-item short-form health surveys. After controlling for demographics, study site, and other disease conditions, regression analyses were used to estimate HRQoL levels for patients with panic disorder, a variety of medical conditions, and major depression. Results revealed that, in general, patients with panic disorder reported physical functioning that was very similar to the general population. However, patients with panic disorder rated current health, role functioning, mental functioning, and well-being below general population norms. In comparison to patients with depression included in the study, patients with panic disorder reported better mental health and energy level. In terms of role imitations in daily activities due to emotional problems ratings from patients with panic disorder were comparable to patients with major depression. In terms of physical health functioning, patients with panic disorder and patients with major depression were similar except that patients with panic disorder rated their current health significantly higher than patients with depression. When comparing the HRQoL ratings for patients with panic disorder to patients with medical illnesses the results were different depending on which medical illness was used as a comparison. Candilis and colleagues (1999) found similar results; results revealed

that patients with panic disorder had significantly lower scores on all subscales of the SF-36 when compared to the general population norms and lower scores on mental health subscales than patients with a general medical condition. However, the subscale scores for patients with panic disorder were comparable to those of patients with depression.

A study of primary care patients that included the general health perception, mental health, and physical functioning subscales of the SF-36 found that patients with panic disorder were significantly more impaired on all three subscales than were comparison participants who had never experienced a panic attack but may have had other psychiatric disorders (Hollifield et al., 1997). Rubin et al. (2000) investigated HRQoL in patients with panic disorder compared to matched population controls. Results revealed a decrease in HRQoL among patients with panic disorder that was similar to the HRQoL ratings reported by persons with diabetes. Ettigi, Meyerhoff, Chirban, Jacobs, and Wilson (1997) found that HRQoL scores were significantly below norms on MCS, PCS, and each SF-36 domain. While the lowest HRQoL ratings were observed on the domains in the MCS, significant decreases were also observed overall on the PCS and each subscale.

Schonfeld and colleagues (1997) examined the impact of untreated panic disorder on HRQoL among primary care patients. Panic disorder with agoraphobia had significant negative effects on physical functioning, social functioning, role physical, mental health, vitality bodily pain, and general health subscales of the SF-36. Panic disorder patients from another primary care sample had significantly lower physical, role, and social functioning compared to clinic patients without mental disorders (Spitzer et al., 1995). Finally, the earliest published study on HRQoL in patients with panic disorder as measured by the short-form health survey found

significant impairment but did not report scale or subscale scores (Massion, Warshaw, & Keller, 1993).

Social Phobia

There are few published studies that have examined the HRQoL, as measured by the SF-36, in individuals with social phobia. Simon and colleagues (2002) compared the quality of life in treatment seeking patients with social anxiety disorder to patients with panic disorder and the general population. The results indicated that treatment-seeking patients with social phobia reported significantly lower mental health and social functioning domains of HRQoL than the general population. However, when compared to patients with panic disorder, patients with social phobia reported significantly better HRQoL. Bech and Angst (1996) also found significant differences between individuals with social phobia and a general population control group. Schonfeld and colleagues (1997) examined the impact of untreated social phobia on HRQoL among primary care patients. Social phobia had significant negative effects on physical functioning, role emotional, mental health, vitality, and general health subscales of the SF-36.

Wittchen and colleagues investigated the impact of “pure” social phobia on quality of life; the participants included in the sample did not have significant comorbidity with another psychiatric disorder (Wittchen & Beloch, 1996; Wittchen, Fuestsch, Sonntag, Muller, & Liebowitz, 2000). The results revealed that when compared to a matched control group, the participants with social phobia reported lower scores on almost all of the SF-36 subscales; significant reductions were evident for role limitations due to emotional problems, social functioning, general mental health, and vitality. Overall, the research to date suggests that social phobia negatively impacts HRQoL; it appears that the impact is usually in the domains of general mental health and domains surrounding social functioning.

Generalized Anxiety Disorder (GAD)

The study of GAD has been complicated by the controversy surrounding the validity of its independent diagnostic status given the high overlap of symptomology and the high rate of comorbidity. However, evidence is emerging that supports GAD as an independent disorder; research has shown that key symptoms of GAD do not seem to be affected by the presence or absence of another disorder (Hunt, Slade, & Andrews, 2004). With less controversy surrounding the diagnostic specificity of GAD, it appears that more research on the independent impact of GAD on HRQoL is also emerging.

Hunt, Slade, and Andrews (2004) examined HRQoL, as measured by the SF-12, of individuals with “pure” Axis I disorders and individuals with comorbid Axis I disorders; the article focuses on the results of individuals with “pure” GAD and GAD comorbid with major depressive disorder. The results revealed that individuals with pure GAD reported a reduction in overall mental HRQoL compared to individuals with no diagnosed mental disorder. Additionally, pure GAD was found to be equally disabling as pure panic disorder but less disabling than pure major depressive disorder. Finally, GAD that is comorbid with any other Axis I disorder results in the greatest levels of disability especially, GAD comorbid with major depression.

Loebach-Wetherell et al. (2004) examined the impact of late-in life GAD on HRQoL in a small sample of older adults (N=75). GAD patients without psychiatric comorbidity reported significantly worse HRQoL on many of the SF-36 subscales including, general health, vitality, social functioning, and role functioning limitations due to emotional problems compared to older adults without DSM diagnoses. GAD patients with comorbid Axis I disorder also reported significantly worse HRQoL on all SF-36 subscales compared to the normal control group. GAD

patients with and without comorbidity did not differ in reported HRQoL. Finally, patients with GAD reported worse HRQoL compared to the published norms of people with type II diabetes and myocardial infarction.

Jones, Ames, Jeffries, Scarinci, & Brantley (2001) examined the HRQoL in low-income primary care patients with GAD compared to patients with other Axis I disorders and no psychiatric diagnosis. The results of the study indicate that patients with GAD had significantly lower HRQoL compared to patients with no diagnosis and patients with other Axis I diagnosis. Schonfeld and colleagues (1997) examined the impact of untreated generalized anxiety disorder on HRQoL among primary care patients. GAD had significant negative effects on physical functioning, social functioning, role physical, role emotional, vitality, and general health subscales of the SF-36. Lee and colleagues (1994, as cited in Schneier, 1997) compared the HRQoL in persons with GAD to persons with diabetes, congestive heart failure, or no chronic condition. The patients with GAD reported more impairment compared to the other groups on subscales of vitality, social function, role function, and mental health; however, these results did not control for psychiatric comorbidity. The patients with GAD generally reported less physical impairment compared to patients with diabetes or heart disease.

Overall, the research reviewed suggests that individuals with GAD in the absence of comorbidity, in fact, suffer impairment in HRQoL; therefore it appears that GAD independently and negatively impacts HRQoL. Additional investigation is needed to further discern how much GAD impacts HRQoL independent of comorbid disorders (Mogotsi, Kaminer, Stein, 2000; Quilty, Van Ameringen, Mancini, Oakman, & Farvolden, 2003).

Specific Phobia

Virtually no information exists on the HRQoL for individuals with specific phobia. One study examined the quality of life in 73 patients with dental phobia and found that those patients showed reduced quality of life on the majority of SF-36 subscales (Roy-Byrne, Milgrom, Tay, Weinstein, & Kanton, 1994). In another study, data from the Norwegian population, found that individuals with a specific phobia had lower global quality of life compared to individuals with no Axis I disorder but compared to other anxiety disorders those with specific phobia showed the least reduction in global quality of life (Cramer, Polit, Torgersen, & Kringlen, 2005). Given the dearth of information on the impact of specific phobia on HRQoL further research is warranted.

Health-Related Quality of Life in Individuals with Mood Disorders

Major Depressive Disorder

Many studies have examined the HRQoL in individuals with major depression and it is fairly well accepted that persons with depression have diminished quality of life. Other studies use the HRQoL in persons with major depression as a benchmark to compare against other Axis I disorders and medical conditions because the SF-36 was normed in individuals with depression. Given the depth of study on the HRQoL in persons with depression, the focus in the literature is changing to examine HRQoL as an outcome variable for various treatment modalities (Jones, Yates, Williams, Zhou, and Hardman, 1999; Kroenke et al., 2001; Simon, Revicki, Grothaus, & Vonkorff, 1998; Valenstein et al., 2000; Walker et al., 1995). The following review will briefly review studies examining the HRQoL in various samples with depression.

Valenstein et al (2000) assessed the HRQoL in patients recruited from two primary care clinics after reviewing chart diagnoses for major depression. Compared to the published population norms of SF-36 scores, this patient sample reported significantly health-related

impairment on all dimensions of the SF-36. Compared to patients with depression from the MOS, the patients in this sample reported similar functional impairment on most subscales of the SF-36. Schonfeld and colleagues (1997) examined the impact of untreated major depression on HRQoL among primary care patients. Major Depression had significant negative effects on physical functioning, social functioning, role physical, role emotional, mental health, vitality, bodily pain, and general health subscales of the SF-36. Patients with major depression (n=115) from the PRIME-MD 1000 Study, another primary care sample, had significantly lower HRQoL across all domains measured by the SF-20 compared to clinic patients without mental disorders (Spitzer et al., 1995). Jones, Yates, Williams, Zhou, and Hardman (1999) found lower reports of HRQoL in sample of adult psychiatric outpatients before they entered treatment. Wells and colleagues (1989) present data from the MOS in which they describe the HRQoL of individuals with depression relative to individuals with chronic medical conditions or no chronic conditions. The results demonstrated that depression resulted in lower HRQoL compared to individuals with no conditions and the HRQoL for depressed individuals was comparable or worse than individuals with medical conditions such as diabetes.

Bipolar Disorder

Few studies have investigated the impact of bipolar disorder on dimensions of HRQoL as measured by MOS derived questionnaires; only three published studies were identified. Yatham and colleagues (2004) examined the impact of bipolar I depression on HRQoL in 920 patients with bipolar I disorder compared to published data on the HRQoL of individuals with unipolar depression in seven different studies and the general population norms. The results demonstrated that participants with bipolar I depression reported significantly lower HRQoL on all domains of the SF-36 compared to the general U.S. population norms. Compared to the seven studies on

unipolar depression and HRQoL, the mean SF-36 scores for the bipolar sample in this study were significantly lower on three of the eight subscales: social functioning, role limitations due to physical health problems, and role limitations due to emotional problems. Mean SF-36 scores for the bipolar sample was also lower for general health, mental health, and vitality subscales compared to unipolar depression scores in six of the studies.

Arnold, Witzeman, Swank, McElroy, and Keck (2000) compared the HRQoL of patients with bipolar disorder to patients with chronic back pain and the general population norms. Their results indicated that individuals with bipolar disorder reported significantly lower HRQoL across all SF-36 domains except for physical functioning when compared to the general population norms. When the patients with bipolar disorder were compared to patients with chronic back pain, the pain patients reported significantly lower scores across four of the subscales; there were no significant differences between the groups on the other four subscales.

Cooke, Robb, Young, and Joffe (1996) assessed the HRQoL in patients with bipolar disorder and compared their scores to MOS patients with major depression and MOS patients with chronic medical conditions. The results suggest that impairment reported by patients with bipolar disorder were comparable to patients with major depression. Compared to the MOS patients with chronic medical conditions, the patients with bipolar disorder reported lower HRQoL on domains of social functioning, mental health, and overall health perception.

Health-Related Quality of Life in Individuals With Alcohol Use Disorders

There has only been a modest amount of research concerning the health-related quality of life in individuals with alcohol use disorders, which was unanticipated given that alcohol misuse is a major cause of mortality and results in increased healthcare utilization and other related healthcare burdens. However, it appears that HRQoL, as measured by MOS derived measures,

in individuals with alcohol use disorders is gaining in interest by the research community. To date, there have been several published studies examining the HRQoL in persons with alcohol use disorders.

Kalman et al. (2004) investigated the relationship between alcohol dependence, comorbid psychiatric disorders and HRQoL in a large random sample of Veterans Health Administration enrollees. Based on the Veterans SF-36, the results indicated that participants diagnosed with alcohol dependence reported significantly lower health-related quality of life on both the MCS and the PCS when compared to participants without any psychiatric diagnosis. Respondents with a history of alcohol dependence had lower scores on all subscales compared to participants without any psychiatric diagnosis. The largest differences were on the mental health, social functioning and role emotional subscales (Kalman et al., 2004). These results are consistent with previous research that found that patients with alcohol use disorders reported diminished HRQoL compared to individuals with no psychiatric disorders (Feeney, Connor, Mc.D Young, Tucker & McPherson, 2004; Johnson et al., 1995; Morgan, Landron, & Lehert, 2004; Spitzer et al., 1995).

In another study of HRQoL in alcohol dependent patients, Daepfen, Krieg, Burnand, & Yersin (1998) administered the SF-36 to 147 DSM-III-R alcohol dependent patients and compared their scores to 1007 healthy participants and 153 participants with depression. Mean scores of alcohol dependent participants compared to the healthy participants was lower on all subscales, however, the scores were substantially lower on role physical, role emotional, and mental health subscales. The authors also examined the relationship between HRQoL and the severity of alcohol dependence by splitting Addiction Severity Index into high, medium, and low severity ratings. The SF-36 scores were between 10% and 141% lower for patients with high

severity ratings compared to those with low severity ratings. The profile for the alcohol dependent participants and the participants with depression were similar.

Romeis and colleagues (1999) investigated the association between DSM-III-R lifetime diagnosis of alcoholism and HRQoL as measured by the SF-36. The authors examined HRQoL in alcoholism discordant, twin pair members of the Vietnam Era Twin Registry; HRQoL was measured in 436 twin pairs in which the alcoholic twin had no symptoms of alcohol dependence in the last 5 years (remitted alcoholics) and in 194 twin pairs in which the alcoholic twin reported one or more symptoms of alcohol dependence in the last 5 years (recent alcoholics). Overall, the results revealed that the twin with a history of alcoholism had poorer HRQoL compared to their nonalcoholic twin; this was true for both recent and remitted alcoholics but the SF-36 subscales differences were smaller in the remitted group (Romeis et al., 1999). However, when comorbid physical conditions, psychiatric conditions, drug and nicotine dependence, income and marital status, severity of alcoholism and familial factors were controlled, no subscale remained significantly lower in remitted nor in recent alcoholics, except for the vitality subscale, compared to their nonalcoholic twin. Generalizing the SF-36 subscales scores reported in this study to other samples, given the modifications to the survey, the exclusion of female alcoholics, and the possibility of non-response from more severe alcoholics is cautioned.

Volk, Cantor, Steinbauer, and Cass (1997) examined the HRQoL in primary care patients with alcohol use disorders. Overall, the results revealed that patients with DSM-IV alcohol dependence reported lower scores on the MCS compared to patients with alcohol abuse and patients with no disorders. More specifically, patients with alcohol dependence scored lower on all eight areas of functioning compare with patients that did not meet criteria for a disorder. However, the magnitude of decrement in the MCS scores was significantly reduced when

comorbid mood and anxiety disorders were controlled; this suggests that comorbidity may moderate the relationship between alcohol dependence and HRQoL. The results suggest that patients with alcohol abuse do not experience diminished HRQoL. McKenna et al (1997) found similar results in their Socio-Economic Costs and Consequences of Alcoholism (SECCAT) study; the results revealed that individuals with DSM-IV alcohol dependence reported poorer HRQoL, as measured by the SF-36, than alcohol abusers.

Summary

The preceding review focused on the individual impact Axis I disorders have on HRQoL. It appears that alcohol use, anxiety, and mood disorders independently impact HRQoL. In terms of anxiety disorders, prior research provides evidence that panic disorder results in decreased HRQoL. Research also suggests that, social phobia, specific phobia, and GAD may also be associated with a decrease in HRQoL but further research is needed to establish the association more concretely. In terms of affective disorders, research revealed that major depression and bipolar disorder are associated with poorer HRQoL. In terms of alcohol use disorders, previous research provides evidence that alcohol dependence is related to diminished quality of life; however, it appears that alcohol abuse may not be associated with decreased HRQoL although that conclusion is based on very few published studies. Further research on the consequences of alcohol abuse on HRQoL is needed. While these disorders appear to have an independent impact on HRQoL, these disorders are rarely independent of each other; alcohol use, anxiety, and mood disorders often co-occur. Many of the studies reviewed previously did not control for comorbid psychiatric or medical disorders both of which may also impact a person's self-reported HRQoL; this is an important limitation of the research to date. Therefore, future research should investigate the impact of individual and independent Axis I disorders on HRQoL by controlling

for comorbidity. Additionally, since many Axis I disorders co-occur, the relationship between alcohol use disorders and comorbid anxiety or mood disorders, termed dual-diagnosis, deserves consideration and examination.

Dual-Diagnosis/Comorbidity

Prevalence Rates

It is widely recognized that alcohol use disorders are often comorbid with anxiety and mood disorders but estimating the prevalence of comorbidity is complex. First, there exists no standard operational definition of comorbidity (Kushner, Abrams, & Borchardt, 2000). The most often used approach defines comorbidity as the presence of two or more psychiatric disorders that meet DSM criteria at some time, but not necessarily at the same time, during the lifetime of the individual (Kessler et al., 1997; Regier et al., 1990). The definition of comorbidity that is utilized may influence the prevalence rates reported. Prevalence estimates of comorbidity are also affected by the specific disorders under consideration (Kushner, Abrams, & Borchardt, 2000). For example, even within anxiety disorders, the prevalence rates for comorbid alcohol use disorders and panic disorder are likely to differ from the prevalence rates for comorbid alcohol use disorders and social phobia. In fact, these differences in prevalence rates have been documented in an earlier review (Kushner, et al., 1990). Finally, prevalence rates have been estimated from clinical studies, family studies, twin and adoption studies, and epidemiological studies. It is beyond the scope of this paper to review the literature in each of these areas (for reviews see: Chilcoat & Menard, 2003; Kushner, Abrams, & Borchardt, 2000; Kushner, Sher, & Beitman, 1990; Swendsen & Merikangas, 2000). The most current epidemiological estimates of alcohol use disorders and comorbid anxiety or mood disorders are presented.

Estimating Prevalence: NESARC

Grant et al (2004) present data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) on the prevalence of comorbidity of alcohol use disorders and independent, not substance induced, mood and anxiety disorders using DSM-IV diagnostic criteria. Within this nationally representative sample of the U.S. population (n=43093), the 12-month prevalence of mood, anxiety, and alcohol use disorders was 9.21%, 11.08%, and 8.46% respectively. About 19% of individuals with a current alcohol use disorder also met criteria for at least one current mood disorder and 17% met criteria for at least one current anxiety disorder. In individuals with alcohol dependence, almost 28% met criteria for a current mood disorder; 20% had major depression and nearly 8% had mania. In terms of anxiety disorders, among individuals with alcohol dependence, 23% had a current anxiety disorder; nearly 14 % had specific phobia and 6% had social phobia. Among individuals with current alcohol abuse, nearly 12% experienced a current mood disorder and 12% had a current anxiety disorder. Comparably, among individuals with current mood disorders, approximately 17% also had a current alcohol use disorder and among those with current anxiety disorders 13% also had a current alcohol use disorder. Additionally, 40.7% of individuals with a current alcohol use disorder who sought treatment during the same period also met criteria for at least one mood disorder and 33% had at least one anxiety disorder.

This epidemiological study provides strong evidence that there is significant comorbidity between alcohol use disorders and mood and anxiety disorders that is not accounted for by substance induced or withdrawal effects. Given the high rates of comorbidity between alcohol use disorders and independent mood and anxiety disorders, assessing the impact of dual-

diagnosis on HRQoL would provide beneficial information for estimating the burden of comorbidity, or dual-diagnosis, and for monitoring outcomes of treatment.

Consequences of Dual-Diagnosis

Individuals with dual-diagnosis, a co-occurring substance abuse and psychiatric disorder, face considerable adversity; they tend to experience more alcohol-related problems including, alcoholism-related medical illnesses (Bowen, 1988 as cited in Romeis et al., 1999), decreased socioeconomic status (Burke, 1988), and greater impairment in social and role functioning than individuals with alcohol use disorders that do not have a comorbid diagnosis (Johnson et al., 1995). In general, substance abusers with coexisting psychopathology have poor medication adherence, increased rates of homelessness, and suicidal behavior (Weiss & Collins, 1992). From an economic point of view, dually diagnosed individuals have significantly higher health care costs than those without comorbidity given their increased rate of hospitalization and service utilization. The prognosis for treatment in individuals with substance abuse and co-occurring psychiatric disorders is poor (Rounsaville, Dolinsky, Babor, & Meyer, 1987 as cited in Rosenthal & Westreich, 1999). The relapse to substance abuse or the exacerbation of a coexisting mental disorder is higher in patients with dual diagnosis (Renz, Chugn, Fillman, Mee-Lee & Sayama, 1995). All of these factors have the potential to contribute to adverse effects to an individual's perceived HRQoL.

Health-Related Quality of Life in Individuals With Dual-Diagnosis

Most recently, Kalman et al. (2004) investigated the relationship between alcohol dependence, comorbid psychiatric disorders and HRQoL in a large random sample of Veterans Health Administration enrollees. Respondents (N=127,308) completed the Veterans SF-36 and alcohol dependence, anxiety disorders, mood disorders, and psychotic disorders diagnoses, based

on ICD-9 criteria for the previous 12-month period, was extracted from the national VA database. The authors investigated whether the presence of one or more additional psychiatric disorders moderated the relationship between alcohol dependence and health-related quality of life. Results indicated that the presence of another psychiatric disorder moderated, or attenuated, the relationship between alcohol dependence and both the MCS and PCS subscales of the SF-36. In comparing participants with a history of alcohol dependence plus psychiatric comorbidity to participants without a psychiatric diagnosis the largest subscale differences between the groups were on the mental health, social functioning and role emotional subscales (Kalman et al., 2004). The strength of this study lies in the large random sample. However, the results of this study cannot be generalized beyond treatment-seeking Veteran samples since only respondents who sought medical and/or psychiatric care at a Veterans facility were included.

Romeis and colleagues (1999) examined HRQoL in alcoholism discordant, twin pair members of the Vietnam Era Twin Registry; HRQoL was measured in 436 twin pairs in which the alcoholic twin had no symptoms of alcohol dependence in the last 5 years (remitted alcoholics) and in 194 twin pairs in which the alcoholic twin reported one or more symptoms of alcohol dependence in the last 5 years (recent alcoholics). The data in their study suggests that when comorbid physical conditions, psychiatric conditions, drug and nicotine dependence, income and marital status, severity of alcoholism and familial factors are controlled, subscale differences between groups disappears. In other words, other factors appear to influence the relationship between alcohol dependence and HRQoL.

Daepfen, Krieg, Burnand, & Yersin (1998) administered the SF-36 to 147 DSM-III-R alcohol dependent patients and compared their scores to 1007 healthy participants and 153 participants with depression. Mean scores of alcohol dependent participants compared to the

health participants was lower on all subscales, however, they were substantially lower on role physical, role emotional, and mental health subscales. The profile for the alcohol dependent participants and the participants with depression were similar. While the authors did not test the effect of comorbid depression with alcohol dependence, they suggest that the presence of depression may affect the perception of HRQoL in individuals with alcohol dependence. Volk, Cantor, Steinbauer, and Cass (1997) examined the HRQoL in primary care patients with alcohol use disorders and the results of this investigation suggest that comorbidity may moderate the relationship between alcohol dependence and HRQoL.

In one of the earliest studies on alcohol use disorders, comorbidity and HRQoL, Johnson et al (1995) found that patients with alcohol use disorders scored significantly lower on all the SF-20 subscales except bodily pain compared to patients with no psychiatric disorders but scored higher compared to patients diagnosed with other psychiatric disorders. Johnson et al then examined to role of comorbidity between alcohol use disorders and other psychiatric disorders on HRQoL. The results showed that patients with alcohol use disorders and psychiatric comorbidity reported more functional impairment compared to patients with no psychiatric diagnosis and compared to patients with alcohol use disorders without psychiatric comorbidity. Therefore, the presence or absence of psychiatric comorbidity was associated with HRQoL in patients with alcohol use disorders; psychiatric comorbidity moderated the relationship between alcohol use disorders and HRQoL.

Summary and Future Directions

The research to date suggests that alcohol use, anxiety, and mood disorders may independently impact HRQoL but the generalizability of these findings is limited. Most of the studies reviewed used convenience and clinical samples, including samples from primary care

clinics, outpatient psychiatric clinics, and VA hospitals and therefore the results of these studies may not be generalized to the general public. Clinical samples may be restricted in the range of both quality of life and disorders present in the sample which constrains the generalizability; this may not be true is a broader sample (Quilty, Ameringen, Mancini, Oakman, Farvolden, 2003). Additionally, most of the studies reviewed utilized small sample sizes; this limits the confidence in the results of these studies. Finally, few studies controlled for comorbidity and this weakens the conclusion that anxiety, mood, and alcohol use disorders independently impact HRQoL. Therefore, future research is needed to investigate the individual impact of various DSM-IV Axis I disorders on HRQoL in large non-clinical samples with controls for comorbidity. No previous epidemiological study to date has measured HRQoL directly, using the SF-36 or any other generic measure, or examined the relationship between anxiety, mood, and alcohol use disorders and HRQoL. Investigating the Axis I psychiatric disorders separately may yield interesting and potentially treatment relevant information.

It is also evident that dual-diagnosis is highly prevalent in the U.S. general population and the research reviewed suggests that individuals with dual-diagnosis report significantly diminished HRQoL compared to individuals with no diagnosis and compared to individuals with “pure” disorders, those without a comorbid disorder. Again these findings are limited by sample characteristics and size. Additionally, investigation of comorbidity is often limited by the problematic distinction between independent and substance-induced disorders. Since DSM-IV criteria provide clarity and guidelines for making the differentiation between independent and substance-induced comorbidity (Grant et al., 2004), future research should utilize DSM-IV definitions of substance-induced and independent mood Axis I disorders to diagnose alcohol use disorders. Future research should investigate the relationship between alcohol use disorders,

other comorbid psychiatric disorders, and HRQoL in large, representative, non-clinical community samples. Previous epidemiological studies have not directly assessed the impact of dual-diagnosis on HRQoL. Epidemiological studies examining the impact of anxiety disorders, mood disorders, alcohol use disorders, and dual-diagnosis on HRQoL will illustrate the burden of these disorders on functioning and well-being, will allow the comparison between the sick and the well, will provide a snapshot of the subjective health of the U.S. population, and may inform policy and treatment of these disorders.

The Present Study

The objective of this investigation is to examine the impact of anxiety disorders (panic disorder, social phobia, generalized anxiety disorder, and specific phobia), mood disorders (major depression, bipolar disorder, and dysthymia), alcohol use disorders (abuse and dependence), and dual-diagnosis (alcohol use disorder and comorbid anxiety or mood disorder) on HRQoL as measured by the SF-12v2. To my knowledge this will be the first study to investigate the impact(s) of DSM-IV Axis I disorders and the impact of dual-diagnosis on HRQoL in a large, non-clinical sample of U.S. adults. This study analyzes data from the National Institute on Alcohol Abuse and Alcoholism's National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant, Moore, & Kaplan, 2003).

The specific aims of this study are to provide further evidence on the independent impact of mood and anxiety disorders on HRQoL and provide more information about the role of comorbidity or dual-diagnosis on HRQoL. It is hypothesized that Axis I disorders will have a negative impact on HRQoL. It is also hypothesized that respondents with any anxiety, mood, or alcohol use disorders will report lower HRQoL compared to respondents without psychiatric diagnoses. More specifically, it is hypothesized that respondents with a diagnosis of major

depression, alcohol dependence, panic disorder, or social phobia will report a decreased HRQoL on the MCS scale compared to respondents with no psychiatric diagnoses. Finally, it is hypothesized that respondents with dual-diagnosis will report significantly lower HRQoL compared to both respondents with an alcohol use disorder without comorbid psychopathology and respondents with no psychiatric diagnoses.

METHOD

Sample Overview

The demographic characteristics of the NESARC sample are presented in Table 1. The NESARC is a representative sample (N=43,093) of the U.S population, citizens and noncitizens, living in the United States; the National Institute on Alcohol Abuse and Alcoholism (NIAAA) conducted this epidemiological survey in 2001-2002 (Grant, Moore, Kaplan, 2003). The target population of the NESARC is the civilian non-institutionalized population, 18 years and older. The sample includes residents of households and non-institutional group housing including, boarding houses, rooming houses, non-transient hotels and motels, shelters, facilities for housing workers, college quarters, and group homes. The sampling frame for the NESARC housing units was based on the US Bureau of the Census Supplementary Survey and the group housing sampling frame was determined by the Census 2000 Group Quarters Inventory both of which are described more thoroughly in Grant, Moore, and Kaplan (2003). One person from each household or group quarter was randomly selected for interview. The response rate for the entire NESARC survey was 81% (Grant et al., 2004). African-American and Hispanic households were over-sampled in the survey; this over-sampling served as a way to correct for under-representation in previous comorbidity studies. Young adults (ages 18-24) were also over-sampled in the NESARC survey in an attempt to increase the understanding of heavy drinking

patterns and adverse consequences of drinking (Grant, Moore, Kaplan, 2003) among younger adults.

Sample Design

A simplified version of the sample design will be presented here; for more detailed information on the sample selection procedures, please see Grant, Moore, and Kaplan (2003). Before the NESARC sample could be selected, the primary sampling units (PSU) had to be identified. The PSU definitions were based on the U.S. Bureau of the Census 2000/2001 Supplementary Survey; the PSUs consist of all counties and county-equivalents in the U.S. The PSUs are then classified as self-representing (SR; if the population in 1996 was 250,000 or more) and nonself-representing (NSR). The NSR PSUs were stratified, grouped together, based on a number of factors. Once the SR and NSR PSUs were identified, then the NESARC sample was constructed in three stages.

In stage one, all SR PSUs were sampled with certainty, a sample probability of one. For the NSR PSUs, two PSU's were selected per stratum with the probability proportional to the size of the estimated population of that stratum in 1996 (Grant, Moore, Kaplan, 2003). In stage two, a systematic sample of the eligible housing units was selected from within each PSU. Before being selected the eligible housing units were sorted into three groups: Hispanic, non-Hispanic Black, and Other. Hispanic and non-Hispanic Black household were sampled at higher rates than the Other households. In stage three of the sample selection, for each household selected in stage two, one sample person was randomly selected from a roster of all persons living in the household. In households where young adults were listed as occupants, the young adults were selected 2.25 times that of others in the household.

Measures and Assessment

Health-Related Quality of Life

Short-Form-12 Version 2. The SF-12v2 is a 12-item, generic, measure of health-related quality of life that was developed from the SF-36. The 12 items included in this measure are identical in terms of wording and response categories to the items in the SF-36. The SF-12v2, as does the SF-36, consists of eight scales, four that comprise the Physical Component Summary (PCS) score (Physical Functioning, Role Limitations due to Physical Problems, Pain, and General Health Perceptions) and four that comprise the Mental Component Summary (MCS) score (Vitality, Social Functioning, Role Limitations due to Emotional Problems, and Mental Health). On each scale, the normed-based scores range from 0-100 with higher scores indicating better health. Each scale has a mean of 50 and standard deviation of 10 for the general population. Scoring procedures for the scales and subscales will adhere to the guidelines for normed-based scoring outlined in the manual. The SF-12 is a reliable and valid measure (Ware, Kosinski, Turner-Bowker, & Gandek, 2002). The test-retest reliability studies conducted with the SF-12 have shown that it is reliable for group applications in a variety of samples including, healthy community members and people with severe and persistent mental illness (Ware et al., 2002). Ware and colleagues also reported the internal consistency of the SF-12v2 for the PCS and MCS as .89 and .86 respectively. Construct validity of the SF-12v2 was examined using the “known-groups” method. This method evaluates the measure in terms of its ability to discriminate between mutually exclusive groups of patients known to differ in the severity of the physical or mental health status, or in terms of both. Overall, the scales that comprise the PCS were more valid in discriminating between groups differing in the presence of a physical condition than the scales that comprise the MCS and vice versa.

Alcohol Use Disorders

The interview schedule used to diagnose alcohol use disorders was the National Institute on Alcohol Abuse and Alcoholism's Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV Version (AUDADIS-IV; Grant, Dawson, & Hasin, 2001). The AUDADIS-IV is a structured diagnostic interview that was designed to be used by lay interviewers. The diagnoses included in the AUDADIS-IV for current (12-month) alcohol use disorders include alcohol abuse and alcohol dependence. Diagnosis for current alcohol abuse requires a respondent to meet at least 1 or the 4 criteria for abuse in the 12-month period prior to the interview, which is consistent with DSM-IV criteria. For a respondent to be diagnosed with alcohol dependence, 3 of the 7 DSM-IV criteria for dependence had to be met during the past year. Diagnosis is recorded as a categorical variable (3= no alcohol diagnosis, 2= alcohol abuse only, 1= alcohol dependence only, 0= both alcohol abuse and dependence). A summary variable was also created for the presence or absence (0=presence, 1= absence) of any alcohol use disorder. The test-retest reliability of the AUDADIS-IV alcohol module was found to exceed .74 (kappa) (Grant et al., 2003; Grant, Hartford, Dawson, Chou, & Pickering, 1995; Hasin, Carpenter, McCloud, Smith, & Grant, 1997). The validity of the AUDADIS-IV alcohol use disorder diagnoses has been well documented (Grant et al., 2004).

Mood and Anxiety Disorders

The AUDADIS-IV was also used to generate diagnoses for mood and anxiety disorders; including, major depression, bipolar I, dysthymia, panic disorder with and without agoraphobia, agoraphobia without a history of panic disorder, social phobia, specific phobia, and generalized anxiety disorder. The mood and anxiety disorder diagnosis reported herein will only include those that are independent from substance-induced or those induced by a general medical

condition. Mood and anxiety disorders were classified as independent if (1) the respondent abstained from alcohol or drug use in the past 12 months; (2) the symptoms did not occur in the context of alcohol or drug intoxication or withdrawal; (3) the episode(s) occurred before alcohol or drug intoxication or withdrawal; or (4) the episode(s) began after alcohol or drug intoxication or withdrawal, but persisted for more than 1 month after the cessation of alcohol or drug intoxication or withdrawal (Grant et al, 2004). All mood and anxiety disorders due to general medical conditions were ruled out. If a mood or anxiety disorder occurred during a physical illness or while recovering from an illness and a healthcare professional deemed the disorder related to the respondents medical condition then that episode was excluded from diagnostic consideration. Additionally, depression due to bereavement was also ruled out. A dichotomous variable (0= presence, 1= absence) was created for each mood and anxiety disorder. Two summary variables were also created, one for any mood disorder (0= presence, 1= absence) and one for any anxiety disorder (0= presence, 1= absence). The test-retest reliability of the AUDADIS-IV measures of mood and anxiety disorders range from fair to good with a kappa value of .42 for social phobia and a kappa of .64 for major depression (Canino et al, 1999 as cited in Grant et al, 2004; Grant et al., 2003).

Dual-Diagnosis

In this study, dual-diagnosis is defined as a coexisting, in the past 12 months, alcohol use and a mood or anxiety disorder. A categorical variable (0= dual diagnosis, 1= Alcohol use disorder only, 2= Mood/Anxiety disorder only, 3= No diagnosis) was created for dual-diagnosis; presence of dual-diagnosis will be indicated if a respondent meets DSM-IV criteria for 12-month (current) alcohol abuse and/or dependence and who also meets DSM-IV criteria for a co-occurring mood or anxiety disorder. The diagnosis for current alcohol use disorders will follow

the system described earlier. The diagnoses for co-occurring independent mood or anxiety disorders are equivalent to the criteria for a mood or anxiety disorder diagnosis described earlier.

Personality Disorders

A dichotomous variable (0= presence, 1= absence) was created for the presence or absence of each personality disorder measured in the study; presence will be indicated if a respondent met the DSM-IV diagnostic criteria for one or more personality disorders measured in the survey; including, antisocial, avoidant, dependent, obsessive-compulsive, paranoid, schizoid, and histrionic personality disorders. Personality disorder diagnoses were derived by the AUDADIS-IV and required the respondent to endorse the required number of DSM-IV criteria for a specific disorder and report significant impairment in social or occupational functioning. All personality disorders measured in the NESARC survey were found to be significant predictors of the MCS, social functioning, and role emotional scales of the SF-12 with the exception of histrionic personality disorder (Grant et al., 2005) and will therefore be controlled for in this study. Test-retest reliability of the categorical diagnoses of each personality disorder was assessed as part of the NESARC study; the reliability coefficients ranged from fair to good with kappa values of .40 for histrionic personality disorder to .67 for antisocial personality disorder (for more details see Grant et al., 2003).

Medical Diagnoses

A dichotomous variable (0= presence, 1= absence) was created for the presence or absence of each medical disorder measured in the study. The presence of a diagnosis will be indicated if a respondent reported that a health professional had confirmed a diagnosis for any of the health problems that were measured; including cirrhosis of the liver, other liver disease, arthritis, heart disease, stomach ulcer, arteriosclerosis, hypertension, chest pain, tachycardia,

myocardial infarction, heart disease, stomach ulcer, and gastritis. A medical diagnosis that is significantly correlated with the HRQoL variables will be entered into the model; if it is not correlated it will be discarded. If the medical diagnosis accounts for significant variance in the model it will remain in the model otherwise it will be discarded.

Data Analyses

Given the complex survey design used in the NESARC, standard methods of statistical analysis are not advisable; the data from complex surveys should be analyzed from a design-based approach. In a design-based approach the sample weights and the complex sample design are taken into account in statistical analyses. In this approach, weights are used when examining descriptive statistics. The design-based approach also includes using weights and indicators of stratum and primary sampling unit membership to estimate variances and to test for statistical significance (i.e. inferential statistics). The weighting of the sample allows estimates about the target population from the sample data to be constructed. Additionally, when analyzing data from complex samples it is important to account for design effects caused by the complex sampling procedures, which impact the calculation of standard errors and thereby test statistics and confidence intervals (National Center for Health Statistics, Landis, Lepkowski, Eklund, & Stehouwer, 1982). Design effects are defined as the ratio of the variance of the statistic from a complex sample to the variance of the same statistic from a simple random sample of the same size (NHANES, 1996). When the design effect equals one, then the variance estimates from the simple random sample and the complex sample are assumed to be equal; in this case the weights and design effects would not need to be utilized. It is important to note that design effects often vary depending on the variable(s) under consideration, which highlights the importance of statistically accounting for them when analyzing the data from complex surveys.

In the current study, the analysis of the NESARC data incorporated the weighting factor and account for sample design effects in estimating descriptive and inferential statistics using SPSS Complex Samples General Linear Model (CSGLM) module. The CSGLM procedure performs linear regression analysis, as well as ANOVA and ANCOVA, for samples drawn by complex sampling methods. The NESARC data were weighted to: (1) reflect the probabilities of selection of primary sampling units (PSUs) within stratum and for the selection of housing units within the sample PSUs; (2) account for oversampling of young adults; (3) account for the selection of one sample person from each household; (4) adjust for nonresponse at the household level and person level (Grant, Moore, Shepard, & Kaplan, 2003). Additionally, the NESARC data are adjusted on a variety of sociodemographic variables including region, age, sex, race, and ethnicity to be representative of the U.S. population. Given that complex sampling procedures also impact variance estimations, standard error and confidence interval estimates were also estimated using SPSS Complex Samples module, which uses appropriate statistical techniques to adjust for sample design characteristics.

Statistical Methodology

The first goal of the analyses was to identify factors and covariates of the PCS and MCS scales of the SF-12v2; therefore, zero-order correlations between the scales and demographic variables, medical conditions, and DSM-IV Axis II personality disorders were analyzed. The decision to investigate particular variables as potential factors was based on previous research. First, any correlation coefficient greater than or equal to a small correlation (.10), as defined by Cohen and Cohen (1983), that was also statistically significant was considered a potential factor/covariate of the summary scales. The second phase of identifying factors of the PCS and MCS was to enter the significantly correlated variables into the CSGLM. First all the significant

demographic variables were entered. If the factor was significantly associated, as indicated by the tests of model effects in the CSGLM, with the PCS or MCS it remained in the model, otherwise it was discarded. The same decision process was applied to the medical diagnosis variables and the Axis II variables. Additionally, after demographic variables were entered into the CSGLM, the medical diagnoses, and Axis II personality disorders had to increase the variance accounted (r^2) in the overall model to be included in the final model. Finally, following the same principles outlined above, the Axis I disorders were examined as factors of both the PCS and MCS summary measures.

In order to estimate the effects of mood, anxiety, and alcohol use disorders on HRQoL (i.e. the MCS score), CSGLM was used to compare individuals with disorders to healthy individuals, defined as those individuals that did not meet diagnostic criteria for any psychological disorder. These individuals serve as the reference group and the estimated score for this group is represented by the intercept in the model. CSGLM was used to estimate the effects of Axis I disorders on HRQoL predicted by the model, while controlling for socio-demographics and medical diagnoses. Variables were coded to make the estimated value of the regression intercept correspond to the predicted value for the 'no diagnosis' comparison group. The CSGLM model can predict scores for individuals with psychological disorders by comparing them to the reference group. This is accomplished by adding the estimate to the intercept for the characteristics that differ from the reference group. For all mood, anxiety, and alcohol use disorders included, the CSGLM model provides an estimate of how much the presence of a particular disorder affects HRQoL.

When interpreting the estimates it is essential to distinguish from statistically significant and clinically significant. Given the size of the NESARC dataset there is ample power to

identify the smallest differences between groups. However, statistical significance should not be interpreted as clinical significance; therefore, both statistical and clinical significance will be examined in the discussion of results. In order to interpret the estimates in terms of clinical significance, it may be useful to consider them a measure of effect size. When a measure has a mean of 50 and a SD of 10, a 2-point difference would be considered a small effect, a 5-point difference would be a medium effect, and an 8 or more point difference would be a large effect (Cohen, 1992). The SF-12, with the normed-based scoring, allows for this type of interpretation given that the MCS is scored to have a mean of 50 and a SD of 10 in the general population.

RESULTS

Prevalence Rates

Using the NESARC dataset, a nationally representative sample of the U.S. population (N=43093), the 12-month prevalence estimates of mood, anxiety, and alcohol use disorders was 9.21%, 11.08%, and 8.46% respectively (Grant et al., 2004; see Table 2). It is estimated that 14.7 million people meet criteria for major depression and 4.3 million U.S adults meet criteria for generalized anxiety disorder. For alcohol use disorders, it is estimated that 9.7 million adults have an alcohol abuse disorder while 7.9 million have alcohol dependence. The prevalence rate for dual-diagnosis (i.e. a current alcohol use disorder and a current mood or anxiety disorder) was estimated to be 2.4%, which represents approximately 5 million U.S. adults.

Identification of significant covariates and factors of the HRQoL Scales

Physical Component Scale

Correlation and CSGLM analysis revealed that age, education, income, employment status, and disability status were significantly related to the PCS (see Table 2). These select demographic variables accounted for 33% of the variance in the PCS score. Next, medical diagnoses were investigated as potential factors associated with the PCS. Several medical diagnoses including, hardening of arteries, $r(41703) = -.20, p < .001$, hypertension, $r(41838) = -.345, p < .001$, angina, $r(41902) = -.285, p < .001$, tachycardia, $r(41856) = -.25, p < .001$, heart attack, $r(41904) = -.16, p < .001$, heart disease, $r(41881) = -.24, p < .001$, stomach ulcer, $r(41861) = -.14, p < .001$, gastritis, $r(41841) = -.17, p < .001$, and arthritis, $r(41864) = -.45, p < .001$, were significant factors and when entered in to the model with the demographics, accounted for 42.5% of the variance in PCS scores. Neither Axis II nor Axis I disorders were correlated with the PCS at or above the .10 level and therefore were not included in the model. In other words, variance in PCS was not impacted by Axis I or Axis II disorders after accounting for demographic and comorbid medical diagnoses. No further analyses with this scale were conducted.

Mental Component Scale

Correlation and CSGLM analysis revealed that, gender, personal income, employment status, and disability status were significantly related to the MCS and were also significant factors of the scale (see Table 3). These demographic variables accounted for 7.5% of the variance in the MCS score. Next, medical diagnoses were investigated as potential factors associated with the MCS. Several medical diagnoses, including gastritis, $r(41841) = -.11, p < .001$, tachycardia, $r(41865) = -.14, p < .001$, stomach ulcer, $r(418861) = -.12, p < .001$, angina,

$r(41902) = -.14, p < .001$, and arthritis $r(41864) = -.12, p < .001$, were significant factors and when entered into the model with the demographics, 9.5% of the variance in MCS scores was accounted for. Axis II personality disorders were investigated as potential factors of the MCS; Antisocial, $r(42743) = -.10, p < .001$, Avoidant, $r(42743) = -.12, p < .001$, Dependent, $r(42743) = -.12, p < .001$, Obsessive-Compulsive, $r(42743) = -.14, p < .001$, Paranoid, $r(42743) = -.20, p < .001$, Schizoid $r(42743) = -.15, p < .001$, and histrionic, $r(42743) = -.10, p < .001$, personality disorders were significantly associated with the MCS. However, when entered together in the CSGLM, Dependent and Histrionic personality disorders were not found to be significant factors and therefore were discarded. When personality disorders were entered as factors in the CSGLM, the model accounted for 15% of the variance in the MSC score. Demographic variables, medical diagnoses, and Axis II disorders were controlled for in the following GLM analyses.

Finally, the independent variables in this study including, mood, anxiety, and alcohol use disorders were investigated as potential factors of the MCS scale. Major Depression, Dysthymia, Bipolar I, GAD, Panic Disorder, Social Phobia, and Specific Phobia were significantly related to the MCS (see Table 4). Although the Alcohol Use Disorder variable was not correlated with the MCS above the .10 level, it was retained as a factor in the model (see Table 5). Previous research has shown differences in alcohol abuse compared to alcohol dependence and since this variable contains both diagnostic categories the correlation may not reflect the possible differential impact of each on HRQoL. For anxiety disorders, panic disorder with and without agoraphobia, GAD, specific phobia, and social phobia were significantly correlated with the MCS score (see Table 6). When mood, anxiety, and alcohol use variables were included in the

model, with demographics, medical diagnoses, and Axis II disorders, 21.4% of the variance was accounted for in the MCS score.

The impact of Axis I disorders on HRQoL

1. Are there differences in HRQoL in individuals with any Axis I disorder compared to individuals without psychiatric diagnoses?

In order to estimate the effects of any psychological disorder on the MCS score, CSGLM analyses compared individuals with disorders to the ‘no diagnosis’ comparison group. CSGLM was used to estimate the effects of meeting criteria for any Axis I disorders on MCS predicted by the model, while controlling for gender, personal income, employment status, disability status, angina, gastritis, tachycardia, stomach ulcer, arthritis and Axis II disorders. The CSGLM model revealed that the estimated effect of meeting criteria for any Axis I disorder on the predicted MCS score was negative, 4.5 points below the estimate for the ‘no diagnosis’ reference group; the magnitude of the effect was statistically significant (see Figure 1). The presence of a psychological disorder was associated with a small to medium effect on the MCS score.

2. Are there differences in HRQoL in individuals with any anxiety, any mood, or any alcohol use disorders compared to individuals without psychiatric diagnoses?

The next step in the analysis was to determine if mood, anxiety, and alcohol use disorders impacted MCS scores. CSGLM analyses compared respondents with any mood, any anxiety, and any alcohol use disorder to the ‘no diagnosis’ reference group. The CSGLM model revealed that the estimated effects of ‘any anxiety’, ‘any mood’, or ‘any alcohol’ on the predicted MCS score was negative and the magnitude of each of the effects was statistically significant. By examining these effects, it can be determined which Axis I disorder category has the greatest estimated impact on the MCS score (see Figure 2). The mean MCS score for mood disorders was significantly lower than the mean for the no diagnosis comparison group. Mood disorders

had the most impact on predicted MCS scores with a score reduction of 8 points compared to the estimated scores for the reference group with no disorders. Therefore, the presence of a mood disorder had a large effect on the MCS mean. Anxiety and alcohol disorders also resulted in significantly lower estimated MCS scores compared to the no diagnosis reference group; score reductions were approximately 2 points lower, a small effect, for each disorder category. Given that the previous analyses were based on categories of psychological disorders, it is possible that individual disorders may impact quality of life differently; especially, since previous literature suggests that there may be differential affects of having alcohol abuse compared to having alcohol dependence. Therefore, the comparison of HRQoL between individual Axis I disorders was evaluated.

3. Are there differences in HRQoL in individuals with Major Depression, Dysthymia, Bipolar I, GAD, Panic Disorder, Social Phobia, Specific Phobia, or Alcohol Use Disorders compared to individuals without psychiatric diagnoses?

The next goal was to examine the estimated effects of individual Axis I disorders on the predicted MCS scores. CSGLM analyses compared respondents who met criteria for Major Depression, Dysthymia, Bipolar I, GAD, Panic Disorder with and without Agoraphobia, Social Phobia, Specific Phobia, and Alcohol Use Disorders to the 'no diagnosis' reference group. Table 7 shows the estimates of each individual on the predicted MCS score while controlling for demographic characteristics, medical conditions, and personality disorders. The CSGLM model revealed that the estimated effect of each of the disorders on the MCS score was negative and statistically significant compared to the reference group of healthy adults. By examining these effects the estimated impact of individual disorders on the MCS score can be determined. In terms of mood disorders, results revealed that major depression and dysthymia were associated the greatest reductions in HRQoL, with scores 7.13 and 5.13 below the predicted scores for the

reference group respectively (see Figure 3). Major depression and dysthymia each had a medium effect on the MCS. In terms of anxiety disorders, results showed that GAD and panic disorder without agoraphobia were associated with the greatest reductions in MCS scores, with scores 4.81 and 2.63 below the reference group estimated mean respectively (see Figure 4). Finally, in terms of alcohol use disorders, alcohol dependence and alcohol abuse with dependence were associated with the greatest reductions in predicted MCS scores compared to the reference group, with scores 3.22 and 2.97 below respectively (see Figure 5). The presence of alcohol dependence had a small effect on mean MCS scores. Compared to the reference group, those with alcohol abuse only reported a significantly lower mean MCS score although the clinical significance is trivial. Additionally, the mean MCS score for the alcohol abuse only group was significantly higher than the two groups that include alcohol dependence.

The impact of dual-diagnosis on HRQoL

4. Does the HRQoL differ between individuals with mood or anxiety disorders, alcohol use disorders, and dual-diagnosis, compared to individuals with no psychiatric diagnoses? Does the HRQoL differ between individuals with dual-diagnosis and those with alcohol use disorders only?

In order to estimate the effects of mood and anxiety disorders, alcohol use disorders, and dual-diagnosis on HRQoL (i.e. the MCS score), CSGLM was used to compare individuals with disorders to healthy individuals, defined as those individuals that did not meet criteria for any psychological disorder diagnosis, these individuals serve as the reference group. CSGLM was used to estimate the effects of mood and anxiety disorders, alcohol use disorders only, and dual-diagnosis on HRQoL predicted by the model, while controlling for socio-demographic characteristics, medical diagnoses, and Axis II disorders. Variables were coded to make the estimated value of the regression intercept correspond to the predicted value for the 'no diagnosis' comparison group. The CSGLM model predicted scores for individuals with

psychological disorders by comparing them to the reference group. For the mood/anxiety disorders, alcohol use disorders, and dual-diagnosis included, the CSGLM model provides an estimate of how much the presence of these diagnostic categories affects HRQoL scores. The CSGLM results revealed that individuals with dual-diagnosis reported significantly lower MCS scores compared the reference group of healthy adults and compared to individuals with only an alcohol use disorder (see Figure 6). The MCS score for dual diagnosis category was 7 points lower than the reference group and almost 6 points lower than the alcohol use disorders only group. The presence of a current alcohol use disorder and either a mood or anxiety disorder had a medium effect on the MCS. Moreover, the estimated mean for those with dual-diagnosis was significantly lower, almost 2 points, than the MCS score for those with only a mood or anxiety disorder.

Interaction analysis

Previous literature that examined the relationship between alcohol use disorders, the presence of another psychiatric disorder, and HRQoL revealed a significant interaction between alcohol dependence and another disorder (Kalman et al., 2004; Johnson et al., 1995). Based on their findings, post-hoc analysis of the possible interaction between mood disorders or anxiety disorders and alcohol use disorders was investigated. The variables for ‘any mood disorder’, ‘any anxiety disorder’, and alcohol use disorders, and the interaction between any mood disorder by alcohol use disorders and any anxiety disorder by alcohol use disorders was entered into the CSGLM. The interaction term for mood disorders by alcohol disorders was significant ($F = 5.25$, $df = 63$, $p < .01$; see Figure 7). The interaction term for anxiety disorders by alcohol disorders was significant ($F = 5.23$, $df = 63$, $p < .01$; see Figure 8).

DISCUSSION

The objective of this investigation was to examine the impact of anxiety disorders (panic disorder, social phobia, generalized anxiety disorder, and specific phobia), mood disorders (major depression, bipolar disorder, and dysthymia), alcohol use disorders (abuse and dependence), and dual-diagnosis (alcohol use disorder comorbid with any anxiety or mood disorder) on HRQoL as measured by the SF-12v2 in a representative sample of U.S. adults. This study was designed to replicate, extend, and improve the validity of previous findings on the impact of Axis I disorders and dual-diagnosis on HRQoL in a large community sample since previous research was often conducted with small clinical samples. The specific aims of this study are to provide further evidence of the independent impact of mood and anxiety disorders on HRQoL and provide more information about the role of comorbid alcohol use disorders and mood or anxiety disorders on HRQoL.

Mental Component Scale

First, it was hypothesized that meeting criteria for any Axis I disorder would have a negative impact on HRQoL. Results revealed that individuals with psychological disorders reported diminished quality of life compared to individuals that do not have psychological disorders. This result replicates previous research findings and sets the foundation for further analyses in this study. The next logical step was to evaluate whether differences in HRQoL exist between individuals with mood disorders, anxiety disorders, and alcohol use disorders. It was hypothesized that respondents with any anxiety, any mood, or any alcohol use disorders would report diminished HRQoL compared to respondents without psychiatric diagnoses.

Results revealed that having a mood disorder was associated with the greatest negative impact on self-reported HRQoL compared to having an anxiety disorder, alcohol use disorder, or having no diagnosis. Individuals with anxiety disorders also reported diminished HRQoL. Finally, those with alcohol use disorders reported a significant reduction in quality of life compared to those without psychological disorders; while the difference is statistically significant the clinical significance is questionable given the difference is less than 1 point. The result for alcohol use disorders as well as the results for mood and anxiety disorders continues to unravel the relationship between psychological disorders and reduced quality of life. Based on previous research, it was hypothesized that respondents with a diagnosis of major depression, alcohol dependence, panic disorder, or social phobia will report a decreased HRQoL compared to respondents with no psychiatric diagnoses. The results revealed that, in fact, all individual mood, anxiety, and alcohol use disorders are associated with decreased self-reported quality of life. In other words, all disorders were independently associated with diminished HRQoL.

In terms of mood disorders, results suggest that major depression, dysthymia, and bipolar I disorder are each associated with diminished quality of life. In fact, individuals with major depression reported the lowest quality of life of all disorders included in this study. This finding supports previous research findings of the negative impact of depression on quality of life. These results also support the use of major depression as a clinical benchmark, or reference point, in order to estimate the clinical impairment of other disorders. For instance, based on the results of this study it appears that panic disorder is associated with less functional impairment compared to depression. Additionally, the results of this study suggest that bipolar I disorder is associated with less disability than major depression and was estimated to have a small effect on HRQoL measured by the SF-12. This result is in contrast to Yatham and colleague's (2004)

findings that on many of the subscales of the SF-36 patients with bipolar depression report lower HRQoL compared to the unipolar depression samples in published literature. The differences between the current study and previous research are in the sample characteristics (clinical versus community) and the comorbidity of Axis II disorders and medical disorders that was controlled for in the analyses. Finally, in the current study, diagnoses were based on the previous 12-month period but Yatham et al. (2004) included patients that had an episode within the previous three years. Given the paucity of research on the relationship between bipolar disorder and HRQoL, further investigation is warranted.

For anxiety disorders, GAD and panic disorder are associated with the greatest deficit in HRQoL. It appears that those with depression report the greatest deficits in their HRQoL but dysthymia, GAD, social phobia, and panic disorder also associated with significant reductions in HRQoL. In this study, the difference between HRQoL in those with a specific phobia and those without a diagnosis was statistically significant; this difference highlights the importance of examining the clinical significance of the results. While individuals with specific phobia reported a reduced quality of life compared to individuals without diagnoses, this difference was less than 1 point, which means less than one-tenth of a standard deviation or a trivial effect size. This suggests that there may be specific areas of HRQoL that are diminished but that these effects are not as pervasive. That said it is not the intent to imply that specific phobias do not cause significant distress for individuals and therefore do not warrant treatment but instead, specific phobia may not impact as many areas in a person's life as does major depression. In addition, it is interesting that the disorders that can use avoidance as a way of coping (i.e., specific phobia, social phobia, panic disorder with agoraphobia, and agoraphobia) report better

HRQoL compared to GAD and panic disorder without agoraphobia, two disorders in which avoidance coping may not be possible.

In terms of alcohol use disorders, results revealed the individuals with alcohol dependence reported significantly lower HRQoL than individuals without psychological disorders. The results of this study replicate previous findings on the association between alcohol dependence and diminished HRQoL (Kalman et al., 2004; Volk, Cantor, Steinbauer, & Cass, 1997). Additionally, alcohol dependence was associated with lower self-reported HRQoL compared to alcohol abuse; this result also supports previous findings. Finally, the HRQoL associated alcohol abuse was statistically different than the no diagnosis group, although that difference was less than one point. It appears that alcohol abuse may not result in a clinically significant decrement of self-reported HRQoL. This result supports previous research that suggested that alcohol abuse was not associated with significant decreases in HRQoL (McKenna et al., 1997; Volk, Cantor, Steinbauer, & Cass, 1997).

There are important limitations of both previous research and this study regarding the results surrounding alcohol abuse. First, this study did not control for the amount of time an individual was abusing alcohol. The amount of time an individual abuses alcohol may influence reports of HRQoL; relatively short periods of alcohol abuse may not result in decreased quality of life, but extended periods of alcohol abuse may impact quality of life. In a similar realm, severity of alcohol abuse and/or current abstinence may also affect the relationship between alcohol abuse and HRQoL neither of which were included in this study. Previous research has found that self-reported HRQoL differs based on the severity of alcohol use (Daeppen, Krieg, Burnand, & Yersin, 1998; Volk, Cantor, Steinbauer, & Cass, 1997). Additionally, whether or not an individual has participated in treatment may influence HRQoL. Finally, the measure of

HRQoL included in this study is based solely on self-report. It is possible that individuals with alcohol abuse may be in denial or minimize the impact their drinking has on their quality of life. These results suggest that individual mood, anxiety, and alcohol use disorders are associated with decreased quality of life, but these disorders are also highly comorbid with each other and therefore the impact of dual-diagnosis was investigated.

Finally, it was hypothesized that respondents with dual-diagnosis would report significantly lower HRQoL compared to both respondents with an alcohol use disorder without comorbid psychopathology and respondents with no psychiatric diagnoses. Results revealed that individuals that met criteria for a current alcohol use disorder and a current mood or anxiety disorders reported the lowest HRQoL compared to those with no diagnosis and to those with only an alcohol use disorder. Additionally, individuals with dual-diagnosis reported lower HRQoL compared to those with only mood/anxiety disorders, although the difference was less than 2 points.

Post-hoc analysis revealed a significant interaction between mood disorders and alcohol use disorders and a significant interaction between anxiety disorders and alcohol use disorders. This result extends previous literature in that alcohol abuse was included in the analyses where as previous investigations only included alcohol dependence. Interestingly, individuals with a mood disorder and alcohol abuse reported better HRQoL than individuals with a mood disorder but no alcohol use disorder while those with mood disorders and alcohol dependence reported the lowest HRQoL. Additionally, individuals with an anxiety disorder and alcohol abuse reported better HRQoL than individuals with an anxiety disorder but no alcohol use disorder while those with anxiety disorders and alcohol dependence reported the lowest HRQoL. These results suggest that individuals may be self-medicating their mood or anxiety disorder and based

on their self-report, this is having a positive impact on their HRQoL. Although the interaction terms are statistically significant the largest impact on HRQoL appears to depend on whether there is the presence or absence of a mood or anxiety disorder, but further investigation is warranted. As noted previously, this study did not control for the amount of time an individual was abusing alcohol or the severity of alcohol abuse; further investigation is warranted before concrete conclusions about this result are made. Additionally, the results for alcohol abusing respondents are based on self-reported HRQoL and therefore may be biased.

Physical Component Scale

The results of this study hint that psychological disorders may not be associated with physical HRQoL; this is somewhat inconsistent with the results of previous research. For instance, Spitzer et al. (1995) found that DSM-III-R Axis I disorders were associated with diminished HRQoL on the PCS subscales after controlling for demographic characteristics and medical and psychiatric comorbidities in a sample of primary care patients. However, it is important to note that DSM-III-R does not rule out medical diagnosis induced or substance induced disorders in the criteria and this is different in DSM-IV, which this study utilized. Other studies that have found an association between diminished PCS scores and Axis I disorders did not control for physical health comorbidities (Kalman et al., 2004; Schonfeld et al., 1997); these comorbidities are likely to affect this relationship and therefore were controlled for in the present study. Further analyses on the association between Axis I disorders and the PCS subscales may yield different results than those included in this study; further investigation is warranted before concrete conclusions about this result are made.

Limitations and Future Directions

There are several strengths of this study that are worthy of note. First this is the first epidemiological study to include a large, representative sample of U.S. adults that directly measured HRQoL. The results of this study can therefore be generalized to the U.S. population. Additionally, this study included measurement for many Axis I disorders which allowed for the comparisons between individual disorders. The diagnoses of the Axis I disorders that were measured are based on current DSM-IV criteria; these diagnoses are not induced by medical disorders and are also not substance induced. The comprehensiveness of the NESARC study also allows the statistical control for other factors that may impact the relationship between Axis I disorders and HRQoL including, medical diagnoses, personality disorders, and many demographic characteristics.

There are also limitations of the study that are important to note. The data included in this study are cross-sectional and therefore causality cannot be inferred. It is unknown whether Axis I disorders are a cause or consequence of decreases in self-reported HRQoL. Within the limitations of this study are the limitations of the SF-12v2. The SF-12 is a generic measure of HRQoL and therefore does not assess all domains that encompass HRQoL. Therefore, there are potential detriments to HRQoL that are not measured. In other words the SF-12 may not be sensitive to all the quality of life related problems associated with, for example, alcohol abuse. Additionally, the SF-12 is based on the person's subjective experience and therefore may be subject to self-report bias. To examine this possible bias, future studies should include additional objective measures such as days missed work, relationship quality, or include a measure for an informant (i.e. spouse).

Future research should investigate the specific impact(s) that a specific disorder (i.e. Dysthymia) has on HRQoL in more depth by examining the subscales that make up the MCS score. Additionally, the relationships in this study may be simplified and therefore, path analysis or structural equation modeling may elucidate the complexities in these relationships more precisely. Finally, longitudinal studies may better explain the impact of psychological disorders on HRQoL by examining the impact over time; this will be possible with the release of Wave 2 of the NESARC data.

In conclusion, the results of this study replicate, validate, and extend previous findings that psychological disorders are associated with reduced HRQoL. The results of this study support previous findings that found that psychopathology is associated with diminished HRQoL. The results of this study validate previous results and conclusions about psychological disorders, including dual-diagnosis, and HRQoL by replicating findings in a large, non-clinical, representative sample of U.S. adults. Finally, the results of this study extend the literature on HRQoL and psychological disorders by using DSM-IV diagnostic criteria that excluded substance and medically induced disorders, controlling for demographic characteristics, medical disorder diagnoses, personality disorders, and examining several Axis I disorders in one study.

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Table 1 Characteristics of NESARC respondents

Variable	Percentage*	Total Respondents**
Gender (female)	52.1%	24575
Race or Ethnicity		
White	83.2	32789
Black	11.6	8600
Native American	3.0	1304
Asian	4.2	1334
Pacific Islander	.8	363
Hispanic	11.6	8308
Working Fulltime	53.5	22267
Marital Status (married or living with someone as married)	61.6	22081
Education(completed high school or higher)	84.4	35244
Income past 12 months		
\$0-19999	47.3	21101
\$20000-34999	22.7	9975
\$35000-69999	21.9	9029
>70000	8.2	3006
Total		43093

*Based on weighted data

**Based on unweighted data

Table 2 DSM-IV Diagnostic Characteristics of NESARC respondents

Variable	Percentage*	Total Respondents**
<i>Mood Disorders</i>	9.2%	5166
Major Depression	7.1%	3119
Dysthymia	1.8%	843
Bipolar I	1.7%	724
Bipolar II	1.2%	480
<i>Anxiety Disorders</i>	11.1%	6036
Panic without Agoraphobia	1.5%	653
Panic with Agoraphobia	.6%	254
Agoraphobia	.1%	22
Generalized Anxiety	2.1%	894
Social Phobia	2.8%	1140
Specific Phobia	7.1%	3073
<i>Alcohol Use Disorders</i>	8.5%	3327
Alcohol Abuse Only	4.7%	1843
Alcohol Dependence Only	1.3%	553
Both Abuse and Dependence	2.5%	931
<i>Dual Diagnosis</i>	2.4%	964

*Based on weighted data

**Based on unweighted data

Table 3 Correlation matrix for SF-12v2 and demographic characteristics

	Mental Component Scale	Physical Component Scale
Age	-.012*	-.422**
Gender	-.101**	-.063**
Current Marital Status	-.077**	.030**
Highest School Completed	.076**	.247**
Working Fulltime	.138**	.356**
Income in last 12 months	.141**	.231**
Permanently Disabled	-.233**	-.360**
Race or Ethnicity		
Hispanic	.019**	.055**
Native American	-.024**	-.018**
Asian	.008	.050**
Pacific Islander	.005	.015**
Black	-.035**	-.066**
White	.027**	.043**

Based on unweighted data.

*p < .05, **p < .01.

Table 4 Correlation matrix for SF-12 and mood disorders*

	Mental Component Scale	Physical Component Scale
Major Depression	-.322	-.019
Dysthymia	-.232	-.062
Manic	-.154	.020
Hypomanic	-.046	.015

*All correlations are significant at $p < .01$. Based on unweighted data.

Table 5 Correlation matrix for SF-12 and alcohol use disorders

	Mental Component Scale	Physical Component Scale
Alcohol Abuse Only	.000	.063*
Alcohol Dependence Only	-.048*	.027*
Both Abuse and Dependence	-.085*	.037*
AUD in past 12 months	-.092*	.067*

*Significant at $p < .01$. Based on unweighted data.

Table 6 Correlation matrix for SF-12 and anxiety disorders*

	Mental Component Scale	Physical Component Scale
Panic without Agoraphobia	-.128	-.034
Panic with Agoraphobia	-.118	-.035
Agoraphobia	-.025	-.016
GAD	-.217	-.053
Specific Phobia	-.112	-.035
Social Phobia	-.145	-.023

*All correlations are significant at $p < .01$. Based on unweighted data.

Table 7 Estimates of the effects of Axis I disorders on mean MCS score

	Mental Component Scale
	Estimate (95% CI)
<i>Reference Group</i>	
No Diagnosis (Intercept)	55.61 (55.24-55.98)
<i>Effects</i>	
<i>Mood Disorders</i>	
Major Depression	-7.13(-7.58-6.67)**
Dysthymia	-5.13(-5.95-4.31)**
Bipolar I	-2.04(-2.68-1.40)**
<i>Anxiety Disorders</i>	
Panic without Agoraphobia	-2.625(-3.25-1.2)**
Panic with Agoraphobia	-1.975(-3.53-.42)**
Agoraphobia	3.02(.38-5.652)*
Generalized Anxiety	-4.81(-5.49-4.12)**
Social Phobia	-1.81(-2.40-1.22)**
Specific Phobia	-.66(-.94-.38)**
<i>Alcohol Use Disorders</i>	
Abuse Only	-.83(-1.18-.47)**
Dependence Only	-3.22(-3.85-2.59)**
Abuse and Dependence	-2.97(-3.46-2.48)**

Note: Analysis controlled for demographic characteristics, medical disorders, and personality disorders. Estimates are based on weighed data. CI= Confidence Interval
 *p < .01, **p < .001.

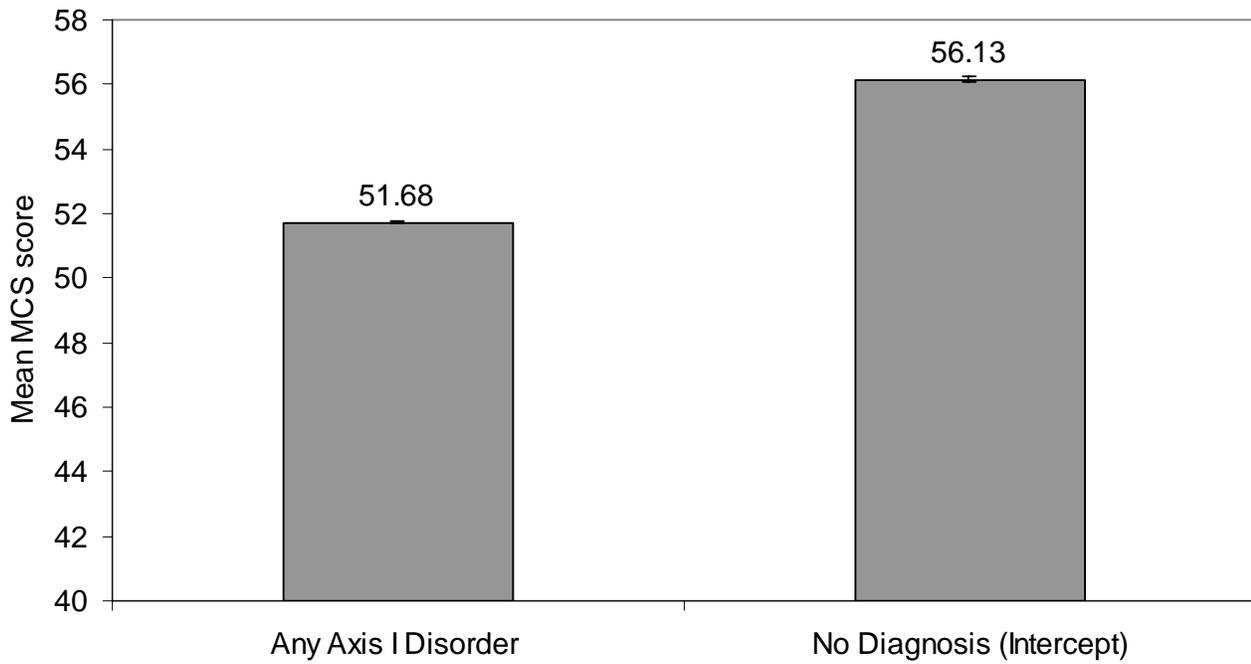


Figure 1: Mean MSC scores for individuals with any Axis I disorder compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

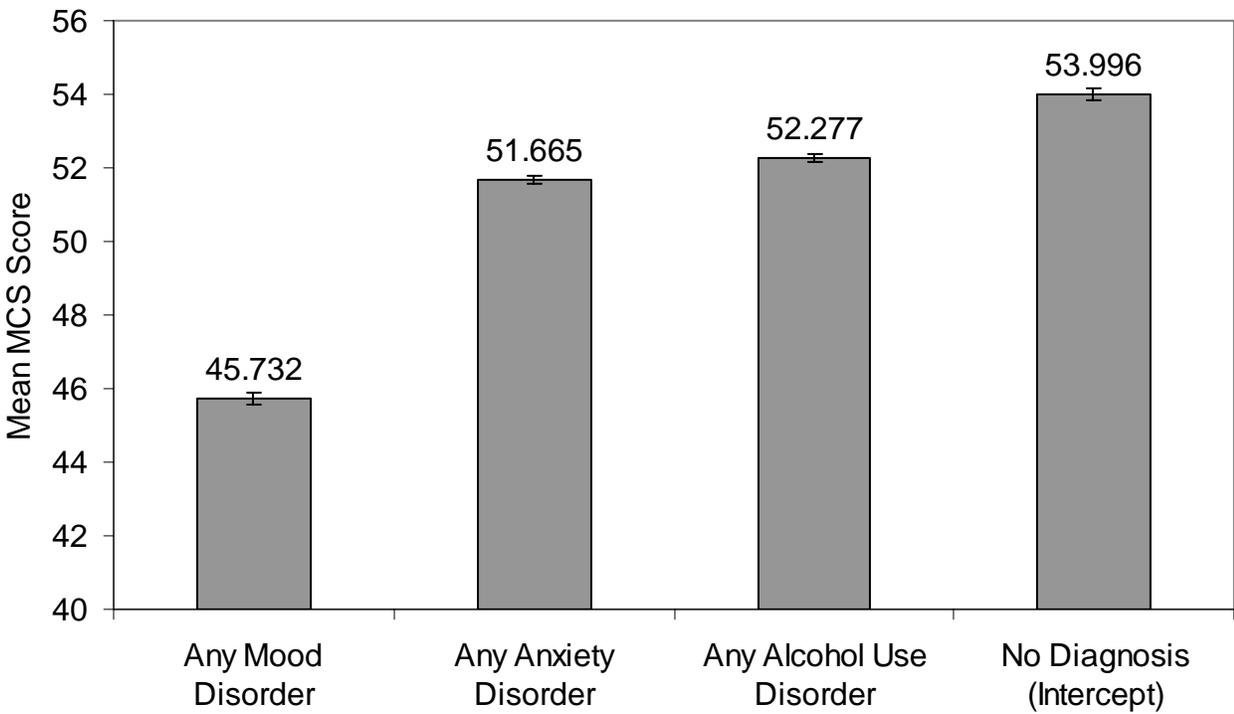


Figure 2: Mean MSC scores for individuals with any mood, anxiety, or alcohol use disorder compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

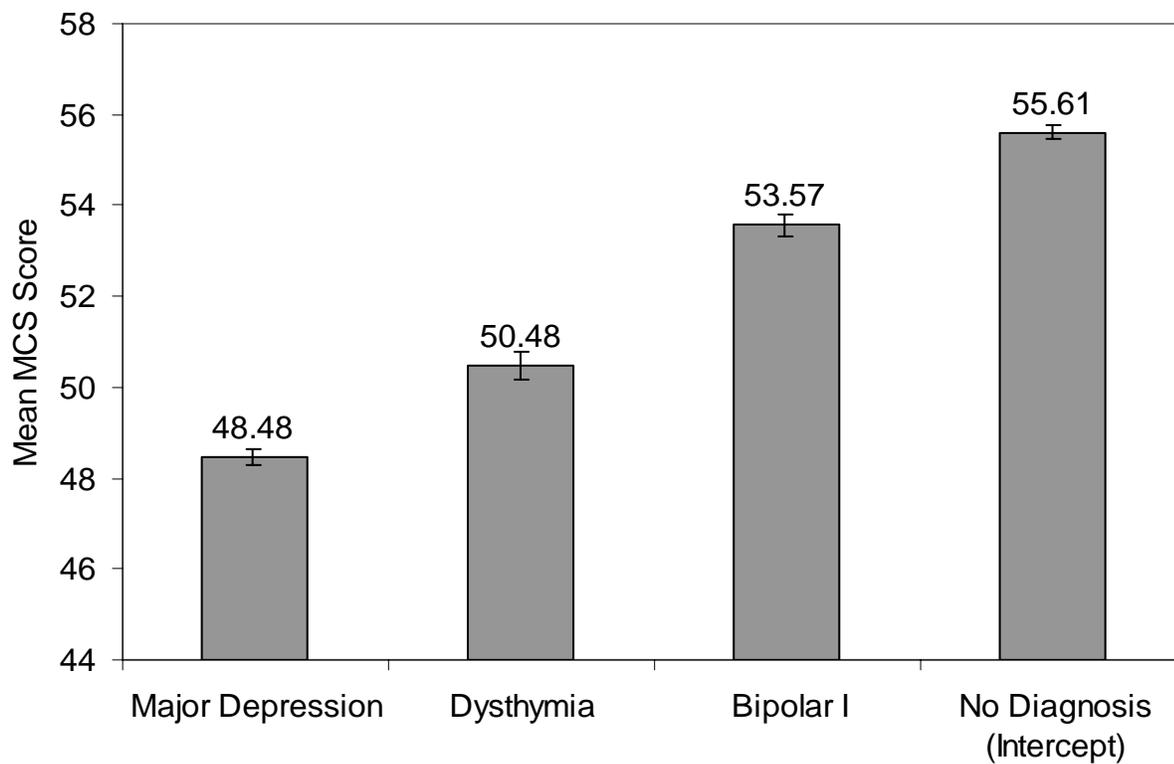


Figure 3: Mean MSC scores for individuals with mood disorders compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

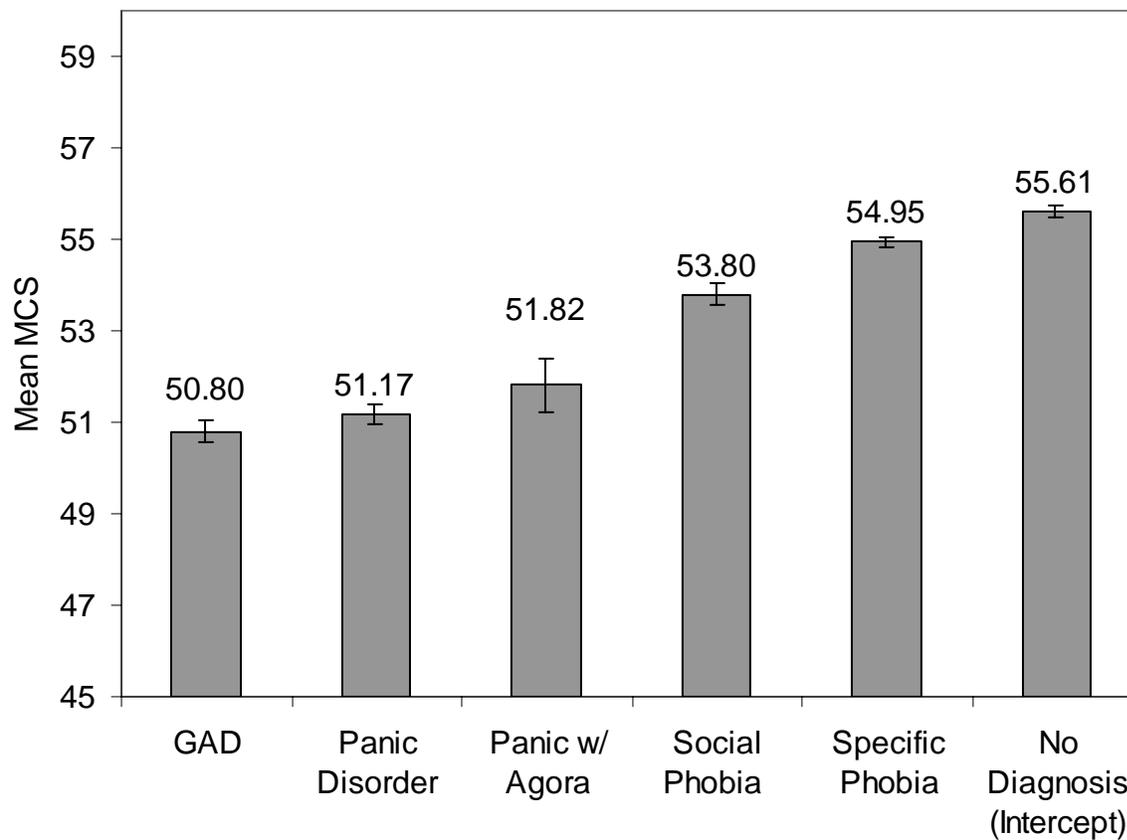


Figure 4: Mean MSC scores for individuals with anxiety disorders compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

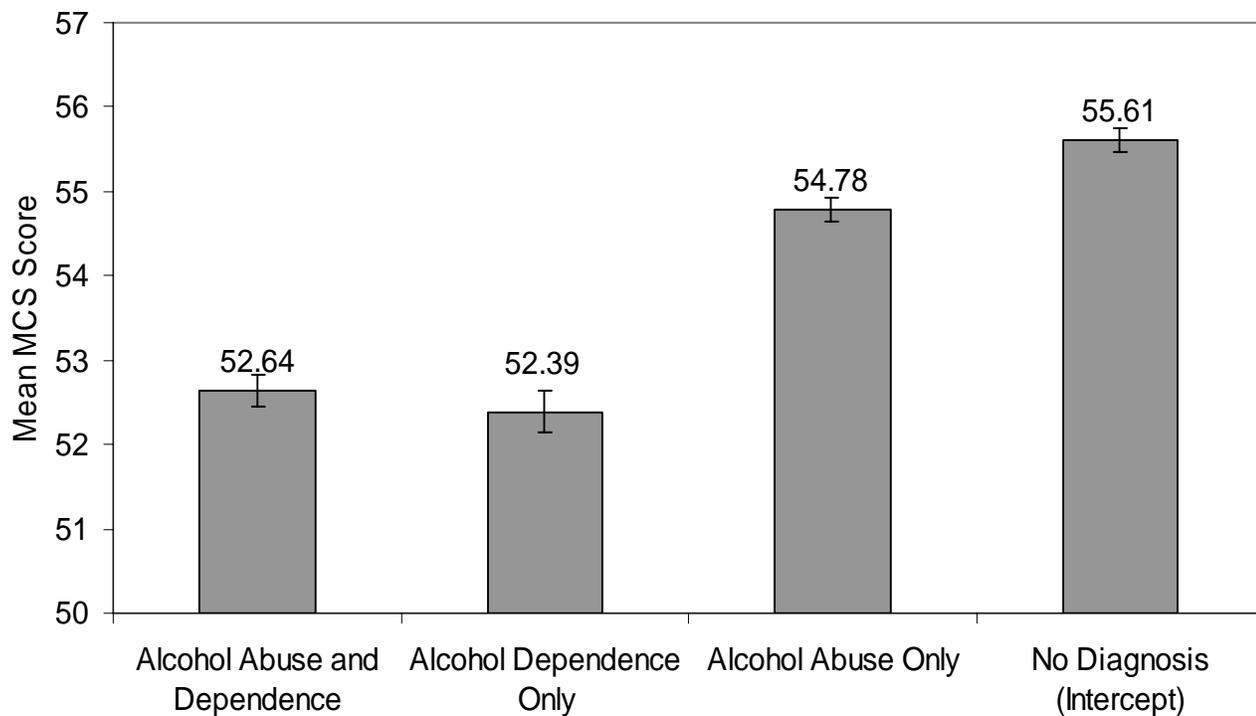


Figure 5: Mean MSC scores for individuals alcohol use disorders compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

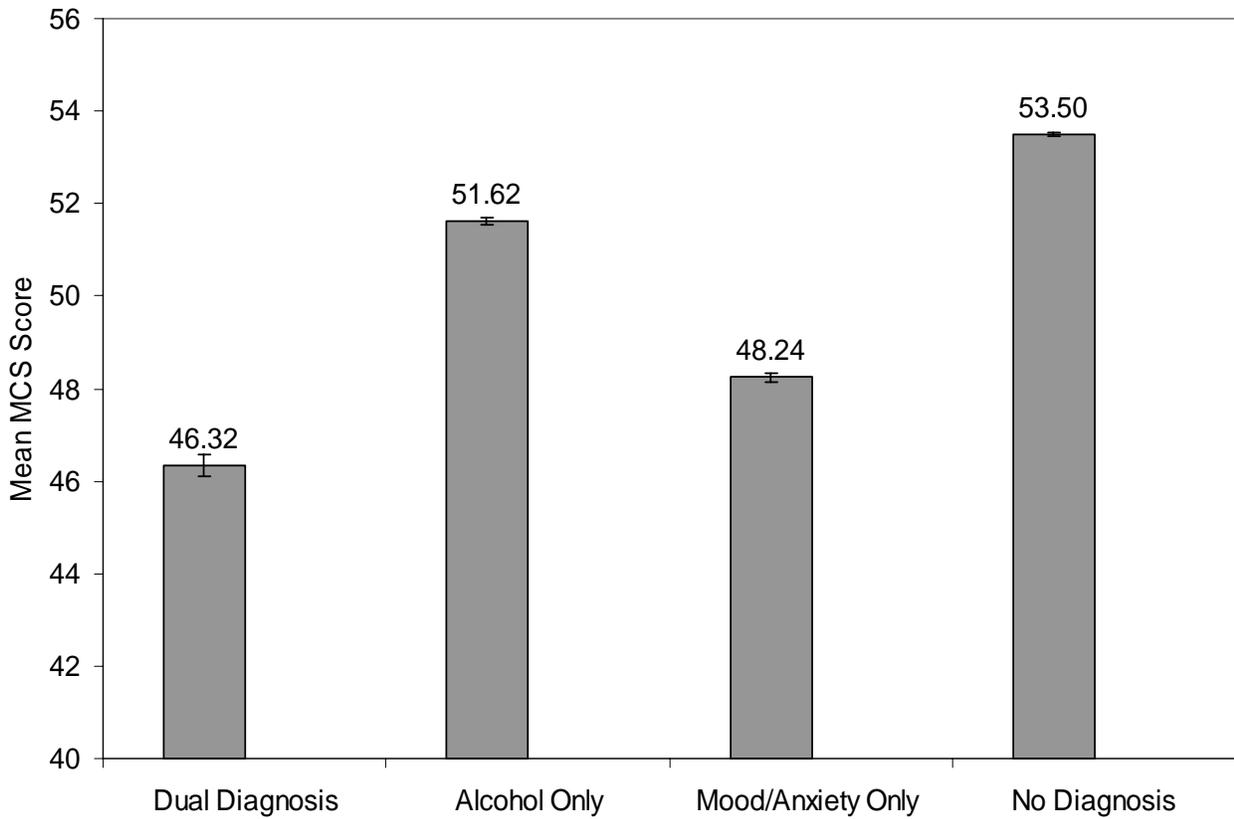


Figure 6: Mean MSC scores for individuals with dual-diagnosis, alcohol use disorders only, and mood or anxiety disorders only compared to individuals with no diagnoses. Higher scores indicate better HRQoL. Analyses control for demographic characteristics, medical diagnoses, and personality disorders. $p < .001$

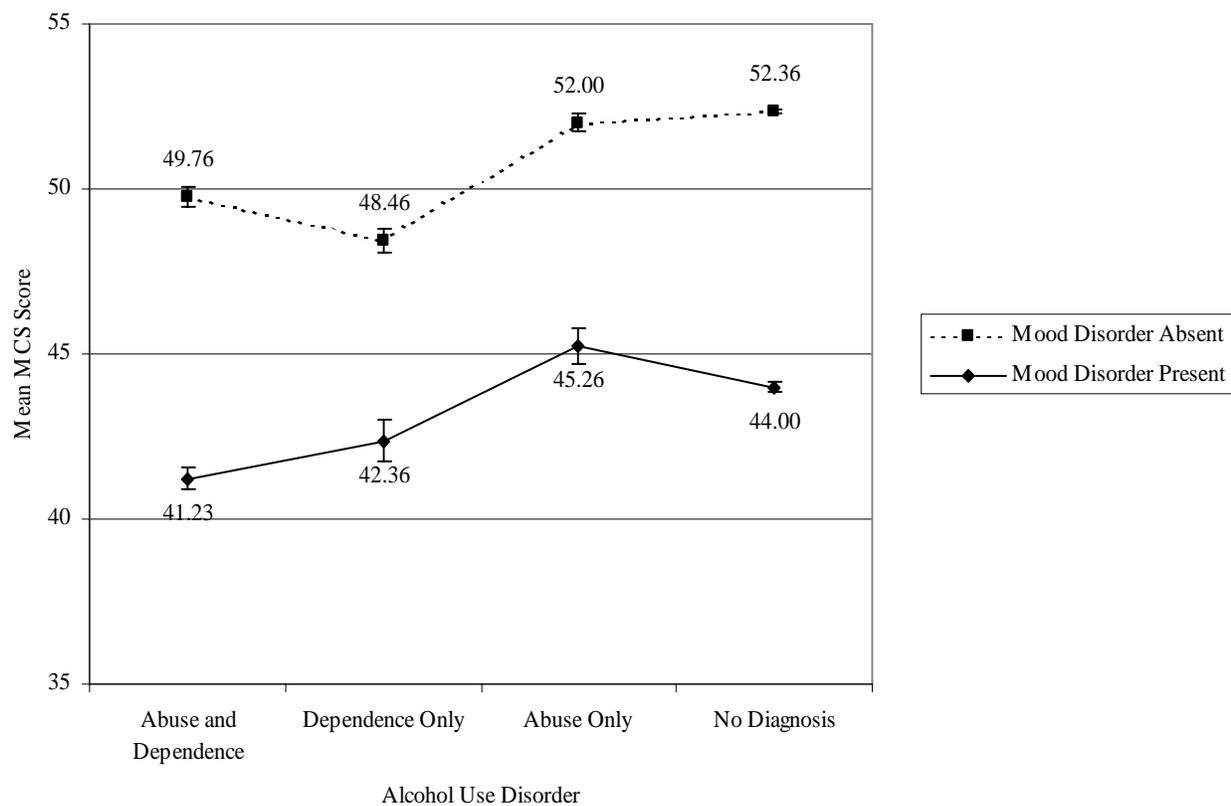


Figure 7: Effects of alcohol use disorders and mood disorders on mean MSC scores after controlling for demographic characteristics, medical diagnoses, and personality disorders.

Higher scores indicate better HRQoL. $p < .01$

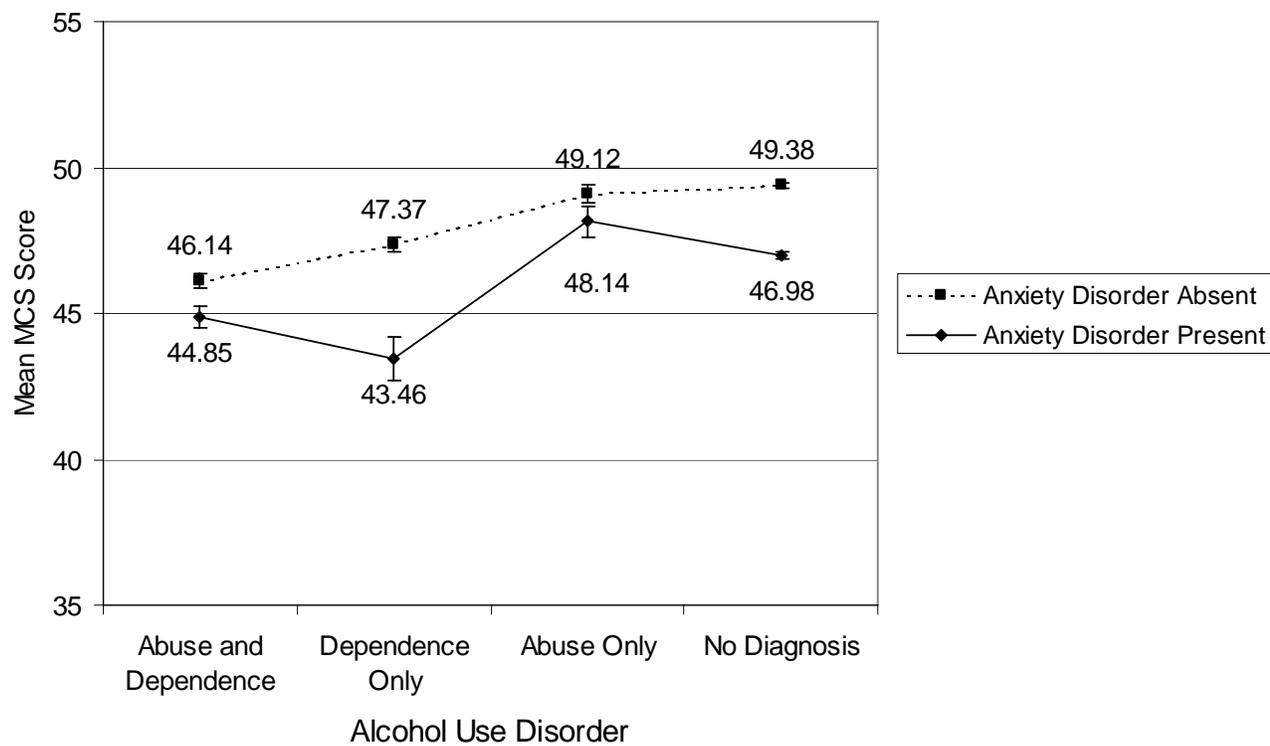


Figure 8: Effects of alcohol use disorders and anxiety disorders on mean MSC scores after controlling for demographic characteristics, medical diagnoses, and personality disorders.

Higher scores indicate better HRQoL. $p < .01$