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Gender, Ethnicity, and Drinking in Older Age: Understanding Mediators and Moderators of Risk

By

Jennifer Price Wolf

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

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in the Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Lorraine Midanik, Chair
Professor Andrew Scharlach
Professor Meredith Minkler
Assistant Adjunct Professor Derek Satre

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Abstract

Gender, Ethnicity, and Drinking in Older Age: Understanding Mediators and Moderators of Risk

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Jennifer Price Wolf

Doctor of Philosophy in Social Welfare

University of California, Berkeley

Professor Lorraine Midanik, Chair

Background: Drinking among older adults might increase in the future due to relatively high rates of alcohol use in the "baby boomer" cohort and the rise in the proportion of older adults in the USA. Little is known, however, about potential moderation and mediation mechanisms determining risk or how these processes vary by gender or race/ethnicity. Guided by a cumulative inequality framework, three nationally representative analyses were conducted to help untangle the complicated relationships between risk factors for drinking and drinking related behaviors in older age, particularly for older women and older adults of color.
Methods: Logistic regression and path analysis models were used to examine drinking and related behaviors among adults aged 60 or older, using samples from the 2002-2010 National Health and Nutrition Epidemiologic Survey (NHANES).
Results: Alcohol use in older adulthood may be even more problematic than previously thought due to the concurrent use of alcohol-interactive prescription drugs (AIPD), particularly for Mexican American men and Black women. Although no mediation effects were found, gender and race/ethnicity significantly modified several relationships between risk factors and drinking in older age. Older men who are impaired by depressive symptoms are at lower risk of heavy episodic drinking, while older women who are impaired by depressive symptoms are at higher risk of heavy episodic drinking. Gender and race/ethnicity also moderate the relationship between physical health and at-risk or heavy episodic drinking in old age, with highest risk for Mexican American men and Black older adults in poor health.
Discussion: Drinking in older age is a not a monolithic behavior, instead there is considerable variation in which factors increase risk. Inconsistencies in the literature investigating drinking in older age are not just due to lack of research, but also to lack of research recognizing these important variations. Research efforts and social work practice with older adults must account for gender and racial/ethnic differences in order to help improve understanding, strengthen assessment efforts, and optimize treatment opportunities. Additionally, it is important to consider the role of AIPD use in older age drinking, as use is highly prevalent and could compound negative outcomes of a social problem poised to become a major public health concern in the 21st century.

Dedication

When people discuss writing a dissertation they often talk about the solitary nature of the process. A dissertation is, after all, a document recording years of conceptualizing, analyzing, and writing by one person. And it is true that writing a dissertation can sometimes feel like the loneliest task in the world. However, this dissertation could not have been completed without the support and care of my wonderful mentors, family, and friends, and I would like to dedicate this project in their honor.

Dr. Lorraine Midanik has been the best dissertation chair in the history of dissertation chairs. She has been a thoughtful reviewer, an unwavering cheerleader, and a formidable source of knowledge about methodology and drinking. She is a shining model of how to be a rigorous scholar and a wonderful person--at the same time. The other members of my committee, Dr. Andrew Scharlach, Dr. Meredith Minkler, and Dr. Derek Satre, were incredibly helpful in deepening my thinking about drinking in older age and challenging, and consequently strengthening, my ideas. Dr. Katherine Karriker-Jaffe of the Alcohol Research Group has also been an insightful and caring mentor. I am indebted to all the scientists and fellows of the Alcohol Research Group, whom are on the forefront of alcohol research and played a large role in developing my thoughts about the field and passion for better understanding problematic drinking. I am honored to have worked with such renowned scholars.

My family has also been a never-ending source of support during my doctoral career. My parents, Lawrence and Kathleen Price, have always supported my dreams and believed in me more than I believed in myself. They have both sacrificed a great deal of time and effort to help me achieve my goals and I am lucky to have them. I would also like to thank my in-laws, Gayle Wolf-Venet and Warren Venet for their help, support, and love through this long process. My younger sister, Laurel Price Cooney, listened to a great deal of complaining about this dissertation, and just as she has every day since she was born, never failed to make me laugh. I could not be more grateful for such wonderful immediate and extended family.

My interest in older adults and passion for their well-being has been shaped by the presence of some remarkable older adults in my own life, including my wonderful grandmother, Bertrande Stone. This dissertation is also in part dedicated to Marlon Stone, Andrew and Edith Price, Dora Wolf, and Maurice and Ruth Kimmel, all of blessed memory. Thank you all for what you taught me about love and respect.

My greatest thanks are for my husband and partner, Marc Price Wolf. He is a prince among men and the reason I was able to pursue and complete this doctorate. His love and companionship are the greatest gift of my life. Finally, to my children Ziporah, Reuben, and Esther- I did this partly for you, even though you don't know it yet. Having you three during my doctoral program did not hinder my progress-it allowed me to succeed. You have always provided the shining love, distraction, and perspective that make me a better scholar and person. I hope that you too will pick a path in life that seems difficult, and sometimes even impossible-because only when you've truly sacrificed, toiled, and challenged yourself will the results feel as sweet as this does.

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Acknowledgments

Chapter 1: Introduction

The proportion of older adults in the United States has increased dramatically; by the year 2030, 20 percent of the U.S. population will be aged 65 years or older (FIFoARS, 2008). This demographic shift has resulted in a reprioritization of social work efforts in the last twenty years, with a focus on training social workers to work effectively with older adults and the specific challenges they encounter (Scharlach, Damron-Rodriguez, Robinson, & Feldman, 2000). Although there has been an increase in research and practice dedicated to older adults in areas such as health and mental health (Morrow-Howell & Burnette, 2001), there has been less interest in addressing problems related to alcohol abuse (Memmott, 2003). Alcohol is the primary substance of abuse for older adults (DHHS, 2008), yet many gaps in knowledge persist about the epidemiology of older adults with alcohol problems. While some risk factors have been identified, there has been limited exploration of relationships among these risk factors and, in particular, how drinking in older age differs by gender or race/ethnicity for older adults.

The lack of research examining alcohol use in older adults most likely arises from a common misperception. In the past, lowered rates of substance abuse among older adults led researchers to conclude that most older substance abusers either die prematurely or cease drinking and drug use without intervention (Borgatta, Montgomery, & Borgatta, 1982). The "drying out" phenomenon seen in earlier generations may be less relevant to the "baby boomer" cohort now entering older age, who are using substances at higher rates than their predecessors (Koenig, George, & Schneider, 1994). Using data projections from nationally representative samples, Groefer et al. (2002) estimate that the number of substance abusing older adults will double from 2.5 million in 1999 to 5 million in 2020.

In addition to these projected increases, sizable proportions of older adults currently drink. Approximately one-third of older men and one-tenth of older women drink above recommend NIAAA guidelines, with a population average of 10-13 percent overall (Blazer & Wu, 2009; Sacco, Bucholz, & Spitznagel, 2009). As many as 9 percent of older adults drink heavily or binge drink (Merrick et al., 2008a). Among older adults who drink, almost one-half of older men and one-third of older women drinkers consume more than recommended amounts of alcohol (Moos, Schutte, Brennan, & Moos, 2009). Problematic drinking among older adults may become an increasingly significant public health problem, requiring enhanced detection and intervention training for social workers in a variety of community, gerontology, and medical settings.

The lack of knowledge about specific risks for alcohol use in older age is particularly problematic as older adults may be uniquely vulnerable to alcohol's negative health effects. Changes in physiologic processes can lead to a heightened effect from alcohol in seniors (Azmitia, 2001; Spencer & Hutchinson, 1999) as can the use of alcohol-interactive prescription drugs (Weathermon & Crabb, 1999). As a result, even small doses of alcohol can lead to disorientation, falls, injury, and feelings of drunkenness, particularly for older women (Beullens & Aertgeerts, 2004; Blow & Barry, 2002; Smith, 1995). Alcohol use or abuse in older age is associated with numerous health conditions, including higher risk of many cancers, strokes, dementia, liver disease and greater risk of mortality (Boffetta, Hashibe, La Vecchia, Zatonski, & Rehm, 2006; Corrao, Bagnardi, Zambon, & La Vecchia, 2004; Moos, Brennan, & Mertens, 1994; Rehm et al., 2003; Smith, 1995; Thomas & Rockwood, 2001). In addition to these health problems, older adults who abuse alcohol are also more likely to be abused by others (Shugarman, Fries, Wolf, & Morris, 2003) and to self-neglect (Choi & Mayer, 2000).

Drinking in older age may also become increasing prevalent among some older adults of color, who have often been excluded or under sampled in the available literature. The percentages of older Hispanic and Black adults are expected to increase at more than twice the rate of Whites between 2004 and 2030 (AoA, 2005). Hispanics and Blacks may also experience more alcohol-related health effects than Whites (Caetano & Clark, 1998; Chartier, 2007; Herd, 1994; NIAAA, 2006; Stinson, Grant, & Dufour, 2001), and may be more likely to drink in older age at the most problematic levels (Blazer & Wu, 2009; Merrick et al., 2008b).

Drinking in older age may also increasingly affect older women who are more likely to begin drinking in older age than older men (Holdcraft & Iacano, 2002). Although older women drink less than older men (Blazer & Wu, 2009; Merrick et al., 2008a; Moore, Endo, & Carter, 2003; Sacco et al., 2009), they experience more related health problems (Bradley, Badrinath, Bush, Boyd-Wickizer, & Anawalt, 1998; Greenfield, Manwani, & Nargiso, 2003; Walter, Dvorak, Gutierrez, Zitterl, & Lesch, 2005). Women tend to have shorter and more intense drinking careers than men (Redgrave, Swartz, & Romanoski, 2003), and are vulnerable to drunkenness (Blow & Barry, 2002) and alcohol-related adverse drug events (Onder et al., 2002).

Although very little is known about why older adults drink, limited evidence suggest that they experience alcohol's effects differently than younger adults. Decreases in dopamine and serotonin in aging brains may lead some older individuals to seek substances like alcohol and sedatives that depress stimulation instead of heightening it (Azmitia, 2001). As a result, older adults may have a greater incentive for stress-coping patterns of drinking (Spencer & Hutchinson, 1999). Very little research has examined alcohol expectancies for older adults, even though these may differ from those of younger adults and between genders as well (Satre & Knight, 2001). Some findings indicate that older adult drinking should be examined separately from younger populations in order to better identify trends and areas for intervention.

Despite the surprising prevalence, expected increase in use, and damaging health consequences, alcohol use in older adults may be under-recognized by clinicians (Babor, 1994; Blow & Barry, 2002), particularly because there is little understanding of how risk varies between and within populations. Older adults with alcohol dependence are less likely to be identified by physicians than younger adults with alcohol dependence and are less likely to be referred to treatment (Curtis, Geller, Stokes, Levine, & Moore, 1989). In a primary care sample, alcohol misuse was noted in fewer than half of the medical records of older adults later identified as potentially alcohol dependent (Callahan & Tierney, 1995). Older adults with alcohol-related problems may be under-identified by providers because of contradictory findings in the research literature. Risk factors often differ by project, and sometimes have opposite effects between studies. This inconsistency suggests that potential group differences or underlying mechanisms have not been uncovered in existing epidemiological research. Studies that attempt to uncover mechanisms and differentiate risk are needed to better inform where and how social workers should intervene.

Study Purpose

The purpose of this study is to understand to what extent and in what ways are certain factors (e.g., gender, race, race/ethnicity, health, depression) are associated with potentially problematic alcohol use in later life. Although we now have better indicators of the prevalence of drinking in older adults, existing research on how risk for drinking in older age differs among groups of older adults is still incomplete. This dissertation attempts to disentangle the complicated relationships among risk factors for drinking in older age, particularly for older women and older adults of color.

Dissertation Structure

This study begins with a broad discussion of background issues related to drinking in older age, with a special emphasis on problem definitions, drinking guidelines, and gender and racial/ethnic-based differences in drinking in older age. The conceptual frameworks that guide this research and the specific research questions and hypotheses examined are also discussed. Next, three separate yet interrelated analyses are presented in the form of journal-length articles. Each secondary data analysis uses an older adult sub-sample of the 2001-2010 NHANES dataset, a nationally representative sample of the community-dwelling population. The analyses are designed to fill some of the major gaps in the older adult drinking literature and help identify pathways for prevention, screening, and intervention for older adults at risk due to problematic drinking.

Paper 1: Drinking and alcohol-interactive prescription drug use. Although it is well documented that older adults use more prescription medications than younger populations (Gurwitz, 2004), most of which are alcohol-interactive (Pringle, Ahern, Heller, Gold, & Brown, 2005; Smith, 2009), little is known about how risk of taking alcohol-interactive medications while drinking varies among different populations of older adults. Combining alcohol and alcohol-interactive medications could lead to a myriad of ill health effects (Adams, 1995; Lieber, Guram, Howden, & Holt, 1992; NIAAA, 2007; Paterniti, Dufouil, & Alperovitch, 2002; Smith, 2009; Widlitz & Marin, 2002).

The first paper, "Drinking and alcohol-interactive prescription drug use by older adults: Gender and racial/ethnic differences" examines any, at-risk (more than 2 drinks per drinking episode or 7 drinks in one week), and heavy episodic drinking (a usual quantity of 4 or more drinks per drinking episode, or 5 or more drinks per drinking episode at least once in the past year) among older adults currently using an alcohol-interactive medication. This is the first known nationally representative study examining this behavior specifically in older age. The analysis also develops racial/ethnic and gender-specific risk profiles to understand better if older women and older people of color have unique risks for combining alcohol with these medications. Of particular note is the discussion of gender and racial/ethnic-based differences in the relationships between socioeconomic status and social contexts (i.e., social support and functional impairment in social activities) and drinking while using an alcohol-interactive prescription drug in older age. Understanding these relationships could inform social work policy by examining whether disparities in drinking while using an alcohol-interactive prescription drug (AIPD) in older age are related to socioeconomic status. In addition, practice efforts could be aided by enhanced knowledge of how the presence or absence of social relationships or the ability to attend social events raise or lower risk for drinking while using an AIPD, and how this might differ by gender and race/ethnicity.

Paper 2: Depressive symptoms, social support, gender, and heavy episodic drinking in older age. Studies of general adult population drinkers have found that the relationship between having depressive symptoms and heavy drinking is stronger for women (Hartka, Johnstone, Leino, & Motoyoshi, 1991; Midanik, 1983; Schutte, Hearst, & Moos, 1997). Yet while these studies have found that depressive symptoms are related to more drinking for adult women, one study investigating this issue in older adults found the opposite: more depressive symptoms were related to heavy drinking in older men, but not in older women (Choi & Dinitto, 2011). This suggests a unique relationship between depressive symptoms and gender in older age. However, this analysis did not investigate whether the relationship between depressive symptoms, gender, and heavy episodic drinking is further moderated by social support. Social

support could buffer against the effects of depressive symptoms or perceived impairment from depressive symptoms on heavy episodic drinking in older age. Limited evidence suggests that this buffering effect may be stronger for older male drinkers, who are less likely to have social support (Krause & Keith, 1989), and consequently may benefit from it more than older women. This analysis, "Depressive symptoms and heavy episodic drinking in older adults: Do gender or social support matter?" helps establish whether these relationships are unique in older adulthood. Although there could potentially be racial/ethnic-based differences between these factors as well, due to small samples sizes in this sample this was not investigated. Findings will be useful to social workers in the mental health and gerontology fields, who should understand how depression relates to alcohol use among older men and older women, as well as how enhancing social support could aid in treatment.

Paper 3: Health, race/ethnicity, and drinking in older age. The third paper "Race/ethnicity, gender, and drinking in older age: The mediation and moderation effects of health," examines whether findings that Mexican American and Black older adults are less likely than Whites to drink at-risk (Breslow, Faden, & Smothers, 2003; Satre & Arean, 2005; Zimmerman, McDougall, & Becker, 2004) and more likely than Whites to engage in heavy episodic drinking in older age (Blazer & Wu, 2009; Merrick et al., 2008a) are partially explained by poorer health or represent racial/ethnic-based variation in the relationship between health and drinking in older age. In addition, the paper examines whether the hypothesized mediation and moderation mechanisms are further moderated by gender, as older women appear to be particularly vulnerable to poor health and alcohol-related negative health effects (Bradley et al., 1998; Redgrave et al., 2003). This analysis will be helpful for understanding whether health disparities are related to negative health behaviors in older age, and could aid both social workers and health care providers seeking to understand how health determines risk of drinking in older age.

Each of these papers fills a noted gap in the literature on drinking in older age, using a well-established nationally representative survey and robust statistical analyses. Following the papers, an overall discussion examines the commonalities, contrasts, and implications of all three papers in light of existing literature. Future directions for research on drinking in older age are also discussed, as are initial steps for developing more effective mechanisms for prevention, screening, and intervening in alcohol-related problems in older adulthood. Studies such as this one, that utilize nationally representative data and examine mediators and moderators of risk, are important to identify which older adults are most in need of assistance and what kind of assistance would be most beneficial.

Background

Although research on alcohol use in older adults has greatly increased in the last five years, comparisons across studies are difficult due to lack of consistent measurement and methodology. There are no universally accepted thresholds for older adulthood or problematic alcohol use in older age. Prior to the newest literature, many studies were non-representative of the United States and limited by homogenous sampling excluding both older women and older people of color. Therefore, little is known about these populations for whom alcohol use may have enhanced negative consequences.

Problems With Defining "Older Adults"

Comparisons of rates of alcohol use by older adults are complicated by the lack of uniform definitions of "older adult". The reported prevalence of the problem consequently varies depending upon how these terms are defined. For example, although older adult-specific

government benefits usually apply to those aged 65 years or older, there is no definitive minimum age used by researchers studying older adults (Stall, 1987), creating potential discrepancies in the assessment of drinking patterns. Some studies in this review include individuals as young as 50 in their samples of older adults (Blazer & Wu, 2009). This wide sampling range may result in overestimates of drinking among older adults, as those in the younger portion of the older population (i.e. 50-65) tend to have higher rates of alcohol abuse than those above age 65 (Weingartner, Robison, Fogel, & Gruman, 2002). Yet while 50 may be too young to include in samples, studies beginning at 65 may be less helpful for understanding drinking in populations with worse health and lower life expectancies. For example, older adults of color and older woman of color may have an accelerated aging process due to structural barriers, resulting lifelong disadvantage, and heightened stress (Geronimus, 2001; Geronimus, Hicken, Keene, & Bound, 2006). This study defines older adults as those aged 60 or older in order to account for these health differences, while at the same time excluding older middle-aged adults. As a result, the older adults examined include both those approaching retirement and the oldest old. In order to account for potential age-based differences in drinking rates (Blazer & Wu, 2009), age was controlled for in all study analyses.

Guidelines for Alcohol Use in Older Age

In addition to differences in how older adults are defined, guidelines vary regarding what quantity and frequency of alcohol consumption is considered problematic.   This variation is reflected in the range of measurement used in studies of alcohol consumption and health. For those aged 65 or over, the National Institute on Aging (NIA) recommends no more than 7 drinks in one week or 3 drinks in one day (NIA, 2010), while the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (1995) suggests no more than 7 drinks in one week and 1 drink per day. This level may be unnecessarily low; however, as Lang et al. (2007) found, older adults who drink more than the NIAAA's recommended 1 drink a day had no greater risk of mortality or cognitive decline than those who drank at the guideline. The authors recommend that older adults should not drink more than the "at-risk" level: 2 drinks a day or 7 drinks in one week. Similarly, Moos et al. (2009) found that approximately one-third of men and women experience alcohol-related functional or interpersonal problems when drinking more than 2 drinks in one day or 7 drinks in one week. A recent nationwide survey found that as many as 27 percent of men and 11 percent of women over age 65 reported drinking above this recommendation in the last month (Blazer & Wu, 2009). Additionally, a significant proportion of older adults who drink do so above this guideline well into old age, including over 27 percent of women and 48 percent of men between the ages 75-85 (Moos et al., 2009). Consequently, while guidelines vary, and there is controversy over whether they should be the same for older men and older women (Dawson, 2009; Moos et al., 2009), the recommendation of no more than 2 drinks a day or 7 in one week appears to be a sensitive and specific guideline to detecting at-risk drinking in older adults.

While at-risk drinking establishes the lower threshold of problematic drinking in older age, drinking at even higher levels may lead to more negative health effects (Rehm et al., 2003). High consumption alcohol patterns, where a large amount of drinks are consumed in individual drinking episodes, are especially worrisome for older adults who experience heightened effects from alcohol even at moderate does (Azmitia, 2001). In particular, Mexican American and Black older adults may to be more likely to follow a high quantity drinking pattern (Blazer & Wu, 2009; Vega, Sribney, & Achara-Abrahams, 2003). This study defines heavy episodic drinking as a usual quantity of 4 or more drinks per drinking episode, or 5 or more drinks per

drinking episode at least once in the past year (Moore et al., 2003) in order to focus on populations at enhanced risk of negative outcomes.

In addition to these at-risk and heavy episodic drinking thresholds, there are circumstances when any alcohol consumption in older age is risky, such as with concurrent use of alcohol-interactive prescription drugs. Alcohol can interact with prescription drugs in two ways (Weathermon & Crabb, 1999). Pharmacokinetic interactions occur when heavy or chronic alcohol consumption impacts how the body metabolizes a prescription drug. As a result, older adults may not receive the full benefits of their prescribed medication. Pharmacodynamic interactions are when acute alcohol consumption enhances negative side effects of a prescription medication, often leading to dizziness or drowsiness (Smith, 2009). Due to the potential of negative health effects from drinking alcohol while using an AIPD (Fu, Liu, & Christensen, 2004), Paper #1 looks at a spectrum of alcohol outcomes, including any drinking, at-risk drinking, and heavy episodic drinking.

Epidemiologic Research Examining Alcohol Use in Older Adults

Prior to 2005, most research examining alcohol use in older adults used small community or hospital samples. While these studies helped identify concerns about alcohol use in older age, they are not generalizeable to the greater U.S. population, and often under sampled older adults of color. In addition, many early researchers in the field were employed by or sampling from institutions serving veterans (Atkinson, Ryan, & Turner, 2001; Joseph, Atkinson, & Ganzini, 1995). As a result, many of these samples were composed entirely or primarily of men who were often disproportionally White. Although White men are more likely than other groups to drink in older age (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman et al., 2004), this has left a great void in understanding drinking among older women and older people of color.

Rates of alcohol use vary depending upon the composition of the sample. While Brennan and Moos (1996) found that approximately 2-4 percent of older adults from a community sample scored as problem drinkers on the Drinking Problems Index (DPI), Satre and Arean (2005) identified 14 percent of older adults from a low-income community based sample as problem drinkers using the Short Michigan Alcohol Screening Test. This low-income sample however, was drawn from a population that attended a health clinic, potentially underestimating the prevalence of alcohol abuse in the community, as at-risk drinkers tend to be in better health than abstainers and moderate drinkers (Brennan & Moos, 1996; Brennan, Schutte, Moos, & Moos, 2011; Merrick et al., 2008b).

Another concern with prevalence rates from some studies is the use of non-probability sampling. While Emlet, Hawks, and Callahan (2001) found that 17 percent of their sample of independent living frail seniors scored positive for problem drinking they used convenience sampling methods. Consequently, their finding that a significant portion of frail older adults abuse alcohol could be reflective of a "birds of a feather flock together" social network effect (Cattell, 2001) instead of an accurate community prevalence.

 Recent literature has utilized national surveys to understand the epidemiology of alcohol use in older adults. While these studies provide better data about the prevalence of drinking, at-risk drinking, and heavy episodic drinking in older age, few examine how associated risk factors are moderated by factors such as gender or race/racial/ethnicity even though there is indication of significant variation among these groups.

Gender. As in other age groups, older men are more likely to drink and drink at-risk than older women (Blazer & Wu, 2009; Breslow, Faden, & Smothers, 2003; Merrick et al., 2008; Moore et al., 2009; Pringle, Ahern, Heller, Gold, & Brown, 2005; Sacco et al., 2009), although

some studies have predicted that rates of at-risk drinking in older women will rise significantly in the future based on drinking in younger cohorts (Blow & Barry, 2002; Epstein, Fischer-Elber, & Al-Otaiba, 2007; Holdcraft & Iacano, 2002). There are several potential reasons for these differences in prevalence rates that are specific to older adults. Older men could have more positive expectancies about alcohol than older women (Satre & Knight, 2001). In addition, older men may drink to combat loneliness, as they generally have fewer social supports and are more likely to be socially isolated than older women (Krause & Keith, 1989).   Although older men generally drink more than older women, some studies have found that older women are more likely to begin (Barrick & Connors, 2002) and maintain heavy drinking in older age (Holdcraft & Iacano, 2002). Breslow, Faden et al. (2003) found that while heavy drinking decreased among males aged 65-84 as compared to younger adults, older women sustained similar heavy drinking rates in that same age group compared to younger women. The authors of the study explained this effect by arguing that men, who drank larger quantities than women, died earlier and at a greater rate than women. However, very little is known about gender-based drinking differences in older age, and there have been far fewer studies of females than males in this area (Epstein, Fischer-Elber, & Al-Otaiba, 2007). Older women outlive men on average, have less lean body mass (Blow & Barry, 2002), experience more alcohol-related negative health effects (Bradley, et al., 1998), and more alcohol-related adverse drug events (Onder et al., 2002) than older men. In addition, women in general are more likely to have shorter and more intense drinking trajectories, otherwise known as "telescoping" (Redgrave et al., 2003).

There are gender-based differences in the relationship between several risk factors, including social support, depression (Choi & DiNitto, 2010), and health and problematic drinking in older age. This dissertation uses gender specific, moderation, and mediation analyses to investigate these areas to establish a better understanding of risk factors for drinking among older women.

Race/ethnicity. Although there are few studies specifically studying older adults of color, most studies have found that Whites have higher rates of alcohol use and at-risk drinking than other racial/ethnic groups in the United States (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman et al., 2004). The lack of studies examining how older adults of color abuse substances is reflective of the field of gerontological social work in general, where many studies do not include diverse samples or focus on diversity issues. Several studies cited in this review fail to mention race or race/ethnicity in their analyses or include a predominately White sample (Atkinson et al., 2001; Joseph, Atkinson, & Ganzini, 1995; Schutte, Byrne, Brennan, & Moos, 2001). Most studies of older adults of color, while offering an initial view of the problem in particular communities, are not representative of the population. One study of predominately Black older women living in urban public housing found that 4.2 percent of the sample had a diagnosable substance use disorder, which is a lower than expected rate (Black et al., 1998). Another study of individuals of Puerto Rican descent aged 50 years or older and living in the Northeast U.S. found that 16 percent had an episode of substance abuse in the past year (Weingartner et al., 2002). Instead of being lower than general population rates, this figure is comparable to the Center for Substance Abuse Treatment's (1998) estimate that 17 percent of older adults are dealing with a substance abuse issue. These studies do not specifically study alcohol, however, leaving much in question about racial/ethnic-related drinking differences.

Due to the lack of research, it is hard to ascertain which mechanisms lead to higher rates of at-risk drinking among older Whites. Is the difference the result of a mediating effect of health, as those with better health are generally more likely to drink at-risk in older age (Brennan

& Moos, 1996; Brennan et al., 2011; Merrick et al., 2008b), and Whites are more likely to have better health (Kington & Smith, 1997; McGee, Liao, Cao, & Cooper, 1999; Warner & Brown, 2011)? Could gender further moderate these relationships, as older women of color may be uniquely vulnerable to the health effects of alcohol (Redgrave et al., 2003)? This trend may also reverse at higher levels of drinking. A recent study found that older Black women were more likely to binge drink than other older adult women, but did not find racial/ethnic-based differences in binge drinking rates for older men (Blazer & Wu, 2009). The lack of knowledge about drinking in older age by people of color is surprising, especially given that an anticipated 25 percent of older adults will be people of color by 2030 (Himes, 2001). In addition, Mexican Americans and Black older adults may be particularly vulnerable to alcohol related negative health consequences (NIAAA, 2006; Stinson et al., 2001).

Although more research is needed on all older adults of color, this study focuses on two populations in particular, Mexican Americans and Blacks. Mexican Americans comprise 58.5 percent of Hispanics in the United States, the largest sub-group of this population (Guzman, 2001). Due to sampling procedures in the NHANES, only Mexican Americans are representative of the U.S. community-dwelling population for some of the years included in this study (NHANES, 2010). Thus while the study does not represent the whole Hispanic population, it is able to precisely examine drinking among older Mexican Americans, who appear to drink at different rates than other Hispanic sub-groups (Caetano, Vaeth, & Rodriguez, 2012). Blacks are the second largest racial/ethnic minority in the U.S. (U.S. Census Bureau, 2011), and may have culturally specific relationships with alcohol (Herd, 1994). Unfortunately, due to small sample sizes, other older adults of color were not included in all analyses of this study. Very little is known about drinking among Asian American, Native American, and multi-racial older adults, although there could be substantial differences among these populations. Broad racial/ethnic categories that group these groups together (as in the NHANES) could artificially erase important population differences. Although all older adults of color are consequently not included in this study, those that are, Mexican Americans and Blacks, are precisely identified and consequently may demonstrate more meaningful results than studies that utilize White/non-White dichotomies or overly broad categories.

Despite the dearth of research on older adults of color, racial/ethnic-based differences in social support and health could impact drinking rates. Older adults of color are also less likely to have quality healthcare and use prescription drugs (Artz, Hadsall, & Schondelmeyer, 2002), implying the possibility of racial/ethnic-based differences in drinking while using an alcohol-interactive prescription drug. This project seeks to explore racial/ethnic-based differences and mechanisms related to risk of problematic drinking in older age.

Conceptual Framework

This project is guided by several overlapping theories that form a larger conceptual framework. The foundational structure of this framework is cumulative inequality theory (CIT) (Ferraro & Shippee, 2009). CIT builds upon the ideas of cumulative advantage and cumulative disadvantage (Dannefer, 2003; O'Rand, 1996), arguing that socially constructed structural barriers defined early in life determine whether a person accumulates relative advantage or disadvantage. Over time, these effects are compounded resulting in wider separation between those with advantage and those with disadvantage on a range of outcomes including, health, functional status, and health behaviors. CIT overlaps with lifecourse theories, which emphasize aging as a measure of accumulation that is affected not only by structural factors, but also by unique developmental tasks influenced by biological, psychological, social, and cultural factors

(Baltes & Baltes, 1993). Older adults face several specific developmental tasks, which include adjustment to changes in social roles (e.g., retirement, widowhood, reduced income, becoming grandparents or caregivers) and acceptance of decreasing physical vitality and worsening health (Havighurst, 1972). The impact of these developmental tasks, combined with the effects of cumulative advantage or disadvantage, are further modified by individual personality, biology, psychological resources, family systems, and greater social networks. By combining theories focused both on systemic oppression and life course development, CIT is a "multi-level approach" similar to the person-in-environment perspective of social work (Greene, 2008).

CIT informs many of the research questions and hypotheses of this study.   First, this project emphasizes the role of racial/ethnic disparities in drinking or drinking while using an AIPD in older age. Many race/ethnicity-based health disparities are attributable to differences in socioeconomic status (Fuller-Thomson, Nuru-Jeter, Minkler, & Guralnik, 2009). People of color more likely to be born and raised in poverty and to face significant barriers to educational attainment like institutional racism and lack of social capital (Crystal & Shea, 1990; Grogger & Trejo, 2002). Resulting low socioeconomic status and oppression through the life course can continue to impact health status through lower levels of health literacy, stability of social supports, and long-term effects of poor nutrition or harmful health behaviors (Bowen, 2009; Jeffreys, 1996), making some disparities potentially widen in older age (Chen & Escarce, 2004).

A related concept is the idea of "weathering", which postulates that accelerated aging due to high-intensity stressors leads to earlier onset of poor health, more intense periods of disability, and premature mortality for disadvantaged groups of older adults (Geronimus, 2001; Geronimus et al., 2006). This may be particularly relevant for older women of color, who face the dual disadvantages of being a woman and a minority. Similarly, "intersectionality" approaches argue that race/ethnicity and gender need to be analyzed to understand the overlapping identities between these domains (Collins, 1990; Crenshaw, 1991). Although this project was limited by sample size from taking an intersectional approach in all three papers, special attention is paid when possible to ways in which race/ethnicity and gender create distinct risk for drinking in older age.

CIT also guides other study questions that examine how aging-specific contexts create unique relationships between variables determining risk of drinking in older age. Older adults face changing social environments as they age, potentially leading to differences in social support, social control, and pursuance of social activities. Social support is typically defined as a sense of feeling understood, listened to, and helped by another person (Thoits, 1995) and is thought to buffer against the negative effects of many stressors (Cohen & Wills, 1985). These effects may differ for older adults, who have smaller social networks than younger adults (Tucker, Klein, & Elliott, 2004). Some of the effects of social support could be manifested through social control, when close interpersonal relationships regulate behavior by discouraging potentially unhealthy behaviors (Rook, 1990; Umberson, 1987). Social control is especially effective in family relationships where the benefit of overall support outweighs the negatives of "nagging" about unhealthy behaviors (Rook & Ituarte, 1996). These effects could differ among older adults of color (Peek, Coward, & Peek, 2000; Sarkisian & Gerstel, 2004) and for older women (Cornwell, Laumann, & Schumm, 2008; Mair, 2010).

This project uses a CIT framework to emphasize the potential roles of cumulative advantage/disadvantage, developmental tasks of aging, and multi-level contexts in racial/ethnic and gender based differences in drinking behaviors in older age. This framework is allied with the social justice goals and person-in-environment perspective of social work and provides

opportunities for research questions and hypotheses designed to improve understanding of disparities in drinking behaviors among older adults. While this project uses cross-sectional data and consequently cannot prove or disprove the role of CIT on drinking in older age, study analyses offer an initial exploration of many of these topics and provide potential avenues for future longitudinal exploration and theory development.

<div align="center">**Research Questions and Hypotheses**</div>

The three study analyses are guided by five research questions and related hypotheses, designed to uncover some of the underlying mechanisms defining risk of drinking and related risk behaviors in older adults, with each analysis playing special attention to the role of race/ethnicity, gender, or both in these mechanisms.

Question 1: What are the population, gender-specific, and racial/ethnic-specific risk factors for any drinking, at-risk drinking, and heavy episodic drinking while using an alcohol-interactive prescription drug?

> *Hypothesis 1a.* Risk of drinking while using an alcohol-interactive prescription drug will vary by gender and race/ethnicity. These risks will also vary by the level of drinking examined.

> *Hypothesis 1b.* There will be gender and racial/ethnic-specific differences in how studied factors (age, martial status, socioeconomic status, social support, functional impairment in social activities, and health) relate to drinking while using an alcohol-interactive prescription drug in older age. These differences will also vary by the level of drinking examined.

Due to inconsistencies in the literature and the lack of data on drinking while using an alcohol-interactive prescription drug in older age, these hypotheses are non-directional. There is enough evidence, however, to suggest that there will be significant gender and racial/ethnic based variation.

Question 2: How do depressive symptoms or perceived impairment from depressive symptoms relate to heavy episodic drinking in older adults? Do these relationships differ by gender?

> *Hypothesis 2a.* Having more depressive symptoms or perceived impairment from depressive symptoms will increase odds of heavy episodic drinking in older adulthood.

> *Hypothesis 2b.* This effect will be stronger for older men than for older women.

Question 3: Does social support buffer against the negative effects of depressive symptoms and perceived impairment from depressive symptoms on heavy episodic drinking? Does this relationship differ by gender?

> *Hypothesis 3a.* There will be a buffering effect. Older adults with more depressive symptoms or more perceived impairment from depressive symptoms and high social support will be less likely to engage in heavy episodic drinking than older adults with more depressive symptoms or more perceived impairment from depressive symptoms and low social support.

> *Hypothesis 3b.* The buffering effect will be modified by gender, with the effect stronger for older men than older women.

Question 4: Is the relationship between race/ethnicity and at-risk or heavy episodic drinking in older age partially mediated by health? Does this mediation effect differ by gender?

> *Hypothesis 4a.* Poorer health will partially mediate the relationship between Mexican American and Black race/ethnicity and lower risk of at-risk drinking in older adulthood.

Hypothesis 4b. Poorer health will partially mediate the relationship between Mexican American and Black race/ethnicity and higher risk of heavy episodic drinking in older adulthood.

Hypothesis 4c. These effects will be stronger for older women than for older men.

Question 5: Is the relationship between health and at-risk or heavy episodic drinking in older age moderated by race/ethnicity and gender?

Hypothesis 5a. Race/ethnicity and gender will moderate the relationship between health and at-risk drinking in older age. Specifically, Mexican American and Black older adults, and older women in poor health will be less likely to drink at-risk or engage in heavy episodic drinking than older White men in poor health.

Study Methodology

This study utilizes the National Health and Nutrition Epidemiologic Survey (NHANES), a complex, stratified, nationally representative study of the community-dwelling U.S. population (www.cdc.gov/nchs/nhanes.htm). The NHANES is well suited to address the lack of information about gender and racial/ethnic-based drinking differences in older age. Sponsored by the National Center for Health Statistics division of the Centers for Disease Control and Prevention, the NHANES collects questionnaire and examination data on a variety of health outcomes and behaviors. The survey is released in 2-year cross-sectional waves that can be combined to increase samples sizes. This increases power for statistical analyses and allows for more robust findings, especially for rare outcomes. As heavy episodic drinking in older adults (9%), and particularly in older women (1-2%) is relatively rare (Moore et al., 2003), the NHANES offers an opportunity to create larger datasets and expand the potential for significant analyses. In addition, the NHANES collects in-depth and specific information about prescription drug use in older adults. As a result, NHANES analyses can investigate older adults who drink alcohol while using alcohol-interactive or other prescription medications.

The NHANES offers a more representative sample of the U.S. population than community or hospital-based studies. In addition, the NHANES also oversampled Mexican Americans, Blacks and adults aged 60 or older during the survey years used in this project, allowing for specific investigation of these populations. Although the oversampling of Mexican Americans specifically limited the study's ability to investigate U.S. Hispanics overall, it allows for more precise examination of drinking in this population, who have different drinking behaviors than other Hispanics (Caetano et al., 2012).

All study analyses were weighted to account for the complex sampling strategy of the NHANES. Two different statistical techniques were used to examine the study's research questions and hypotheses. First, weighted logistic regression models were utilized to examine adjusted odds ratios of drinking behaviors. Logistic regression is a robust modeling procedure for non-parametric data and is commonly utilized in public health and social work research when binary outcomes are of interest (Jewell, 2009). Second, weighted path analysis models examined mediation effects with the use of bootstrapping, a non-parametric sampling method (Preacher & Hayes, 2008). While the use of path analyses to examine mediation effects is relatively new, there is a burgeoning methodological literature in this area (MacKinnon, 2008; MacKinnon, Krull, & Lockwood, 2000; Muthen, 2011). Path analysis models offer the opportunity to formally test statistical significance and effect size in relationships between variables of interest. All analyses were conducted with the use of either SPSS Complex Samples (Version 19.0) or Mplus (Version 6.1), well-established statistical programs that are equipped to handle NHANES' sampling procedures (Siller & Tompkins, 2005).

Study Significance

Due to an aging general population, problematic alcohol use among older adults is an increasingly salient issue for further study. This project seeks to examine current knowledge about problematic drinking and drinking while using an AIPD in older age, and to examine racial/ethnic and gender-based variation in risk. By utilizing a cumulative inequality framework and focusing on older adults of color and older women, this project attempts to redress the lack of research on these populations and uncover some of underlying mechanisms contributing to disparities in both negative health behaviors and the consequences of those behaviors in older age. As a field, social work has an increased commitment to improving quality of life and well being among older adults. This project uses a social work research approach, with an emphasis on social justice, interdisciplinary, theoretical, and applied analysis to examine a social problem that is poised to become a major public health concern in the 21st century.

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Chapter 2

Drinking and alcohol-interactive prescription drug use by older adults:

Gender and racial/ethnic differences

Jennifer Price Wolf, MPH, MSW
University of California, School of Social Welfare

Abstract

Objectives: Older adults consume a disproportionate amount of prescription drugs, the majority of which can interact with alcohol, potentially resulting in a range of adverse side effects. Little is known about this behavior, especially among older women and older people of color who may be particularly vulnerable to negative outcomes due to poorer health or lower socioeconomic status. This study examines population, gender, and racial/ethnic-specific predictors of drinking among alcohol-interactive prescription drug (AIPD) using older adults.

Methods: Logistic regression models examined AIPD using adults age 60 or older in the 2001-2008 National Health and Nutrition Examination Survey (NHANES) (n=4,441).

Results: Approximately half of AIPD using older adults were current drinkers, while 14.3 percent were at-risk drinkers and 4.6 percent engaged in heavy episodic drinking. Whites with low social support and Blacks with some functional impairment in social activities were more likely to drink at-risk while using an AIPD. Men with lower education levels and poor health, and women with low social support had higher odds of heavy episodic drinking while using an AIPD.

Discussion: A substantial proportion of older adults drink (and drink at higher than recommended levels) while using an AIPD, and risk factors were similar to those predicting drinking in general older adult populations. Richer understanding of drinking while using AIPDs could improve health education efforts for providers serving older adults.

Introduction

Drinking and at-risk drinking [i.e., drinking an average of more than 2 drinks per drinking episode or 7 or more drinks per week (Moos, Schutte, Brennan, & Moos, 2009)] among older adults (60 or older) might increase in the near future due to relatively high rates of alcohol use in the "baby boomer" cohort now reaching their 60's (Blow & Barry, 2002; Booth & Blow, 2002; Patterson & Jeste, 1999) and the rise in proportion of older adults in the United States (AoA, 2005). A nationally representative study looking at adults aged 50 or older found that 17 percent of men and 11 percent of women are at-risk drinkers (Blazer & Wu, 2009). Further, one community sample found that a significant proportion of older adult drinkers drink at-risk well into older age, including over 27 percent of women and 48 percent of men between the ages 75-85 (Moos et al., 2009). Although less prevalent (Merrick et al., 2008), heavy episodic drinking (i.e., a usual quantity of 4 or more drinks per drinking episode, or 5 or more drinks per drinking episode at least once in the past year) by older adults is also potentially problematic (Blazer & Wu, 2009).

Increasing alcohol use in older adults could be complicated by concomitant alcohol-interactive prescription drug (AIPD) use i.e., drinking while regularly taking a prescription drug known to interact with alcohol (Benza, Calvert, & McQuown, 2010). Approximately 83 (NIH, 2009) to 90 (Gurwitz, 2004) percent of older adults take prescription drugs, three-fourths of which can interact with alcohol, including commonly prescribed medications for anxiety, depression, high blood pressure, high cholesterol, diabetes, enlarged prostate, and sleep problems (Smith, 2009). Acute doses of alcohol taken in conjunction with AIPDs can prolong and accentuate the drugs' negative side effects, while chronic alcohol use can decrease an AIPD's effectiveness (Adams, 1995; Lieber, Guram, Howden, & Holt, 1992; NIAAA, 2007a). Concomitant use of alcohol and AIPDs also could be related to falls (Widlitz & Marin, 2002), cognitive decline (Paterniti, Dufouil, & Alperovitch, 2002), unsafe driving (Maxwell, Dubois, Weaver, & Bedard, 2010), adverse drug events (Onder et al., 2002), and increased risk of mortality (Smith, 2009). Despite these potential harms, physicians often fail to identify older adults who are dependent on alcohol (Callahan & Tierney, 1995), are less likely to discuss alcohol consumption with older adults as compared to younger adults, and are not more likely to discuss alcohol consumption with AIPD users than non-AIPD users (Duru et al., 2010). In addition, while many older adults appear to quit drinking due to poor health, they are not more likely to quit drinking as a result of using an alcohol-interactive medication than a non alcohol-interactive medication (Pringle, Heller, Ahern, Gold, & Brown, 2006).

Drinking while using AIPDs could be especially problematic for older women and older people of color who generally are in worse health and of lower socioeconoimic status (Case & Paxson, 2005; Kington & Smith, 1997; Sudano & Baker, 2006) and may experience more alcohol-related health problems (Bradley, Badrinath, Bush, Boyd-Wickizer, & Anawalt, 1998; Greenfield, Manwani, & Nargiso, 2003; NIAAA, 2006; Stinson, Grant, & Dufour, 2001; Walter, Dvorak, Gutierrez, Zitterl, & Lesch, 2005). However, little is known about factors predicting drinking while using an AIPD, how these factors interact with each other, or whether they differ by level of drinking, gender, or racial/ethnic group.

This study will address the following research question: what are the population, gender-specific, and racial/ethnic-specific risk factors for any drinking, at-risk drinking, and heavy episodic drinking while using an alcohol-interactive prescription drug? It is hypothesized that the risk of drinking while using an alcohol-interactive prescription drug will vary by gender and race/ethnicity and the level of drinking examined. The study also hypothesizes that there will be

gender and racial/ethnic-specific differences in how examined factors (age, marital status, socioeconomic status, social support, functional impairment in social activities, and health) relate to drinking while using an alcohol-interactive prescription drug in older age. These differences are also expected to vary by level of drinking. The study hypotheses are non-directional due to significant inconsistencies in the literature and limited research on drinking while using an AIPD. Better understanding of the specific relationships that create risk for drinking while using an AIPD could help identify older adults uniquely vulnerable for potential negative consequences.

Background

Recently there has been increased attention to drinking in older age, resulting in several nationally representative studies examining the prevalence and correlates of problematic drinking (Blazer & Wu, 2009; Choi & DiNitto, 2010; Sacco, Bucholz, & Spitznagel, 2009).   These studies did not investigate concomitant AIPD use, however, despite the prevalence of AIPD use and the potential risks of drinking while using an AIPD. As a result, little is known about the population of older adults who continue to drink while using an AIPD. One community-based study found that only one-fifth of older adults taking AIPDs were current drinkers (Pringle et al., 2005), indicating that AIPD users drink less frequently than the general older adult population. Other studies have reported much higher prevalence rates of drinking or at-risk drinking while using an AIPD. Fink et al. (2002) found that 88 percent of current drinkers were using an AIPD, while more recently, Barnes et al. (2010) found that 61 percent of at-risk drinkers aged 60 or older were taking high risk (although not specifically alcohol-interactive) medications. In a recent Australian study, 35.4 percent of those aged 65 or older drank alcohol while using an AIPD in the last 24 hours (Swift, Stollznow, & Pirotta, 2007). Finally, a recent unpublished longitudinal study reported that 55.4 percent of adults aged 65 or older drank alcohol while using an AIPD at least once during the follow-up period (Smith, 2009).

Only one known study has examined problem drinking while using AIPDs in the general U.S. adult population (Jaibert, Quilliam, & Lapane, 2008). Although older adults were found to be far less likely to problem drink while using AIPDs than younger adults, this study examined only one level of drinking (usual quantity of 3 or more drinks per drinking episode on 90 or more days a year) and did not examine specific risk factors for older adults of color or older women.

The few studies examining drinking while using an AIPD have used different drinking thresholds, making it difficult to compare results across study populations. There is indication, however, that older adults who drink while using an AIPD may be more likely to be male, better educated, healthier, younger (Jaibert et al., 2008; Pringle, Ahern, Heller, Gold, & Brown, 2005) and White (Smith, 2009). Despite this evidence of gender and racial/ethnic-based differences in drinking while using an AIPD, however, it is unknown how risk factors for these groups differ in a nationally representative sample.

Gender and Drinking While Using an AIPD

Emerging evidence suggests that as in younger populations, risk factors for drinking in older age differ by gender (Blazer & Wu, 2009; Brennan, Schutte, Moos, & Moos, 2011; Choi & DiNitto, 2010). The predicted rise in alcohol consumption among older adults may be more significant for women, whose rates of alcohol dependence have increased more than men (Holdcraft & Iacano, 2002). Women may also be more likely to start drinking problematically in older age (Barrick & Connors, 2002), even though drinking in older age could be riskier for older women than older men (Redgrave, Swartz, & Romanoski, 2003; AoA, 2005) and those using AIPDs could be both unhealthier (Jaibert et al., 2008) and at greater risk of negative

consequences from drinking than older adults not using an AIPD. Older men are more likely than older women to drink at-risk (Blazer & Wu, 2009; Breslow, Faden, & Smothers, 2003; Merrick et al., 2008; Pringle et al., 2005; Sacco et al., 2009), while women are more likely to take prescription drugs (Blazer, Hybels, Simonsick, & Hanlon, 2000) and AIPDs (Smith, 2009). Although men appear to be more likely to drink while using an AIPD (Jaibert et al., 2008; Pringle et al., 2005; Smith, 2009), women may be more likely to have alcohol-related adverse drug events (Onder et al., 2002). It is unknown however, whether gender-specific risk factors exist for drinking while using an AIPD and whether these factors vary by level of drinking.

Limited evidence suggests that there may be gender-based differences in the relationship between social contexts and drinking while using an AIPD in older age. Several studies have found that unmarried or divorced older men are more likely to drink than married older men (Blazer & Wu, 2009; Merrick et al., 2008; Moore et al., 2009; Pringle et al., 2005). This suggests that something about marriage, potentially social control (i.e., monitoring of health behavior) or social support may be more influential in drinking for older men than older women. However, a recent nationally representative study found that older women with more social support were more likely to drink heavily than older women with low social support (Choi & DiNitto, 2010). Consequently, while social support could help prevent older men from problematic drinking, it could promote drinking in older women. However,the relationship between social context and drinking in older age is largely unknown. Few studies have also conceptually differentiated between the availability of social support and the ability to attend social functions (i.e., functional impairment in social activities). Consequently, it is unknown whether functional impairments in an older adult's ability to attend social events could impact their drinking behaviors beyond the influence of social support. Older adults with limited exposure to social activities where drinking commonly occurs, such as parties, could be less likely to drink in older age due to lack of social contexts. Conversely, they could be more likely to drink out of boredom or loneliness. This study is the first known to examine both social support and functional impairment in social activities in relation to drinking in older age.

Race/ethnicity and Drinking While Using an AIPD

Like gender, the role of race/ethnicity in predicting older adult drinking has been understudied, with many samples non-representative of racial/ethnic minority populations. White older adults are more likely to take prescription drugs (Blazer et al., 2000), and take more prescription drugs on average than Blacks (Gaskin, Briesacher, Limcangco, & Brigantti, 2006). Whites are also more likely to drink (Blazer & Wu, 2009), drink at-risk (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman, McDougall, & Becker, 2004) and drink while using an AIPD (Jaibert et al., 2008; Smith, 2009) than racial/ethnic minority older adults. Yet while Whites are more likely to drink at-risk overall, some studies suggest that among at-risk drinking older adults, Hispanics and Blacks drink more than Whites (Blazer & Wu, 2009; Merrick et al., 2008), which could put them at increased risk of mortality (Holahan, et al., 2010). Hispanics and Blacks may also be more likely to suffer from alcohol-related negative health effects (Jones-Webb, 1998; McDonald, Nan Wang, Carlos, & Camargo, 2004; NIAAA, 2006). As the U.S. population of older Hispanics and older Blacks is expected to increase at a higher rate than older Whites in the next twenty years (AoA, 2005), knowledge of racial/ethnic specific differences in older adult drinking while using an AIPD may become increasingly important.

Preliminary evidence suggests that the relationship between socioeconomic status (SES) and drinking may also have racial/ethnic-based differences. Some studies, both nationally representative (Blazer & Wu, 2009) and community-based (Merrick et al., 2008; Moos, Brennan,

Schutte, & Moos, 2010) have found that older adults with higher incomes are more likely to drink at higher levels. Older adults with higher incomes may have more opportunities to attend business or social events in which alcohol is consumed (Moos et al., 2010) and may have more disposable income to purchase alcohol. Income also could affect prescription drug use, as those with higher incomes may have more access to prescription drug coverage than those with lower incomes, through supplemental or high-quality insurance coverage in addition to Medicare (Artz, Hadsall, & Schondelmeyer, 2002; Card, Dobkin, & Maestas, 2008). A recent nationally-representative study, however, found that lower income predicted the heaviest levels of drinking in older adults (Choi & Dinitto, 2011). As lower educational level, which is often correlated with lower income, has been related to risky or heavy drinking (Barnes et al., 2010; Sacco et al., 2009), it may be that while higher SES predicts any drinking or at-risk drinking among AIPD using older adults, lower SES predicts heavy episodic drinking among AIPD using older adults.

These socioeconomic differences in risk likely translate to racial/ethnic differences as well. Mexican Americans and Blacks are less likely to obtain high levels of education and more likely to have lower incomes than Whites (Crystal & Shea, 1990; Grogger & Trejo, 2002) for a variety of reasons, including deficits in social or human capital and institutionalized racism (Coleman et al., 1966; Mirowsky & Ross, 2003). Health disparities caused by these differences have been found to persist, and even worsen, in older age (Chen & Escarce, 2004). While studies generally control for education or income when examining race/ethnicity and drinking, they rarely examine these factors in racial/ethnic-specific models. Understanding the mechanisms through which race/ethnicity and socioeconomic status increases risk for drinking while using an AIPD could aid practitioners in developing effective interventions.

Conceptual Framework

This study is guided by cumulative inequality theory (Ferraro & Shippee, 2009), which draws upon both cumulative advantage/disadvantage theories (Dannefer, 2003; O'Rand, 1996) and life course theories. Cumulative inequality theory posits that structural forces lead to the accumulation of opportunities for advantage or disadvantage over the life course. These opportunities interact with individual characteristics, family systems, and social environmental factors to shape life trajectories. Using this frame, this study examines a series of SES indicators to capture how disadvantage relates to drinking while using an AIPD in older age, as well as how that might vary among populations who have faced different levels of structural obstruction. In addition, the study investigates the social contexts of alcohol use in an effort to understand how these factors differ among populations with differing levels of advantage or disadvantage.

Purpose of Study

This study is a cross-sectional secondary data analysis combining four waves (2001-2008) of the National Health and Nutrition Examination Survey (NHANES) (2008). The NHANES, which oversamples Black and Mexican American older adults, and is representative of non-institutionalized US older adult population, provides a unique opportunity to investigate drinking among these populations. This study examines population, gender, and racial/ethnic-specific risk factors for any drinking, at-risk drinking, or heavy episodic drinking while using an AIPD. Building upon Jaibert et al. (2008), this is the first known nationally representative study to examine potential gender and racial/ethnic disparities in the risk for drinking while using an AIPD.

Methods

Sample

The NHANES, sponsored by the National Center for Health Statistics division of the Centers for Disease Control and Prevention, is a cross-sectional, complex, stratified, clustered probability sample of the civilian, non-institutionalized population. The NHANES is a publically accessed dataset released in biennial surveys since 2001, and designed to accommodate combining multiple 2-year cycles for investigation of relatively rare events with enhanced statistical reliability. The study selects clusters of households, screens each person in a selected household, and then randomly selects one or more individuals from a household based on their age, gender, or race/ethnicity classifications (mean=1.6 respondents per household). Upon selection, respondents complete a face-to-face household interview followed by physical examinations, laboratory testing, and additional computer administered questionnaires (including alcohol consumption questions) at mobile examination centers. The average response rate for the examination component of the 2001-2008 surveys was 77 percent. During the waves analyzed, the NHANES oversampled adults over aged 60, Blacks, and Mexican Americans to increase the reliability of statistical estimates in these sub-populations (NHANES, 2006, 2010).

The 2001-2002, 2003-2004, 2005-2006, and 2007-2008 waves of the NHANES survey were merged to increase study sample size. Point estimates were examined for significant differences between the surveys, and survey year was controlled for in all analyses to protect against changes over time. All adults age 60 or older examined at the mobile examination center were eligible (n=6,911). However, due to oversampling of Mexican Americans in the 2003-2006 surveys, "other Hispanics" do not provide reliable population estimates for these years (NHANES, 2010). In addition, those in the "multi-racial or other" racial/ethnic category were excluded from this analysis due to small sample sizes and the lack of precision in this general category. In order to provide racial/ethnic specific data that were meaningful and nationally representative, the final racial/ethnic categories were White, Black, and Mexican American (N=6,418).

During the in-person interviews, NHANES interviewers examined bottles of prescription drugs taken by respondents and recorded the generic name of each medication. For this analysis, medications were classified as alcohol-interactive based on a review of three resources: the National Institute of Health's Medline Plus Prescription Drug Database (http://medlineplus.gov), the National Institute on Alcohol Abuse and Alcoholism's report on mixing alcohol with medications (NIAAA, 2007b), and Drugs.com, an independent drug database including unedited information from the Wolters Kluwer Health, the American Society of Health-System Pharmacists', Cerner Multum, and Thomson Reuters Micromedex pharmaceutical databases. Drugs that included warnings about concomitant alcohol consumption were classified as alcohol-interactive (yes=1 or no=0) (see Appendix 1). In order to maintain the same time frame as the alcohol questions (see below), respondents were included in the final sample if they had been taking an AIPD every day or nearly every day for the past 30 days and had taken the AIPD for one year or longer (n=4,441, 72.1% of sample).

Variables

Stratification variables. Gender and racial/ethnic-specific profiles were created to assess risk of drinking while using an AIPD in older age. *Gender.* Interviewers identified the gender of each respondent, which were coded as female=0 and male=1. *Race/ethnicity.* The NHANES asked respondents "what race do you consider yourself to be" and "do you consider yourself to be Hispanic/Latino"? Interviewers additionally asked respondents who self-identified

as Hispanic/Latino for their ancestor's countries of origin. The NHANES coded responses into the following categories: Mexican-American; other Hispanic; White; Black; and Multi-racial or other. Those in the "other Hispanic" and "multi-racial or other" categories were excluded (see above).

Dependent variables. Drinking was assessed at three levels: 1) any drinking; 2) at-risk drinking; and 3) heavy episodic drinking. *Any drinking.* Respondents were asked if they had consumed any type of alcoholic beverage in the past 12 months. Those who consumed alcohol were labeled drinkers (50.9% total; 58.8% men; 44.8% women; 52.9% White; 39.4% Mexican American; 34.8% Black), while those who did not were coded as "abstainers" and excluded from the at-risk and heavy episodic drinking analyses. *At-risk drinking.* The NHANES asked respondents about the frequency ("In the past 12 months, how often did you drink any type of alcoholic beverage?") and quantity ("In the past 12 months, on those days that you drank alcoholic beverages, on the average, how many drinks did you have?") of their alcohol consumption. At-risk drinking was defined as an average of more than 2 drinks per drinking episode or 7 or more drinks a week in the past 12 months (Moos et al., 2009) (14.3% total; 23% men; 7.5% women; 14.7% White; 13.9% Mexican American; 10.4% Black). *Heavy episodic drinking.* Heavy episodic drinking was defined as a usual quantity of 4 or more alcoholic beverages per drinking episode or drinking 5 or more alcoholic beverages per drinking episode at least once in the past 12 months (Moore et al., 2011) (4.6% total; 8.4% men; 1.6% women; 4.4% White; 7.9% Mexican American; 5.1% Black).

Independent variables. To assess risk of any drinking, at-risk drinking, and heavy episodic drinking while using an AIPD in older age, independent variables were selected based on existing literature examining drinking in older age (Blazer & Wu, 2009; Merrick et al., 2008; Moore et al., 2011; Sacco et al., 2009). Variables assessed included age, marital status, education, income, physical health, social support, and impairment in social activities. *Age.* The NHANES records the age at the time of interview for each respondent, except for those 80 years or older, who are all recorded as "80" years old. These ages were categorized into four groups: 60-64 (pre-retirement age, 22.7%); 65-69 (retirement age, 21.8%); 70-79 (post-retirement, 35.1%); and 80 or older (approaching and including the "oldest old", 20.5%). *Marital Status.* Interviewers asked respondents for their current marital status, which were coded into three categories: married or living in a marriage-like relationship; divorced or never married; and widowed. *Education level.* The interviewers asked respondents to indicate the highest grade or level of school they had completed or the highest degree they had received. For this analysis, responses were categorized into four groups: less than high school graduate; high school graduate or GED; some college or 2-year degree; or 4-year college graduate or above. *Income.* Interviewers asked respondents to name the total household income before taxes for all persons living in their household in the last calendar year, including wages, salaries, Social Security or retirement benefits, help from relatives and any other sources. This analysis categorized the responses into three groups: under $20,000; $20,000-54,999; or $55,000 and above. *Physical health.* The NHANES assessed self-rated physical health by asking the respondents how they felt about their general health in comparison to people of the same age on a five-point scale [(1) excellent; (2) very good; (3) good; (4) fair; and (5) poor]. This is a commonly used health measure (White, Philogene, Fine, & Sinha, 2009) found to be highly predictive of mortality (Idler & Benyamini, 1997). Categories were combined to create a binary variable with 0=excellent, very good, or good health and 1=fair or poor health (Martin, Schoeni, Freedman, & Andreski, 2007). *Social support.* Respondents were asked, "Can you count on anyone to

provide you with emotional support such as talking over problems or helping you make a difficult decision?" with results coded yes=0, no=1. This one-item measure is part of the adapted Berkman-Syme Social Network Index (Berkman et al., 1993) used by the NHANES.

Functional impairment in social activities. The impairment in social activities measure is one item taken from the NHANES activities of daily living (ADL) scale. Respondents were asked "By yourself and without using any special equipment, how much difficulty do you have participating in social activities, visiting friends, attending clubs or meetings or going to parties? Difficulty in attending social activities was rated on the following scale: 1) no difficulty; 2) some difficulty; 3) much difficulty/unable to do.

Data Analysis

IBM SPSS Complex Samples (Version 19.0) was used for all analyses. IBM SPSS Complex Samples is designed to account for clustering, unequal probability of selection, and non-response rates in multistage surveys and produces comparable parameter estimates to similar statistical programs (Siller & Tompkins, 2005). For all analyses, weighted data were used to account for the complex survey design, oversampling, and non-response rates and to generalize findings to the non-institutionalized civilian U.S. population (NHANES, 2006). A correlation matrix of the independent variables was examined for multicollinearity. As none of the variables were correlated above .50, all were retained in the analysis (Menard, 2002). Logistic regression analyses were conducted to predict the odds of any drinking among AIPD users and at-risk drinking or heavy episodic drinking among AIPD using current (past 12 months) drinkers. To look more closely at gender and racial/ethnic effects, separate models for women, men, Whites, Mexican Americans, and Blacks were examined. Two-way and three-way interaction regression terms were tested to further examine gender and race/ethnicity effects. Predicted and observed classifications were examined to informally gauge model fit (Hosmer & Lemeshow, 2000). Due to complex sample weighting chi-square goodness of fits tests were not calculated.

Description of Study Population

Table 1 presents a comparison between AIPD using older adults and non-AIPD using older adults. AIPD using older adults were older, in worse health, more likely to have functional impairment in social activities, and less likely to drink any alcohol, drink at-risk, or engage in heavy episodic drinking than those not taking an AIPD. Whites were more likely to take an AIPD than Mexican-Americans and Blacks. Unlike other studies of prescription drug use (Blazer et al., 2000), there was no association between AIPD use and gender.

<div align="center">

Results

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Tables 2-4 present population, gender-specific, and racial/ethnic specific risk factors for any drinking, at-risk drinking, and heavy episodic drinking while using an AIPD in older age.

Risk Factors for Any Drinking While Using an AIPD

For all racial/ethnic groups, male gender and higher education level predicted drinking while using an AIPD. Except for Mexican Americans, those with the highest incomes ($55,000 or more) were more likely to drink while using an AIPD as compared to those with an income between $20,000 and $54,999. Among women, men, and Whites, those with the lowest incomes (under $20,000) were less likely to drink while using an AIPD than those in the middle-income group. Women, men, and Whites in poor health were less likely to drink while using an AIPD, as were Whites and Mexican Americans who had impairment in social activities. Among men, those with low social support were more likely to drink while using an AIPD than those with high social support.

There were no significant interactions between race/ethnicity and income and race/ethnicity and health status. There was a significant two-way interaction between gender and social support (Wald F=5.865, p=.018). Older men with low social support had higher odds of any drinking while using an AIPD than older men with high social support, while older women with low social support had lower odds of any drinking while using an AIPD than older women with high social support.

Risk Factors for At-Risk Drinking While Using an AIPD

Male gender predicted higher odds of at-risk drinking while using an AIPD for all racial/ethnic groups. Among women, those with incomes of over $55,000 had 1.82 odds (95% CI=1.10,2.48, p=.048) of at-risk drinking than those with incomes between $20,000 and $54,999. Whites with low social support had 2.03 odds (95% CI=1.16,3.53, p=.014) of at-risk drinking compared with Whites with high social support. Blacks who had some functional impairment in social activities had 4.66 odds (95% CI=1.74,12.45, p=.01) of at-risk drinking while using an AIPD than Blacks with no functional impairment in social activities.

In follow-up interaction models, there was no significant interaction between social support and race/ethnicity. There was a significant two-way interaction between race/ethnicity and impairment in social activities (Wald F=4.78, p=.002). For Whites, predicted probability of at-risk drinking remained stable regardless of impairment in social activities, while for Mexican Americans, predicted probability of at-risk drinking declined as impairment in social activities increased. For Blacks, however, predicted probability of at-risk drinking peaked for those with some impairment in social activities (see Figure 1). There was also a significant three-way interaction between gender, race/ethnicity, and income (Wald F=2.42, p=.015). For most groups, predicted probability of at-risk drinking decreased as income increased. For White women, predicted probability of at-risk drinking increased for those in the highest income bracket (see Figure 2).

Risk Factors for Heavy Episodic Drinking While Using an AIPD

Younger age predicted higher risk of heavy episodic drinking while using an AIPD for men and Whites. Odds ratios for age categories were not calculable for Blacks due to quasi-separations of data, which result in unreliable parameter estimates (Heinze & Schemper, 2002). Among women, Blacks had 4.42 odds (95% CI=2.14,9.15, p=.000) of heavy episodic drinking while using an AIPD than Whites. Among men, Mexican Americans had 2.28 odds (95% CI=1.33,3.92, p=.006) of heavy episodic drinking while using an AIPD than Whites. Among men, but not women, lower education levels predicted higher odds of heavy episodic drinking while using an AIPD, while poorer health predicted lower odds of heavy episodic drinking while using an AIPD. Lower income predicted higher odds of heavy episodic drinking for Blacks only. Among women, those with low social support had 7.72 odds (95% CI=1.26,47.49, p=.028) of heavy episodic drinking while using an AIPD than those with high social support. Blacks with some functional impairment in social activities had higher odds of heavy episodic drinking while using an AIPD than those with no functional impairment, while those with much functional impairment had lower odds of heavy episodic drinking than those with no functional impairment.

In interaction tests, there were no significant interactions between education level and gender, race/ethnicity and social support, or race/ethnicity and functional impairment in social activities. There was a significant three-way interaction between race/ethnicity, gender and income level (Wald F=2.57, p=.01)(see Figure 3). Increasing income appeared to decrease

predicted probability of heavy episodic drinking more significantly for Blacks than for the other racial/ethnic groups.

Discussion

In this study, the first known to examine drinking and AIPD use in a nationally representative sample of older adults, a surprising amount of older adults drank alcohol, and drank at higher than recommended levels while taking an AIPD. Using an AIPD did not appear to dissuade a sizeable proportion of older adults from drinking. As a high percentage of older adults in this sample were taking an AIPD (72.1%), it could be that many recent studies of drinking in older adults potentially contained a majority of respondents who should not drink alcohol at any level, or at least should take particular care when drinking due to the risk of negative health effects. The current study indicates that many older adult drinkers are at risk of both alcohol-related problems and prescription drug-related adverse events.

These results present the first known investigation of how risk of any drinking, at-risk drinking, and heavy episodic drinking while using an AIPD differs between men and women, and between Whites, Mexican Americans, and Blacks. By examining three levels of drinking, the study was able to capture a wide spectrum of alcohol use among AIPD using older adults, all of whom have taken an AIPD every day or nearly every day for the past twelve months and potentially at risk of interactive effects. Study results suggest that both older women and older adults of color have different risk of drinking while using an AIPD than older men and older Whites and that there is significant variation in some risk factors for drinking while using an AIPD between these populations. The most striking of these results involve how socioeconomic status (i.e., education and income) and social contexts (i.e., social support and functional impairment of social activities) relate to drinking while using an AIPD in older age.

Gender and Racial/Ethnic Differences in Risk of Drinking While Using an AIPD in Older Age

Several gender and racial/ethnic differences in risk for drinking while using an AIPD were identified in this study. Older men were more likely to drink while using an AIPD than older women across all racial/ethnic groups and at all drinking levels. This is unsurprising, given that men drink more than women across the lifecourse, including older age (Blazer & Wu, 2009; Merrick et al., 2008; Sacco et al., 2009). Women, and particularly older women, may face more social stigma regarding alcohol use (Ridlon, 1988). Cultural dictates against drinking by older women could be stronger for Black women, who are highly influenced by religious culture that promotes abstinence (Herd, 1994). Given evidence that older women may be more vulnerable to alcohol-related health problems (Bradley et al., 1998; Redgrave et al., 2003) and alcohol-related adverse drug events (Onder et al., 2002), however, the finding that 44.8 percent of older women drink while using an AIPD, 7.5 percent drink at-risk, and 1.6 percent engage in heavy episodic drinking is not insignificant.

In addition to these gender differences, there was racial/ethnic-based variation in risk for drinking while using an AIPD in older age. Similar to other findings in the literature (Smith, 2009), Blacks were less likely to drink any alcohol while using an AIPD. This is likely a function of increased religiosity among Blacks in the U.S. (Herd, 1994). Surprisingly, unlike other studies of drinking in older age (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman et al., 2004), no racial/ethnic-based differences in risk for at-risk drinking while using an AIPD in older age were found. It could be that controlling for multiple SES indicators as well as several social variables eliminated the effect of race/ethnicity on at-risk drinking while using an AIPD. Alternatively, as demonstrated in this study, racial/ethnic-based differences may be more

discernable at either pole of the drinking spectrum, with fewer differences in more moderate drinking.

The study findings are congruent with other studies of drinking in older age which found that older adults of color are more likely drink at the highest levels (Blazer & Wu, 2009; Merrick et al., 2008) that are associated with worse health and social consequences (Moore, Endo, & Carter, 2003; Rehm et al., 2003). Older Mexican American men were more likely to engage in heavy episodic drinking while using an AIPD than older White men. Although there is very little research on Mexican American drinking in older age (CSAT, 2010), Mexican American men may drink more due to cultural ideas that equate masculinity with heavy alcohol consumption (Alaniz, 1994; Cuadrado & Lieberman, 1998). The traditional pattern of drinking among Mexican men is infrequent but heavy drinking. However, exposure to U.S. drinking norms, where drinking occurs more often, may create a high frequency/high quantity pattern of drinking in Mexican American men (Vega, Sribney, & Achara-Abrahams, 2003). As evidenced by study findings, this pattern of heavy drinking by Mexican American men continues into older age, even for those that by virtue of using an AIPD are potentially at higher risk of negative side effects.

Older Black women were more likely to engage in heavy episodic drinking while using an AIPD than older White women, validating similar findings in another recent nationally representative sample (Blazer & Wu, 2009). It is possible that heavy episodic drinking in AIPD using older Black women is related to differences in socioeconomic status and the social context of alcohol use (discussed below), although very little research has been conducted on this population. Interestingly, Blacks overall were less likely to engage in heavy episodic drinking while using an AIPD, indicating potential gender differences among Blacks. This suggests the need for an intersectionality approach, which examines differences within gender and racial/ethnic categories (Collins, 1990; Crenshaw, 1991) when studying alcohol use in older age. Although the rarity of at-risk and heavy episodic drinking while using an AIPD in older age (particularly for women) prevented the use of an intersectionality approach in this analysis, researchers should take into account significant variation in overlapping gender and racial/ethnic domains.

Drinking While Using an AIPD and Socioeconomic Status

The relationship between socioeconomic status and any drinking while using an AIPD in older age was similar to literature examining drinking in general older adult populations (Merrick et al., 2008; Moos et al., 2010), with higher education levels and mid-range incomes predicting greater odds of any drinking while using an AIPD for most groups examined. At the higher drinking thresholds, gender and racial/ethnic specific variation in these relationships was more apparent.

Gender and socioeconomic status. There were two noteworthy gender-specific differences in the relationship between SES and problematic drinking while using an AIPD in older age. Older women with incomes greater than $55,000 a year were more likely to drink at-risk while using an AIPD than older women with mid-range incomes ($20,000-54,999). In addition, lower education level increased risk of heavy episodic drinking while using an AIPD for older men, but not for older women. As there were no significant SES findings for older men at the at-risk drinking level, and older women at the heavy episodic drinking level, it is difficult to compare these findings. Consequently, given literature suggesting differences in the effects of SES between these two drinking thresholds, it may be unlikely that there are different trends in

play here, with higher SES leading to more drinking for older women and lower SES leading to more drinking for older men.

Instead, it could be that there are gender-based differences in which proxies are a better indicator for SES in older age. For example, education may be the superior measure of SES for men in this cohort. If partnered women are less likely to work outside of the home, their socioeconomic status is more dependent on their partner's education status than on their own. This may be particularly true with older women in the NHANES 2003-2008, who were all born before or in the early years of WWII. Only 34 percent of women were employed in 1950, as compared to 60 percent of women in 2000 (To ossi, 2002). Consequently, women's education may have a looser connection to SES in this cohort. Alternatively, lower drinking levels among women, especially at the heavy episodic drinking level, might make their drinking behaviors less variable to the influence of factors such as education level. There could be significant unstudied factors better able to represent the variability of at-risk and heavy episodic drinking in AIPD using older women.

As education level is fixed early in life (Kitigawa & Hauser, 1973), the finding that older men with lower educational attainment are at higher risk for heavy episodic drinking while using an AIPD gives credence to cumulative inequality theory. It is well established that education status, which is generally determined in earlier adulthood, significantly affects health behaviors and outcomes in later life (Mirowsky & Ross, 2003), and its importance may be increasing (Goesling, 2007; Liu & Hummer, 2009; Mirowsky & Ross, 2008). However, it should be noted that education may best differentiate between those of higher socioeconomic status, as the cohort of older adults in this study have lower levels of education overall (Martelin, 1994). In addition, others have argued that measurements that do not take into account in-kind assistance or other indicators of wealth, such as property ownership, may be less accurate in assessing SES in older adults (Allin, Masseria, & Mossialos, 2009; Grundy & Holt, 2001). It is likely that education level represents a broad number of factors in this sample, including general socioeconomic status, environmental culture, and neighborhood quality, which have been shown to influence alcohol consumption (Ahern, Galea, Hubbard, Midanik, & Syme, 2008; Bernstein, Galea, Ahern, & Vlahov, 2007). It could be that measurements that assess general household SES (Sacker, Firth, Fitzpatrick, Lynch, & Bartley, 2000) as well as those that include both education level and current ability to meet subsistence or other needs may be the best indicators of socioeconomic status in older age for both men and women (Grundy & Holt, 2001). Findings from this study suggest that in the absence of more inclusive wealth measures, both income and education should be examined in ascertaining the role of SES on outcomes among older adults.

Race/ethnicity and socioeconomic status. There were few racial/ethnic-based differences in the relationship between SES and drinking while using an AIPD in older age, even though Mexican Americans and Blacks were more likely to have lower educational attainment and incomes. As prior studies have increasingly found that associations between race/ethnicity and poor outcomes are primarily attributable to socioeconomic status (Fuller-Thomson, Nuru-Jeter, Minkler, & Guralnik, 2009), it is surprising that there were fewer within racial/ethnic group associations between SES and drinking. It could be that limited variability on SES indicators reduced power to detect associations. Another possibility is that by selecting only those who are currently taking an AIPD, this sample excluded the small minority of adults who do not have insurance (DeNavas-Walt, Proctor, Smith, & Bureau, 2011). Consequently, older adults in this study might be relatively advantaged in comparison to other older adults and as a result less likely to show racial/ethnic differences in the relationship between SES and drinking

while using an AIPD in older age. Health disparities in older age could also be leveled by "survival bias", as those with lower socioeconomic status who live to older age are likely to be relatively healthy (Jeffreys, 1996). As a result, reduced income and increasing medical costs in older age could significantly erode the relative advantage of many members of the middle class over lower earners. However, recent evidence suggest that income-related disparities in health care utilization (which determine AIPD use) are more pronounced for older adults than younger adults and children, even though many older adults are eligible for Medicare and most are insured (Chen & Escarce, 2004). More research is needed examining potential racial/ethnic-based differences in the relationship between SES and drinking while using an AIPD, especially analyses that use mediation or moderation analyses to understand mechanisms of action in these phenomena.

Drinking While Using an AIPD and Social Context

This study was the first known to examine both social support and the ability to attend social functions in the context of older adult drinking while using an AIPD. There were two population effects of social support. Similar to the limited existing literature (Kirchner et al., 2007), older adults with high social support were less likely to drink at-risk and engage in heavy episodic drinking while using an AIPD than older adults with low social support. Older adults with low social support who drink while using an AIPD could be trying to numb feelings of loneliness and using alcohol to cope with stressors in place of emotional support. Conversely, instead of drinking to deal with social isolation, older adults, and older men in particular (Colsher & Wallace, 1990), could be socially isolated because of a heavy drinking past. Social support could also be a proxy for social control, as those with nobody to confide in could be less likely to have relationships where someone would intervene in risky behaviors such as drinking while using an AIPD. Having a person exerting social control is not the same as social support, however, as social control may be experienced as intrusive instead of supportive (Rook & Ituarte, 1996).

These findings are in contrast to a community-based longitudinal study, which found that older adults with better marital relationships [which are likely to provide emotional support (Thoits, 1995)] are more likely to drink at risk (Moos, Brennan, Schutte, & Moos, 2010). Participants were not randomly selected, however, and study findings are not representative of the U.S. older adult population. Consequently, it is unknown whether the differences between our conclusions and Moos et al.'s are related to the use of an AIPD (i.e., spouses are more likely to regulate drinking when the risks are potentially higher, such as when using an AIPD) or bias in their sample.

In addition to these population-level findings, there were several gender and racial/ethnic-based differences in the relationship between social support and drinking while using an AIPD in older age, and racial/ethnic-based differences in how functional impairment in social activities relates to at-risk and heavy episodic drinking while using an AIPD in older age.

Gender and social context. Older men with low social support had higher odds of drinking any alcohol while using an AIPD than those with high social support, while the effect was non-significant for older women. This could be an effect of social control, with older men with social support more likely to be monitored for unhealthy behaviors such as drinking while using an AIPD. This finding is also aligned with literature suggesting that social control (assessed by marital status) may be more influential for older men than older women (Blazer & Wu, 2009; Merrick et al., 2008; Moore et al., 2009; Pringle et al., 2005).

Social support may be more influential for older women at the highest level of drinking, as older women with low social support had higher odds of heavy episodic drinking while using an AIPD. Although the overall population effect was significant, there was no significant effect for men. This suggests that the presence of social support is important in drinking while using an AIPD among older women, yet contrasts with a recent study which found that older women with high social support were more like to drink heavily than older women with low social support and older men with high social support (Choi & DiNitto, 2010). Those authors concluded that older women were more likely to drink at social occasions and in social contexts than older men, giving older women with more social support enhanced opportunities to drink heavily. It could be that focusing only on AIPD using older adults dramatically changes this pattern. Older women using an AIPD are in worse health than those who do not use an AIPD, and consequently may be less likely to have extensive social networks (Rook, 1990). Consequently, heavy episodic drinking among older women using an AIPD may be more about social isolation than socializing. Since this study's findings indicate than the majority of older adult drinker may be AIPD users, however, more research is needed to understand potential gender differences in the role of social support in drinking while using an AIPD in older age.

Race/ethnicity and social context. In addition to gender-based differences, there was also racial/ethnic-based variation in the roles of social contexts and drinking while using an AIPD in older age. Social support may be more influential for Whites than Mexican Americans and Blacks. Indeed, the population effect for social support at the at-risk drinking level could be representative of the strong effect for Whites overall, as they make up the majority of the sample. As there was no statistically significant interaction between race/ethnicity and social support, it is uncertain whether this finding represents a different pattern (with low power). It could be that Mexican Americans in particular have less variability on this measure, as only 22 percent of older Hispanics live alone, compared to 42 percent of older Whites and older Blacks (FIFoARS, 2008). Additionally, both Mexican Americans and Blacks have a strong culture of intergenerational support with the expectation that older adults will be cared for by their families as they age (Burr & Mutchler, 1999). If Whites are more likely to live alone and less likely to have a cultural expectation of being cared for, lack of social support for them may be more solitary and isolating. These findings may also reflect how support is received, however, as Whites are more likely to receive emotional support from family (Sarkisian & Gerstel, 2004) while Blacks receive support from faith-based organizations (Dilworth-Anderson, Williams, & Gibson, 2002). As a result, social support measures that focus only on close emotionally supportive relationships may miss out on the importance of spiritual and social support from churches.

There was also a significant racial/ethnic difference in functional impairment in social activities. Older adults overall were less likely to drink any alcohol while using an AIPD when they had any functional impairment in social activities and to engage in heavy episodic drinking while using an AIPD if they had a great deal of functional impairment in social activities. It could be that many older adults drink at social events, such as parties or outings with friends, and cease to drink when they are unable to attend these functions. However, Blacks were much more likely to both drink-at-risk and engage in heavy episodic drinking if they had some functional impairment in social activities. Thus Blacks who have some difficulty attending social functions are more likely to drink while using an AIPD than those who have no difficulty attending. This implies that Blacks may be drinking at home, perhaps out of loneliness or to counteract sadness regarding their functional disabilities. It is also possible that depression plays a role in this

relationship; unfortunately, depression was not measured in all eight years of data collection used in this study and could not be assessed. In addition, Blacks who had a great deal of functional impairment in social activities were less likely to engage in heavy episodic drinking than Blacks with no functional impairment in social activities. Thus, there is something unique about having some, but not severe, limits in pursuing social activities for Blacks.

Future research should further examine potential gender and racial/ethnic differences in social contexts. Creating more precise measures of social support, social control, and drinking contexts would help illuminate causal relationships for gender and racial/ethnic differences in these factors. Research examining the contexts in which support is purveyed and received in relation to problematic drinking behaviors while using an AIPD could help clarify more precise mechanisms of social support. In addition to main effects, social support could have a buffering effect against stressors (Cohen & Wills, 1985) such as depression in older age, which should be examined in future studies. Finally, longitudinal research can help clarify whether lack of social control, social support, or social activities lead to drinking while using an AIPD, or if drinking while using an AIPD leads to social isolation.

Practice Implications

Education level appears to be important in understanding heavy episodic drinking in older adults and should be considered in planning health education and intervention efforts. The extent of health education about alcohol and AIPD in the U.S. is largely unknown, although preliminary research suggests that prescribing an AIPD does not affect whether primary care physicians discuss alcohol consumption with patients (Duru et al., 2010). Care providers could be more likely to warn patients about alcohol consumption with some AIPDs than others, or only for older adults taking multiple AIPDs. However, older adults are also not more likely to stop drinking if they start using an AIPD compared to starting a non- alcohol-interactive drug (Pringle et al., 2006), suggesting that they may not have been warned about the risks of drinking while using an AIPD. Care providers could also be relying on the ability of older adults to review drug information pamphlets on their own, even though these are often difficult for older adults to read or understand (Moisan, Gaudet, Gregoire, & Bouchard, 2002). Even when health education is present, those with less educational history may have less functional or critical literacy, impacting their ability to analyze and internalize health education messages (Nutbeam, 2000). Additionally, although literature has associated higher SES with greater health literacy (Gazmararian et al., 1999), those with higher education levels were more likely to drink while using an AIPD, and older women with high incomes were more likely to drink at-risk while using an AIPD. Consequently, heath education messages about drinking while using an AIPD may not be adequately communicated to older adults on both ends of the economic spectrum.

Primary care intervention in older adult drinking is a promising, though understudied, option. A randomized controlled trial of a primary care intervention with follow-up heath education telephone calls for at-risk drinking older adults demonstrated promising short-term effects (Lin, Karno, Barry, et al., 2010; Lin, Karno, Tang, et al., 2010), although more moderate long-term outcomes (Moore et al., 2011). More research on best practices to approach alcohol and AIPD use in older adults in integrated care environments is needed, especially as these interventions are typically low-cost and older adults report wanting more discussion about medication side effects with their primary care physicians (Smith, Cunningham, & Hale, 1994).

In addition to primary care interventions, this study's social context results indicate that social workers or other behavioral health care providers need to pay increased attention to drinking while using an AIPD. Social workers are trained to work within family systems and

supports to assist clients. A lack of social support appears to be a significant risk factor for drinking at any level while using an AIPD. Although the directionality of this relationship remains uncertain, social workers should screen for drinking while using an AIPD among older adults with fewer social relationships. In addition, social workers should be aware of the potential need for extra intervention for older Black clients with limited ability to socialize outside of the home.

Due to AIPD use, the majority of older adults who drink are at even more risk of alcohol-related problems than previously thought. Both health and behavioral health care providers should consequently pay attention to screening for alcohol-related problems in older adult populations, particularly Mexican American men and Black women, and to providing culturally appropriate care that strengthens social systems.

Limitations

This study was the first known nationally representative examination of drinking while using an AIPD among older adults. While the results present a first understanding of this behavior and population, they are somewhat limited. The NHANES sample represents the non-institutionalized U.S. population, and consequently, older adults who live in nursing homes, are incarcerated, or are homeless were not included in the sample. Study findings are representative of Mexican Americans, the largest Hispanic sub-group in the United States (Ennis, Rios-Vargas, & Albert, 2011), and not the overall Hispanic population. In addition, the alcohol measures used in the NHANES survey can underestimate drinking among heavier drinkers (Midanik, 1994). Due to limitations in NHANES data, over-the-counter drugs (many of which can interact with alcohol) and non-prescribed use of prescription drugs could not be examined, potentially underestimating alcohol-interactive medication use among older adults. Finally, there is discrepancy between the timelines for the alcohol (past 12 months) and prescription drug (past 30 days) questions. In an effort to reconcile these differences, only those who had been taking an AIPD every day or nearly every day for the past 12 months were included. It is possible that some older adults deliberately do not use their AIPDs on days when they drink alcohol. This could be more likely among heavy episodic drinker than at-risk drinkers, as the at-risk drinking measure includes a frequency component (i.e. they are drinking more than 7 drinks in one week). Unfortunately it was impossible to ascertain definitely that alcohol consumption and AIPD use were occurring at the same time with available data. Future studies of older adults should develop more precise measures on drinking while using AIPDs.

Although these findings offer potential avenues for future exploration of this issue it is likely that other unstudied factors may be influential in predicting drinking while using an AIPD. More understanding about the psychological, social, and physical environments of older adult AIPD users might help uncover other risk or protective factors for drinking, at-risk drinking, or heavy episodic drinking.

Future Directions

This study gives a first glance of a population of older adults engaging in potentially risky behavior. Much remains to be known, both about older adults who drink while using AIPDs, as well as how much of a risk this behavior poses to them. Some have critiqued current drug warning procedures, arguing that many warnings from drug information pamphlets are primarily to protect against liability and do not represent real risks for the majority of users (Duke, Friedlin, & Ryan, 2011). If drug warnings are too vague and overcautious, consumers may ignore them and miss potential interactions that are truly dangerous. Policy changes requiring more specific information, including the likelihood and predicted severity of potential

side effects might help clarify alcohol-related prescription drug risks. The significant percentage of older adults continuing to drink despite taking an AIPD makes this population and issue in need of further investigation.

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Figure 1. Mean predicted probability of at-risk drinking by race/ethnicity and impairment in social activities
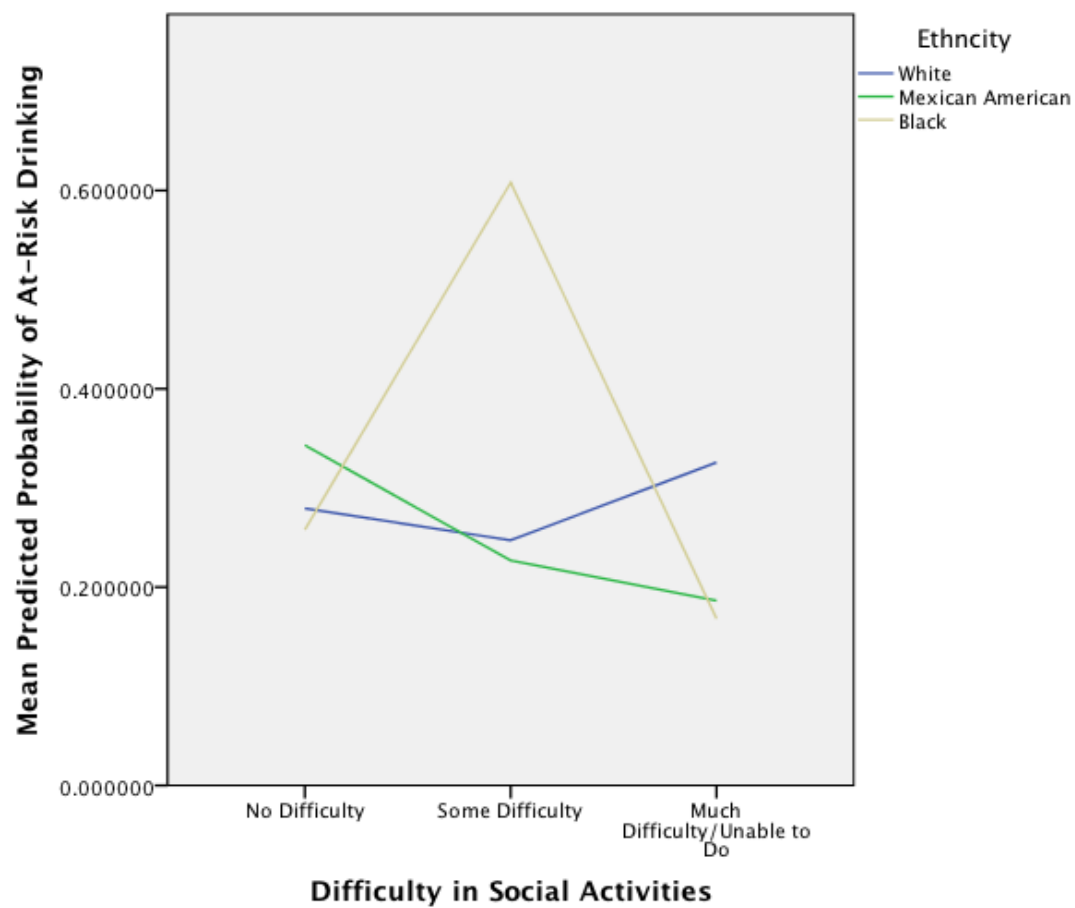
Figure 2.Mean predicted probability of at-risk drinking by race/ethnicity, gender, and income
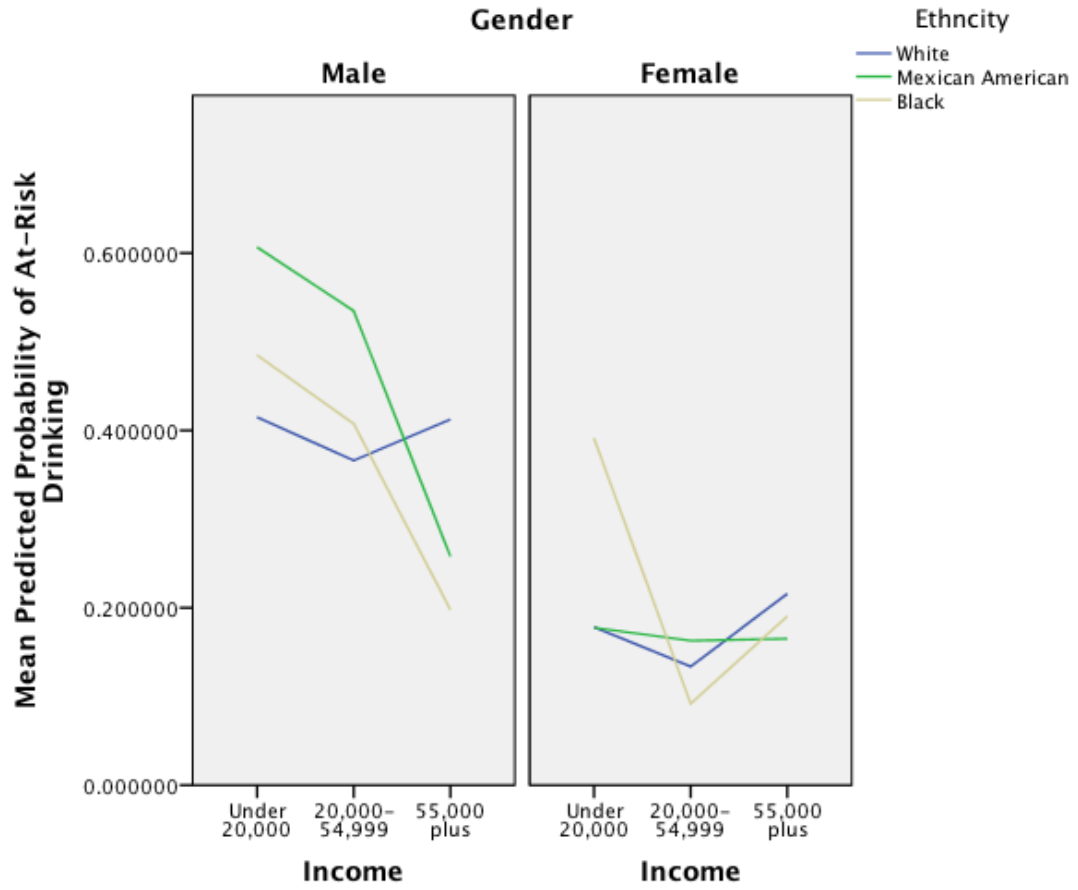
Figure 3. Mean predicted probability of heavy episodic drinking by gender, race/ethnicity, and income
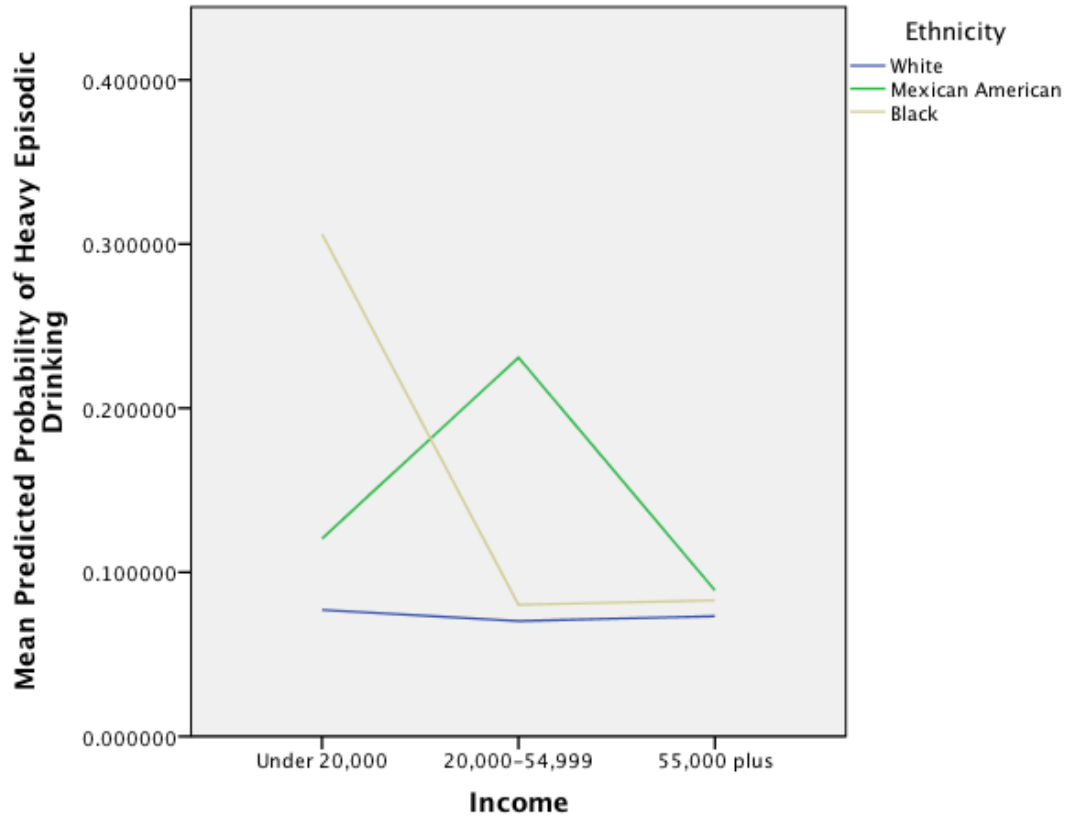
Table 1. Weighted percentage sample demographics comparing AIPD users with non-AIPD users, aged 60 plus

Variable	Categories	Population percentage of those taking AIPD for 12 months (%) (n=4,441)	Population percentage of those not taking AIPD last 12 months (%) (n=1,977)	Total sample population (%) (n=6,418)
Age** (n=6,418)	Age 60-64	22.7	35.5	26.1
	Age 65-69	21.8	22	21.8
	Age 70-79	35.1	28	33.1
	Age 80+	20.5	14.5	18.8
Gender (n=6,418)	Male	43.4	45.1	43.8
	Female	56.6	54.9	56.2
Race/ethnicity*** (n=6,605)	White	88.2	84	87
	Mexican American	3	5.9	3.8
	Black	8.9	10.1	9.2
Marital Status** (n=6,413)	Married	61.1	60.4	60.9
	Widowed	25.4	22.5	24.6
	Divorced/Never Married	13.5	17.1	14.5
Education Level (n=6,401)	Less than High School Grad	26.5	25.7	26.3
	High School Grad/GED	29.4	27.4	28.8
	Some College or AA degree	22.9	23.6	23.1
	College Grad or Above	21.2	22.3	21.8
Income (n=5,914)	Under 20,000	24.6	23.6	24.3
	20,000-54,999	49	47.6	48.6
	55,000 plus	26.4	28.8	27.1
Health Status** (n=6,179)	Excellent/Very Good/Good	72.3	84	75.6
	Fair/Poor	27.7	16	24.4

Social Support (6,322)	Low	5	6.2	5.3
Functional Impairment in Social Activities*** (6,173)	No Difficulty	84.4	91.2	86.3
	Some Difficulty	9.6	5.4	8.4
	Much Difficulty/Unable to Do	6.1	3.4	5.3
Any drinking in past 12 months (n=5,965)***	Yes	50.9	59.2	53.2
At-risk Drinking in past 12 months (n=5,965)***	Yes	14.3	20.4	16
High-risk Drinking in past 12 months*** (n=5,965)	Yes	4.6	7.8	5.5

*p<=.05, **p<=.01, ***p<.001

Table 2. Odds of any drinking among AIPD-using older adults for demographic characteristics by gender and race/ethnicity (4,751)

Independent Variables (Reference Category)	All	Women	Men	White	Mex. Amer.	Black
	OR	OR	OR	OR	OR	OR
Age (80+)						
60-64	1.46*	1.4	1.45	1.39*	3.09**	1.61
65-69	1.28*	1.56*	0.97	1.25	2.91**	1.25
70-79	1.14	1.14	1.1	1.15	1.64	1.0
Gender (Female)						
Male	1.57***			1.5***	2.73***	2.16***
Race/ethnic. (White)						
Mexican American	0.93	0.83	1.2			
Black	0.59***	0.54***	0.674*			
Marital Status (Married)						
Widowed	1.06	1.03	1.06	1.06	0.94	1.24
Divorced/Never Married	1.44*	1.29	1.74*	1.45	1.6	1.48*
Education (College +)						
Less that HS grad	0.42***	0.35***	.5***	.43***	.55**	0.43*
HS grad/GED	0.57***	0.5***	.64***	.55***	1.39**	0.82
Some college/AA degree	0.76***	0.621***	.93***	.75***	1.16**	0.77
Income ($20,000-54,999)						
Under $20,000	0.66***	0.67***	.63***	.63***	1.13	0.79
$55,000 plus	1.58***	1.45***	1.81***	1.6***	1.76	1.63*
Health Status (Excellent/Very Good/Good)						
Fair or Poor	0.6***	0.59***	0.57***	0.57***	0.69	0.84
Social Support (Hi.)						
Low	1.08	0.70	1.63*	1.1	0.97	0.93

Func. Impair. in Social Activities (No Difficulty)						
Some Difficulty	0.7***	0.67	0.75	0.68***	0.36**	0.93
Much Difficulty/Unable to Do	0.5***	0.37***	0.76	0.51***	0.4**	0.53

*p<=.05, **p<=.01, ***p<=.001

Table 3. Odds of at-risk drinking among AIPD-using older adults for demographic characteristics by gender and race/ethnicity (n=2,041)

Independent Variables (Reference Category)	All	Women	Men	White	Mexican American	Black
	OR	OR	OR	OR	OR	OR
Age (80+)						
60-64	1.28*	0.56	2.23**	1.23*	2.02	1.48
65-69	1.02	0.75	1.29	1.02	2.92	0.56
70-79	0.82	0.73	0.94	0.77	2.77	1.07
Gender (Female) Male	3.19***			3.16***	6.93***	2.97***
Race/ethnic. (White)						
Mexican American	1.166	0.91	1.38			
Black	0.93	1.24	0.72			
Marital Status (Married)						
Widowed	0.86	0.62	1.21	0.79	1.59	1.84
Divorced/Never Married	1.27	1.19	1.33	1.23	1.98	2.27
Education (College +)						
Less that HS grad	1.16	1.28	1.09	1.02	3.78†	4.66†
HS grad/GED	0.98	0.87	1.01	0.95	3.24	2.64
Some college/AA degree	1.2	1.19	1.21	1.25	0.95	1.29
Income ($20,000-54,999)						
Under $20,000	1.33	1.49	1.17	1.27	0.82	1.51
$55,000 plus	1.25	1.82*	0.97	1.28	0.57	0.92
Health Status (Excellent/Very Good/Good)						
Fair or Poor	1.03	1.14	0.97	1.03	0.69	0.81
Social Support (High) Low	1.82*	1.98	1.77	2.03*	0.64	1.35
Func. Impair./Social Activities (No Difficulty)						

Some Difficulty	0.96	0.59	1.28	0.77	0.58	4.66**
Much Difficulty/	1.12	1.36	0.94	1.29	0.41	0.52
Unable to Do						

*p<=.05, **p<=.01, ***p<=.001

Table 4. Odds of heavy episodic drinking among AIPD-using older adults for demographic characteristics by gender and race/ethnicity (n=2,041)

Independent Variables (Reference Category)	All	Women	Men	White	Mexican American	Black
	OR	OR	OR	OR	OR	OR
Age (80+)						
60-64	7.04***	2.37	11.06***	6.1***	7.9	UNK
65-69	3.86***	2.77	4.72***	3.57***	8.19	UNK
70-79	2.4***	1.15	3.39***	2.12***	1.79	UNK
Gender (Female)						
Male	5.38***			5.82***	11.57***	2.92*
Race/ethnic. (White)						
Mex. American	0.93	1.03	2.28**			
Black	0.59*	4.42***	1.01			
Marital Status (Married)						
Widowed	0.94	0.87	0.85	0.78	1.16	2.96
Divorced/Never Married	1.47	1.3	1.68	1.47	1.38	3.27
Education (College+)						
Less that HS grad	2.2*	0.8	3.13**	2.17	0.96	6.87
HS grad/GED	2.15*	0.44	3.75**	2.17	0.64	5.61
Some college/AA degree	1.63	0.16	3.05**	1.74	0.24	3.54
Income ($20,000-54,999)						
Under $20,000	1.59	1.05	1.76	1.34	0.55	4.35*
$55,000 plus	0.83	0.14*	1.1	0.84	0.27	1.37
Health Status (Excellent/Very Good/Good)						
Fair or Poor	0.65	1.02	0.53*	0.57	1.43	0.71
Social Support (High)						
Low	2.29*	7.72*	1.79	2.49	1.91	2.4

Func. Impair. in Social Activities (No Difficulty)						
Some Difficulty	1.4	1.66	1.32	1.13	0.41	3.84**
Much Difficulty/Unable to Do	0.21*	UNK	0.26	0.21	1.41	0.11**

*p<=.05, **p<=.01, ***p<=.001

Chapter 3

Depressive symptoms and heavy episodic drinking in older adults:

Do gender or social support matter?

Abstract

Objectives: Heavy episodic drinking (i.e., average of 4 or more drinks per drinking episode or 5 or more drinks per drinking episode in the past 12 months) among adults aged 60 or older is expected to increase in the future and could lead to negative health outcomes. Preliminary evidence suggests that depressive symptoms and perceived impairment from depressive symptoms increase the risk of heavy episodic drinking in older adults, but little is known about whether that relationship is moderated by gender or social support.

Methods: Two waves of the National Health and Nutrition Epidemiologic Survey (NHANES) (2005-2008) were used to examine if gender or social support moderated the relationship between depressive symptoms or perceived impairment from depressive symptoms and heavy episodic drinking in adult drinkers aged 60 or older (N=1,356).

Results: Overall, gender moderated the relationship between depressive symptoms and heavy episodic drinking. Among women, there was a trend for those with an increase in depressive symptoms to have higher odds of heavy episodic drinking. Men generally had lower or similar odds of heavy episodic drinking as their depressive symptoms increased. There was also a three-way interaction between social support, gender, and perceived impairment from depressive symptoms, with social support buffering for older women but not older men.

Discussion: The effect of depressive symptoms on heavy episodic drinking differs by gender, while the effect of perceived impairment from depressive symptoms varies by both gender and level of social support. Behavioral health clinicians working with older adults should assess drinking while addressing depressive symptoms, especially for women and those with little social support. More research is needed to understand the unique role that gender plays in older adult drinking and mental health.

Introduction

Alcohol consumption has typically been found to decrease with age (Shaw, Krause, Liang, & McGeever, 2011), although some older adults (aged 60 or older) continue to drink or drink heavily well into older age. Approximately 3.5% of men and 1.2% of women aged 65 or older are heavy episodic drinkers (a usual quantity of 4 or more drinks per drinking episode or 5 or more drinks per drinking episode in the past 12 months) (Merrick et al., 2008), while 20% of men and 6% of women aged 50 or older report having 5 or more drinks in one drinking episode in the last 30 days (Blazer & Wu, 2009). These rates could theoretically increase due to relatively high alcohol consumption among baby boomers (Gfoerer, Penne, Pemberton, & Folsom, 2003), as problem drinking in late middle age is associated with increased drinking in older age (Platt, Sloan, & Costanzo, 2010). Heavy episodic drinking among older adults is related to impairments in instrumental activities of daily living (Moore, Endo, & Carter, 2003), cognitive problems (Thomas & Rockwood, 2001), and increased risk of mortality compared to moderately drinking older adults (Holahan et al., 2010).

Emerging research suggests that depression (Sacco, Bucholz, & Spitznagel, 2009) and depressive symptoms (Kirchner et al., 2007; Merrick et al., 2008) are related to higher rates of heavy drinking in older adults, although the temporal and theoretical mechanisms for how depressive symptoms relate to heavy episodic drinking in older adults are unclear. Few studies have examined how gender impacts this relationship, although older women are more likely to have depressive symptoms (Meeks et al., 2011) and older men are more likely to drink heavily (Blazer & Wu, 2009). The presence of social support, which is related to lower odds of heavy episodic drinking in older adults (Kirchner et al., 2007), could buffer the effects of depressive symptoms (Cohen & Wills, 1985) on heavy episodic drinking. Using nationally representative survey data, this study examines whether gender or social support moderate the relationship between depressive symptoms or perceived impairment from depressive symptoms and heavy episodic drinking in older adults.

Background

Depression is the most common mental health disorder among older adults (Blazer, 2003), and is related to declines in self-rated health (Han, 2001) and elevated suicide risk (Conwell & Brent, 1995). Depressive symptoms that do not meet the diagnostic criteria for depression are also prevalent in older adults and relate to future risk of clinical depression (Horwath, Johnson, Kierman, & Weissman, 1992; Meeks, Vahia, Lavretsky, Kulkarni, & Jeste, 2011). Although recent research indicates that depressive symptoms may be related to increased odds of heavy drinking in older age (Kirchner et al., 2007; Merrick et al., 2008; Zanjani et al., 2008), the causal direction of this relationship is unclear. The potential effects are significant, however, as compounded effects between heavy drinking and depression may increase risk of mortality fourfold (Greenfield, Rehm, & Rogers, 2002). Older adults could use alcohol to self-medicate against depressive symptoms such as insomnia or anxiety (Immonen, Valvanne, & Pitkala, 2010). Heavy episodic drinking could consequently be an avoidant coping strategy in response to depressive symptoms (Schutte, Brennan, & Moos, 1998; Willis & Shiffman, 1985). Alternatively, long-term drinking and alcohol-related problems could lead to higher levels of depression (Reifman & Welte, 2001).

Part of the difficulty in untangling the mechanisms that connect depressive symptoms and heavy episodic drinking is the likely presence of moderating factors in this relationship. Investigations of heavy episodic drinking and depressive symptoms that do not take into account moderating effects such as social support and gender could disguise important differences in this

relationship, especially for older adults, for whom less is known about the relationship between drinking and mental health.

Depression and Gender

Studies of the general adult population have found that gender moderates the relationship between depressive symptoms and heavy drinking. In particular, the association between depressive symptoms and alcohol consumption may be stronger for women than men (Hartka, Johnstone, Leino, & Motoyoshi, 1991; Midanik, 1983; Schutte, Hearst, & Moos, 1997). These findings suggest that although men are at higher risk of alcohol-related disorders (Chou, Mackenzie, Liang, & Sareen, 2011; Slopen, Williams, Fitzmaurice, & Gilman, 2011), women are more likely to report depressive symptoms (in general populations and in older age) (Blazer, 2003) and may be more likely drink to heavily as a result of depressive symptoms.

Despite evidence that gender matters in the relationship between depressive symptoms and heavy episodic drinking in general adult populations, few studies have examined the possibility of gender moderation among older adults. Initial evidence suggests that these relationships may indeed be different for older adults. A longitudinal study of those in late middle-age (55 to 65) found that among women, heavy drinking resulted in less depression over time, while for men, depressive symptoms led to lowered levels of drinking (Schutte, Moos, & Brennan, 1995). Alternatively, a recent nationally-representative study found that heavy drinking was significantly associated with higher depression scores in older men but not older women (Choi & Dinitto, 2011). It could be that older women are more sensitive to aging effects that decrease alcohol consumption (Hartka et al., 1991) thereby weakening the relationship between drinking and other factors. For older men, correlates of the aging process such as decreased physical health or changing social networks may lead to increased depressive symptoms. Heavy episodic drinking could be a coping mechanism for these symptoms (Schutte et al., 1998). Taken together, these findings indicate that depressive symptoms, gender, and heavy episodic drinking may have unique relationships among older adults, with older men uniquely susceptible to associations between depressive symptoms and heavy episodic drinking.

Depression and Social Support

Social support could have both a main effect on heavy episodic drinking in older adults, in which older adults with higher levels of social support are less likely to engage in heavy episodic drinking, and a buffering effect against depressive symptoms' effect on heavy episodic drinking. Social support emphasizes the quality of social ties and can be defined as a sense of feeling understood, listened to, and helped by another person (Thoits, 1995). Lower levels of social support were related to higher odds of drinking more than 14 drinks a week in a primary care sample of adults aged 65 or older (Kirchner et al., 2007). Older adults who are divorced, widowed, or never married may also be more likely to drink beyond recommended guidelines (Blazer & Wu, 2009; Merrick et al., 2008; Moore et al., 2003; Pringle, Ahern, Heller, Gold, & Brown, 2005; Sacco et al., 2009), although the reason for this association is unknown. It could be that unmarried older adults are more likely to drink heavily because they lack close social relationships that encourage positive health behaviors (i.e., social control) (Rook, 1990). Close interpersonal relationships (i.e., ones that are more likely to provide emotional support) are the most likely to regulate behavior in older adults by exerting social control (Rook, 1990; Rook & Ituarte, 1996; Umberson, 1987).

Social support might also moderate the relationship between depressive symptoms and heavy episodic drinking in older adults. Higher levels of emotional support in older adults can buffer against the effects of life stressors (Krause, 1985) and disability (Taylor & Lynch, 2004)

on depression. Older adults with depressive symptoms and little social support may have less positive social control influences in their lives (i.e., to encourage them to seek treatment or monitor unhealthy behaviors) who could dissuade them from heavy episodic drinking than those with depressive symptoms but higher levels of social support. In buffering relationships, social support is more beneficial in instances of high stress (Cohen & Wills, 1985; Gerin, Milner, Chawla, & Pickering, 1995). Consequently, we hypothesize that older adults with higher depressive symptoms will have higher odds of heavy episodic drinking than older adults with fewer depressive symptoms, but older adults with more depressive symptoms and high social support will be less likely to engage in heavy episodic drinking than older adults with higher depressive symptoms and low social support.

Depression, Social Support, and Gender

Gender may also moderate relationships between social support, depressive symptoms, and drinking in older adults. A nationally representative study found that heavy drinking older women had higher levels of emotional support than older women who abstained or drank moderately (Choi & Dinitto, 2011). In contrast, heavy drinking older men had less emotional support than older men who abstained or drank moderately. It may be that social situations are more influential in encouraging drinking in older women, and that these social encounters also potentially ward off depressive symptoms (Schutte et al., 1995; Mair, 2010). In contrast, older men could drink to cope with loneliness or stressors such as depressive symptoms. As a result, the buffering role of social support on the relationship between depressive symptoms and heavy episodic drinking may be stronger for older men, who face a steeper decline in social contacts (Cornwell, 2011), than for older woman, who might drink in more social environments.

Purpose of the Study

This cross-sectional study uses the nationally-representative 2005-2008 National Health and Nutrition Epideimiologic Survey (NHANES) to examine three study hypotheses. First, having more depressive symptoms or perceived impairment from depressive symptoms will increase odds of heavy episodic drinking, with the effect stronger for older men than for older women. Second, we hypothesize that social support will buffer negative effects of depressive symptoms and impairment from depressive symptoms on heavy episodic drinking. Specifically, those with more depressive symptoms or impairment from depressive symptoms and high social support will be less likely to engage in heavy episodic drinking than those with more depressive symptoms or impairment from depressive symptoms but low social support. Third, the buffering effect of social support on the relationsip between depressive symptoms or impairment from depression and heavy episodic drinking will be further moderated by gender, with the buffering effect stronger for older men than for older women (see conceptual model presented in Figure 1).

Methods

Sample

The NHANES is a complex, stratified, clustered probability sample of the non-institutionalized civilian population of the United States. The data are collected by the National Center for Health Statistics division of the Centers for Disease Control and Prevention and publicly accessible (www.cdc.gov/nchs/nhanes.htm). This cross-sectional 2-year survey is designed to combine with other survey waves in order to maximize sample size and statistical precision. The survey selects households randomly from stratified sections of the United States, and then screens household members for their age, gender, and race/ethnicity. An average of 1.6 respondents per household are then selected for the study, after which they complete a face-to-face interview, a physical examination, laboratory testing, and an additional computer-

administered questionnaire at a mobile examination center. The average response rate for the 2007-2008 NHANES was approximately 75.4%, an acceptable response rate for a nationwide survey (http://www.cdc.gov/nchs/data/nhanes/response_rates_cps/RRTO708MF .pdf). More information on the NHANES sampling strategy is available at http://www.cdc.gov/ nchs/data/nhanes/nhanes_03_04/nhanes_analytic_guidelines_dec_2005.pdf.

 For the current study the 2005-2006 and 2007-2008 survey waves were combined. As recommended in NHANES analysis guidelines, survey year was included in initial models to control for historical trends (NHANES, 2010). Respondents aged 60 or older who completed the mobile examination center component of the study (where the alcohol questions were administered) were selected (n=3,533). Because of oversampling of Mexican Americans in the 2005-2006 sample, the "other Hispanics" race/ethnicity is not representative of the United States population. This category was dropped from the analyses, resulting in an eligible sub-sample of 3,310. As those who currently abstain from alcohol are different than those who drink at any level (Dawson, 2000) and include both life-long abstainers as well as former drinkers, those who did not consume alcohol in the past year were excluded, resulting in a final eligible sub-sample of 1,365.

Measures

 Independent variables. *Social support*. One item was selected from the NHANES social support assessment, which is adapted from the Berkman-Syme Social Network Index and the Yale Health and Aging study (Berkman et al., 1993). Respondents were asked, "Can you count on anyone to provide you with emotional support such as talking over problems or helping you make a difficult decision?" with results coded yes=0, no=1.

 Depressive symptoms. The NHANES uses the nine-item Patient Health Questionnaire (PHQ-9) (Kroenke & Spitzer, 2002) for assessing depressive symptoms (Kroenke, Spitzer, & Williams, 2001). The PHQ-9 has been validated with older adults as well as general populations and is comparable to the longer, geriatric-specific Geriatric Depression Scale (Phelan, 2010). Respondents were asked "Over the past two weeks, how often have you been bothered by: little interest or pleasure in doing things; feeling down, depressed, or hopeless; trouble falling or staying asleep, or sleeping too much; feeling tired or having little energy; poor appetite or overeating; feeling bad about yourself-or that you are a failure or have let yourself or your family down; trouble concentrating on things, such as reading the newspaper or watching TV; moving or speaking so slowly that other people could have noticed, or the opposite, being so fidgety or restless that you have been moving around a lot more than usual; thoughts that you would be better off dead or hurting yourself in some way?" Responses were scored from not at all=0 to nearly every day=3, leaving a range of scores from 0-27, with 0 representing no depressive symptoms and 27 representing severe depressive symptoms. The average score for the overall sample was 2.14 (SD= .11), while the average for men was 1.91 (s.d. .137) and for women was 2.39 (SD=.14). (Cronbach's Alpha=.789). *Perceived impairment from depressive symptoms*. Question 10 from the PHQ-9 was used to assess impairment from depressive symptoms among those whom reported any depressive symptoms. Respondents were asked, "How difficult have these problems made it for you to do your work, take care of things at home, or get along with people?" with responses dichotomized into two categories: 0=Not at all difficult; and 1= Somewhat, very, or extremely difficult (Kroenke, Spitzer, & Williams, 2001).

 Dependent variable. Heavy episodic drinking was defined as a usual quantity of 4 or more alcoholic beverages per drinking episode or consumption of 5 or more alcohol beverages on a at least one occasion in the past 12 months (Sacco et al., 2009).

Control measures. Several variables known to be risk factors for heavy episodic drinking in older age (age, gender, education, income, marital status, race/ethnicity, and health) were controlled for in all analyses. *Age.* Age was categorized as: 60-64 (pre-retirement age); 65-69 (peri-and post retirement); 70-79; and 80+ (the "oldest old"). *Gender.* Respondents were coded female or male. *Education.* Respondents identified the highest grade or level of school that they completed or the highest degree that they had received. Responses were condensed into four categories: less than high school graduate; high school graduate or GED; some college or 2-year degree; or 4-year college graduate or above. *Income.* Respondents were asked for their total household income for the past year, including wages, salaries, Social Security income, retirement benefits, and any other sources. Three categories, designed to retain maximum sample size, were created from these responses: under $20,000; $20,000-54,999; and $55,000 or above. *Marital status.* Respondents were asked for their current marital status, which was coded into three categories: married or living in a marriage-like relationship; divorced or never married; and widowed. *Race/ethnicity.* Study interviewers asked respondents "what race do you consider yourself to be?" and "do you consider yourself to be Hispanic/Latino?" Those who answered that they were Hispanic or Latino were also asked to identify their ancestor's countries of origin. The following categories were used for this analysis: White; Black; Mexican American; and other race or multi-racial. *Physical health*. Respondents were asked to rate their overall health compared to others their age as excellent, very good, good, fair, or poor. Responses were dichotomized into categories: 0=excellent, very good, or good; or 1= fair or poor (Martin, Schoeni, Freedman, & Andreski, 2007).

Data Analysis

IBM SPSS Complex Samples (Version 19.0) was used to account for the clustering, unequal probability of selection, and non-response rates of the NHANES (Siller & Tompkins, 2005). Weighted survey data were used in all analyses due to the complicated survey design and in order to generalize findings to the civilian non-institutionalized U.S. population.

Several analyses were conducted to address the study's hypotheses: 1) Two-way interaction effects between gender and depressive variables were examined to test whether the relationships between depressive variables and heavy episodic drinking were stronger for older men; 2) Two-way interaction effects between depressive variables and social support were tested to understand if social support buffers against negative effects of depression on heavy episodic drinking in older adults; and 3) Three-way interaction effects between gender, depressive variables, and social support were examined to test whether the buffering relationship between depressive variables and social support on heavy episodic drinking is stronger for older men than for older women.

Sample sizes were different depending upon the depressive variable examined. Analyses examining depressive symptoms used a sample of 1,356, while those examining perceived impairment from depressive symptoms only included respondents who reported any symptoms of depression (n=823). Estimates were evaluated as significant at the alpha=.05 level. Multicollinearity matrices were examined and found to be below .5 for all variable relationships (Menard, 2002). Pseudo R squares were compared between main effects models and models with interactions to assess whether interactions improved model fit. All analyses controlled for age, race/ethnicity, marital status, education level, income, and physical health status.

Description of study sample. Approximately 10 percent of the total sample was high-risk drinkers. Only 5.3 percent had low levels of social support, while 15.3 percent reported at least one depressive symptom. The most commonly endorsed depressive symptoms were being

bothered by feeling tired or having little energy (43.2%); being bothered by trouble falling asleep, or sleeping too much (34.7%); being bothered by feeling down, depressed, or hopeless (16.7%); and being bothered by little interest or pleasure in doing things (16.4%). Amongst those with depressive symptoms, 22 percent reported perceived impairment from them.

Results

Overview of Main Effects

The odds of heavy episodic drinking for all independent and control variables included in the two models are displayed in Table 1. There was no main effect for depressive symptoms (mean= 2.15, Wald F=.01, p=.93) on heavy episodic drinking. Although not statistically significant at the p<.05 level, perceived impairment from depressive symptoms approached significance (Wald F=3.88, p=.058) and lowered odds of heavy episodic drinking. There was, however, a significant main effect for social support in both the model including the whole sample (Wald F=8.560, p=.006) and the model including only those who reported depressive symptoms (Wald F=7.28, p=.011). In the whole sample, those with low emotional support had 2.16 odds (95% CI=1.26-3.71) of heavy episodic drinking compared to those with high emotional support.

Moderation Models

Three study hypotheses were tested with the use of moderation models.

Hypothesis 1: Interaction effects of depressive variables and gender. There was a significant interaction between gender and depressive symptoms (Wald F=9.03, p=.005), although the direction of the results was not as hypothesized. Among women, there was a trend for those with increasing depressive symptoms to have higher odds of heavy episodic drinking. For men, odds of heavy episodic drinking either lowered or remained primarily the same as depressive symptoms increased (see Figure 2).

In follow-up gender-stratified analyses, the hypothesis that the relationship between depressive symptoms variables and heavy episodic drinking would be stronger for older men than older woman was partially supported.   Depressive symptoms were not significantly related to heavy episodic drinking in older men (p=.378). In older women, depressive symptoms approached significance (p=.053). For every 1-unit increase on the depressive symptoms scale, odds of heavy episodic drinking increased by 1.095 (95% CI .999-1.201). Among older men who had depressive symptoms, however, those who had perceived impairment from their depressive symptoms had significantly lower odds of heavy episodic drinking (OR=.469, 95% CI= .272-.807) than older men who had no perceived impairment from their depressive symptoms. There was no significant relationship between perceived impairment from depressive symptoms and heavy episodic drinking for older women (p=.880).

Hypothesis 2: Interaction effects between depressive variables and social support. The data did not support the hypothesis that social support would buffer against the effects of depressive symptom variables on heavy episodic drinking. There were no significant interactions between depressive symptoms or perceived impairment from depressive symptoms and social support.

Hypothesis 3: Interaction effects of depressive variables, social support, and gender. There was no significant three-way interaction between depressive symptoms, social support, and gender. Although relationships were not as hypothesized, there was a significant three-way interaction between being perceived impairment from depressive symptoms, social support, and gender (Wald F=3.08, p=.043). Although men with low social support had higher risk of heavy episodic drinking than those with high social support, their risk for heavy episodic drinking

declined at a steeper rate when they were impaired from depressive symptoms. Women with low social support had higher risk of heavy episodic drinking when impaired by their depressive symptoms than those with high social support who were impaired by their depressive symptoms (see Figure 3).

Discussion

In this nationally representative sample of adults age 60 and older, gender significantly modified relationships between depressive variables and heavy episodic drinking, and depressive variables, social support, and heavy episodic drinking. Specifically, increasing depressive symptoms raised odds of heavy episodic drinking for women. In contrast, for men, odds of heavy episodic drinking were lower in the presence of increasing depressive symptoms, or when impaired by depressive symptoms. For those who are impaired by their depressive symptoms, this relationship was further qualified by the presence of social support. Among women, social support buffered against the negative effects of impairment from depressive symptoms. In men, those with high social support had lower odds of heavy episodic drinking overall, but their odds of heavy episodic drinking did not decline as steeply as those with low social support when impaired by depressive symptoms.

As in the general adult population, gender is a key moderator of the relationship between depressive symptoms and heavy episodic drinking in older age. Gender appears to determine whether increasing depressive symptoms raise or lower risk of heavy episodic drinking in older adults. The only other nationally representative study that found gender differences among older adults in the relationship between heavy drinking and depression scores found that there was a significant relationship between drinking heavily and higher depression scores for older men, but not for older women (Choi & Dinitto, 2011). Conversely, the results of this study suggest risk of heavy episodic drinking *lowers or stays the same* for men with increasing depressive symptoms, and *raises* for women with increasing depressive symptoms. These findings are consequently more aligned with studies of younger adult populations, which have found that the relationship between depressive symptoms and heavy drinking is stronger for women than for men (Midanik, 1983; Schutte et al., 1997). Increasing risk of heavy episodic drinking for women with more depressive symptoms may occur across the lifespan, suggesting that the significant correlation in these behaviors is gender-specific, and not necessarily age-specific.

While there is little theoretical literature examining alcohol use in older adults, some have suggested that older adults engage in heavy episodic drinking to self-medicate or cope with symptoms of depression (Schutte et al., 1998). This study's findings raise questions about this theory for older men, and suggest that any theorizing about these relationships must include gender as an important component. In addition, the findings suggest a need for better theoretical understanding of why risk of heavy episodic drinking is lower for older men who are impaired by their depressive symptoms. As older men are far more likely to drink heavily than older women, as demonstrated both in this study and elsewhere (Blazer & Wu, 2009), it could be that health or mental health care providers treating depressive symptoms are more likely to screen older men for alcohol use than older women. Providers could be less likely to discuss alcohol-related issues with depressed older women, which is particularly problematice given that alcohol abuse may become increasingly prevelent and problematic for older women in the future (Epstein et al., 2007).

The second study hypothesis, which examined whether social support buffered against the negative effects of depressive variables on heavy episodic drinking, was not supported by the data. Although the presence of social support lowered odds of heavy episodic drinking overall,

two-way interactions between the depressive variables and social support were not significant. There are several potential explanations for why a two-way buffering relationship was not found in this study. First, the overall rates of depressive symptoms in this sample were low, which may have reduced my power to detect a buffering effect. A similar study with more depressed respondents may be more likely to support the buffering hypothesis than this nationally representative sample of community-dwelling older adults. Second, as the main effect trend of impairment from depressive symptoms was the opposite of what was expected (impairment from depressive symptoms appeared to lower risk of heavy episodic drinking, instead of raise risk), the effect of social support may not have been needed to further lower risk.

Gender appears to be an important moderator in the relationship between impairment from depressive symptoms and heavy episodic drinking in older adults, and needs to be included in models to more fully understand how social support operates in the relationship between depressive symptoms and heavy episodic drinking. For women, social support buffered against the negative effects of impairment from depressive symptoms, as among those with high social support, risk of heavy episodic drinking was lower for those who were impaired by their depressive symptoms than for those who were not impaired by their depressive symptoms. Either through social control or another supportive mechanism, high social support may protect women who are bothered by depressive symptoms from heavy episodic drinking. This finding was contrary to that of another nationally representative study, which found that older women with more social support were more likely to engage in heavy episodic drinking than older woman with less social support, or older men (Choi et al., 2010). The contradictory findings between this study and Choi et al. (2010) may be a result of measurement error, as the scale used to assess social support in that study demonstrated low reliability (Cronbach's alpha=0.56). Alternatively, the current findings could reflect the connected role that depressive symptoms have with social support, suggesting that even single-gender analyses that do not explore all of these factors together may be missing the bigger picture. More research is needed to understand whether older woman's social support encourages them to drink heavily or buffers against the negative effects of depressive symptoms on heavy episodic drinking.

For older men, the buffering effect of social support appears to be different. While older men with high social support had lower risk of heavy episodic drinking overall, their risk did not decrease as sharply as those with low social support when impaired by depressive symptoms. It could be that since the risk of heavy episodic drinking for older men with low social support is higher, there is more opportunity for their drinking to decline in the presence of bothersome depressive symptoms than for those with high social support. Alternatively, something about social relationships, such as drinking buddies trying to "cheer up" a depressed friend, or enhanced social opportunities, may keep men with high social support from decreasing heavy episodic drinking when impaired by depressive symptoms. More refined measures of social relationships and interactions are needed to better understand how social support and gender interact with depressive symptoms.

Although this study is one of few to examine the relationships between depressive symptoms, social support, gender, and heavy episodic drinking in older age in a nationally representative sample, it has several limitations.   The NHANES reflects the non-institutionalized United States population and does not include older adults residing in nursing homes, who may have higher incidence of depressive symptoms and depression (Alexopoulos, Vrontou, Kakuma, & Meyers, 1996; Jones, Marcantonio, & Rabinowitz, 2003). The sample is only representative of Mexican Americans, the largest Hispanic group in the U.S. (Ennis, Rios-

Vargas, & Albert, 2011) and more information about how Hispanic race/ethnicity might impact these relationships is needed. As usual quantity alcohol measures can underestimate drinking among heavier drinkers (Midanik, 1994), older adults who have drank five or more drinks per drinking episode at any point in the last year were included to help capture most of the heaviest drinking older adults.

        Like all cross-sectional surveys, the NHANES cannot establish causality. For example, while it was theorized that depressive symptoms lead to heavy episodic drinking in older adults, limited evidence suggests that the relationship may be reversed, with heavy episodic drinking leading to depressive symptoms through the effect of hangovers (Paljarvi et al., 2009). Hangovers occur after alcohol has left the body and can lead to a variety of mood changes and cognitive dysfunction (Vester, 2008). Mood disturbances resulting from frequent hangovers could manifest as depressive symptoms in heavy episodic drinking older adults. If this is indeed the case, this data suggests that it is truer for older women, who might have more intense hangovers due to their bodies changing ability to metabolize alcohol in older age (Blow & Barry, 2002).

        Any health, mental health, or behavioral health provider working with older adults should screen for depressive symptoms and heavy alcohol use, particularly for women and those who are socially isolated. Although more information is needed about how these complex factors are related to each other, it appears that there should be enhanced screening for heavy episodic drinking in older adults, particularly for older women with bothersome depressive symptoms. Behavioral health practitioners treating older women for depression should assess drinking, especially when older women are receiving pharmacetuical treatment for depression, as most anti-depressent medications have the potential to negatively interact with alcohol. In addition to routine screening, older adults, and particularly older women, should have access to behavioral health interventions that seek to foster and maintain social support.   Programs that both succesfully integrate mental health and behavioral health treatment and employ trained staff who understand the biopsychosocial effects of aging will be increasingly needed as the U.S. population ages.

        More information is needed about the contexts and circumstances in which older adults drink. Do older adults drink alone, or in social circumstances? Do these patterns differ by gender, and by the presence of depressive symptoms? Advanced analyses that examine potential moderating, mediation, or longitudinal effects are particularly needed. Analyses examining only main effects cannot capture intricate mechanisms, and could lead researchers to the wrong conclusions, particularily in samples that are not gender balanced. This nationally representative study suggests that there are significant differences in the drinking behaviors of older men and older women with depressive symptoms. Social support also appears to complicate this relationship. Establishing the interplay among these factors will help providers and policy makers prevent older adults from drinking at a level that could lead to premature disability and shorter lifespans.

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Figure 1. Hypothesized relationships between depressive symptoms, social support, gender, and heavy episodic drinking in older adults
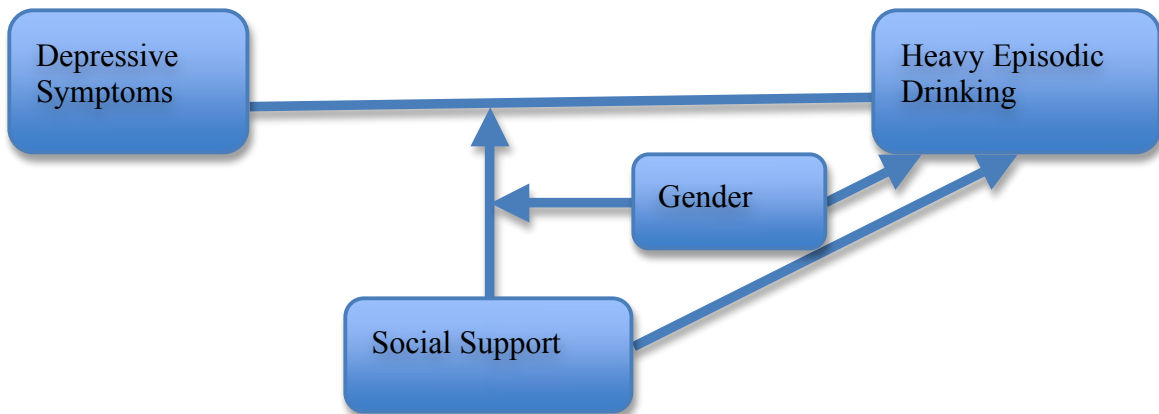
Figure 2. Interaction between depressive symptoms and gender on mean predicted probabilities of heavy episodic drinking among older adults (n=1.356).
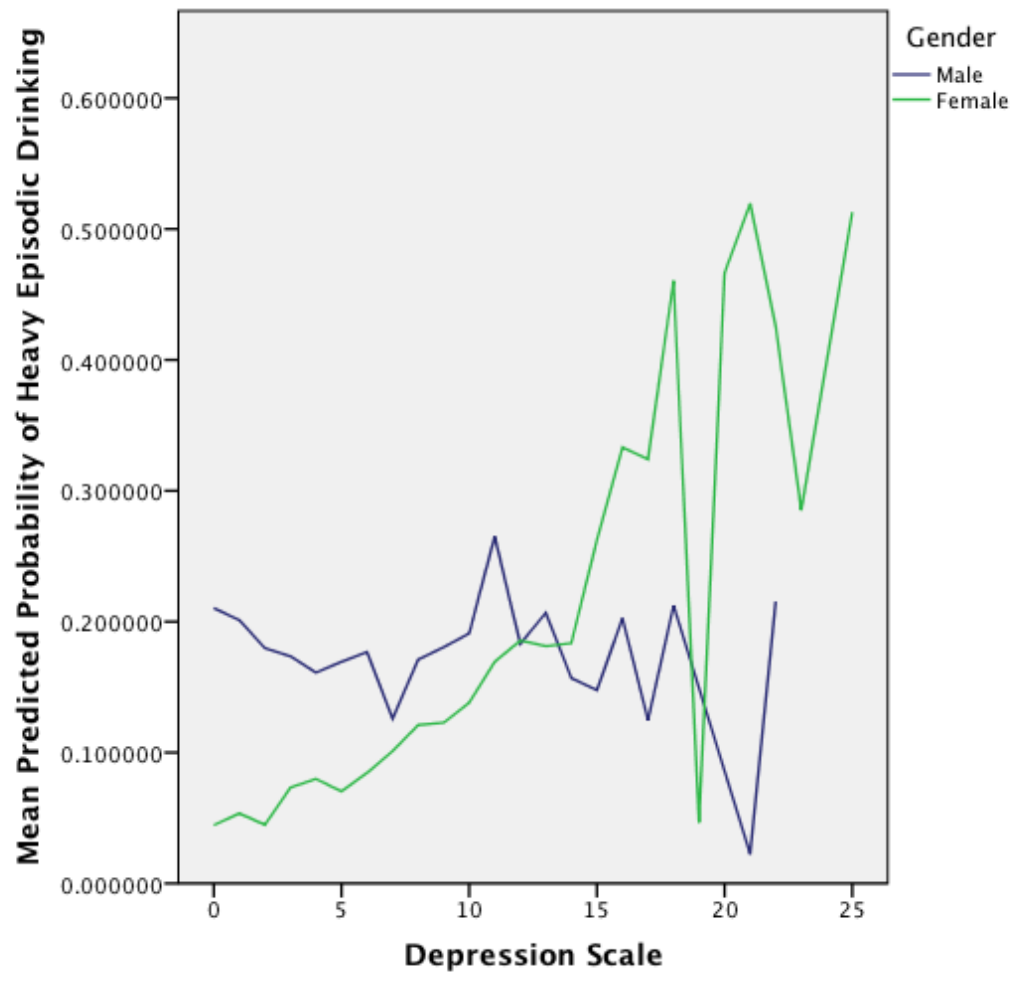
Figure 3. Interaction between impairment from depression symptoms, emotional support, and gender on mean predicted probabilities of heavy episodic drinking among older adults with any depressive symptoms (n=823).
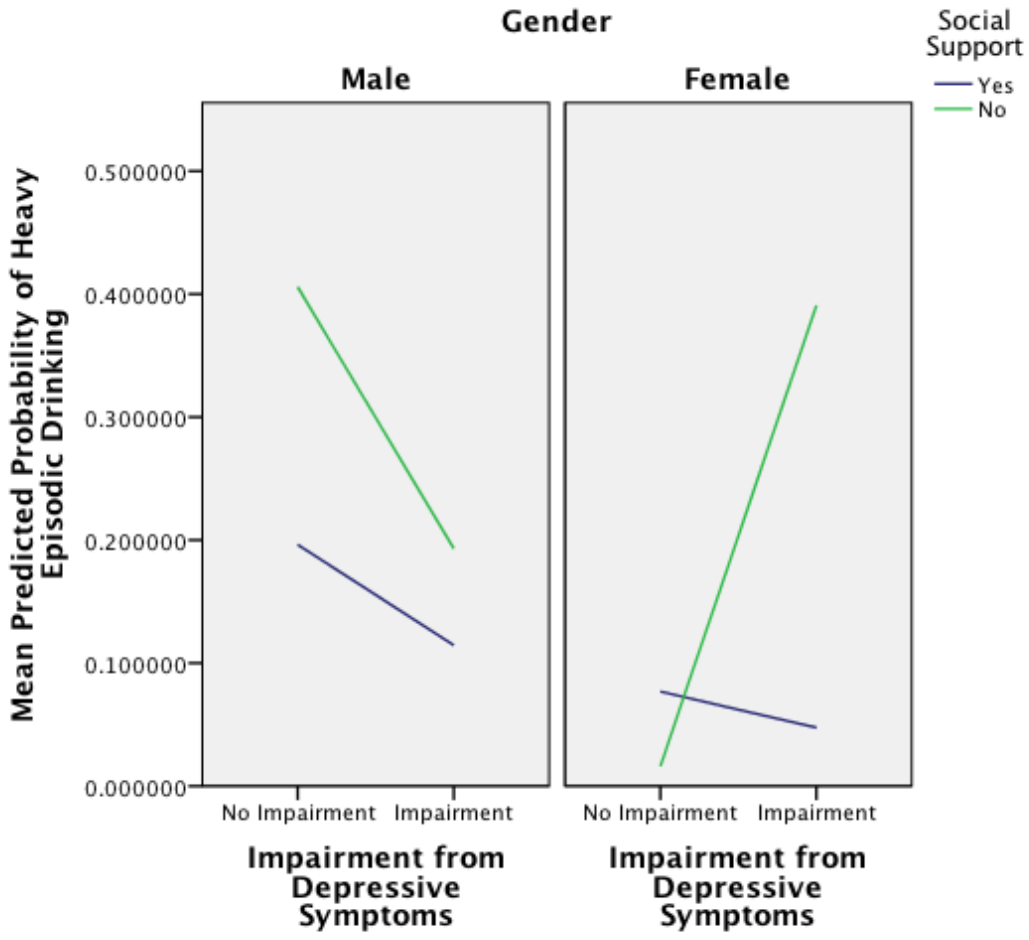
Table 1. Odds of heavy episodic drinking among adults aged 60 or older, excluding abstainers: data from NHANES

Variables (Reference)	Total sample (n=1,356)		Among those with depressive symptoms (n=823)	
	OR	95% CI	OR	95% CI
Gender (Female)				
Male	4.58***	2.94-7.15	3.86***	2.19-6.80
Age (80+)				
60-64	7.69***	3.86-15.35	10.91***	4.25-28.03
65-69	3.68***	1.52-8.91	4.12***	1.22-13.86
70-79	2.66***	1.17-6.05	3.31***	1.13-9.69
Marital Status (Married)				
Widowed	0.85	0.40-1.84	0.94	0.33-2.67
Divorced/Never Married	1.19	0.61-2.34	1.20	0.52-2.74
Physical Health (Excellent, Very good, or Good)				
Fair or Poor	0.580	0.34-0.98	0.72	0.35-1.46
Race/ethnic. (White)				
Mexican American	2.02*	1.13-3.60	1.51	0.62-3.72
Black	1.06	0.57-1.98	1.16	0.61-2.20
Other, Multi-Racial	.24	0.03-2.19	0.45	0.03-6.89
Education (College degree+)				
Less than HS grad	3.62**	1.91-6.89	2.66	1.02-6.90
HS grad or GED	3.20**	1.61-6.36	3.14	1.17-8.43
Some college or 2-year degree	1.99	0.91-4.31	1.45	0.48-4.35

Income ($20,000-54,999)				
Under $20,000	1.76	0.90-3.46	1.68*	0.84-3.34
$55,000 or more	.81	0.52-1.28	0.55	0.32-0.93
Emotional Support				
No support	2.16**	1.26-3.71	1.26*	1.26-5.29
Depressive Symptoms (1Unit Increase)	1.003	0.930-1.082		
Impairment from Depression (Not Bothered by Depressive Symptoms)				
Bothered by Depressive Symptoms			0.612†	0.368-1.018

Note: *p<.05, **p<.01, ***p<.001,†p<.10

Chapter 4

Race/Ethnicity, Gender and Drinking in Older Age

The Mediation and Moderation Effects of Health

Abstract

Background: Older adults of color have different drinking patterns than older Whites, yet there has been limited investigation of why or if these patterns differ by gender. These differences could be a result of poorer health among older people of color and older women or variation in how health relates to drinking in older age. Guided by an intersectionality approach and cumulative inequality theory, this paper tests two models: 1) a moderated mediation model and 2) a moderation model examining the relationships between race/ethnicity, gender, health and at-risk or heavy episodic drinking in older age.

Methods: Weighted path analysis and logistic regression models examined White, Mexican American, and Black adults aged 60 or older in the 2005-2010 National Health and Nutrition Epidemiologic Survey (NHANES) (N=2,348).

Results: Older men and older Mexican American men were more likely to both drink at-risk and engage in heavy episodic drinking than older women and older White men. There was no evidence of moderated mediation effects. Significant three-way interactions were found between health, race/ethnicity, and gender at both the at-risk and heavy episodic drinking levels, providing evidence for the moderation model. Odds of at-risk drinking increased as health worsened for Mexican American men and women and Black men; this was true only for Mexican American men at the heavy episodic drinking level. Poorer health decreased odds of both at-risk and heavy episodic drinking for White women.

Discussion: The relationship of health and drinking in older age varies dramatically between racial/ethnic groups and genders. Behavioral health and health care providers should be aware of how these differences determine risk of drinking in older age, particularly for older adults of color and older women.

Introduction

Drinking in older age is projected to rise in the near future due to the aging of the relatively heavy drinking "baby boomers" and the US population overall (Gfoerer, Penne, Pemberton, & Folsom, 2003). This problem could be more significant among older people of color and older women. Populations of older Hispanics and older Blacks are expected to grow respectively by 254 percent and 147 percent in the next twenty years (AoA, 2005), while dependence on alcohol in older age may increase more for older women than older men (Holdcraft & Iacano, 2002).

The expected increase of drinking in older age could place a strain on existing health systems serving older adults, as drinking at even moderate levels is related to many health conditions (Rehm et al., 2003). Approximately 10-13 percent of older adults currently drink above NIAAA guidelines, defined as no more than 7 drinks in one week or 1 drink per day for aged 65 or older (Blazer & Wu, 2009; Sacco, Bucholz, & Spitznagel, 2009). In addition, 9 percent of older adults are heavy episodic drinkers, drinking a usual quantity of 4 or more drinks per drinking episode, or 5 drinks in at least one episode in the last 12 months (Merrick et al., 2008a). Drinking at this level can be even more detrimental to health, and is related to functional impairment and increased risk of mortality (Holahan et al., 2010; Moore, Endo, & Carter, 2003).

Drinking in older age could be especially problematic for older adults of color and older women who tend to be in worse health and who may be particularly vulnerable to alcohol-related negative health effects (Bradley, Badrinath, Bush, Boyd-Wickizer, & Anawalt, 1998; Chartier, 2007; Kington & Smith, 1997; NIAAA, 2006). Older adults of color and older women are rarely studied separately or proportionally represented in studies, even though they drink at different rates than White men. Older men are more likely to drink at any level compared to older women (Blazer & Wu, 2009; Merrick et al., 2008a; Sacco et al., 2009), while Whites are more likely to drink at-risk than older adults of color (Breslow, Faden, & Smothers, 2003; Satre & Arean, 2005; Zimmerman, McDougall, & Becker, 2004). However, although they are less likely to drink overall, older adults of color [and particularly Black older women (Blazer & Wu, 2009)] are more likely to drink at the heaviest levels (Blazer & Wu, 2009; Merrick et al., 2008a).

Racial/ethnic and gender-based differences in rates of drinking in older age could be partially explained by moderated mediation or moderation mechanisms in the relationships between health, race/ethnicity, gender and at-risk or heavy episodic drinking in older age. Little research has addressed this topic or formally examined relationships among these variables. Guided by an intersectionality approach and cumulative inequality theory, this paper examines health status and drinking among White, Mexican American, and Black older men and women. To better understand racial/ethnic and gender based differences in drinking in older age, two models are tested; 1) a moderated mediation model, examining whether the relationship between race/ethnicity and at-risk or heavy episodic drinking in older age is mediated by health and moderated by gender, and 2) a moderation model investigating whether the relationship between health and at-risk or heavy episodic drinking in older age is moderated by race/ethnicity and gender.

Background

Health Effects of Drinking in Older Age

Older adults face a large number of health challenges relative to the rest of the population that can be exacerbated by heavy consumption of alcohol (Brower & Hall, 2001). Given evidence that some alcohol can improve health, however, there is uncertainty about how much

alcohol is bad for health, or if these levels should differ for older people of color and older women.

Many studies indicate that moderate drinking, typically one drink a day or less, in later life is associated with better health (Bond et al., 2003; Chan, von Muhlen, Kritz-Silverstein, & Barrett-Connor, 2009; Lee et al., 2009), including lower risk of coronary artery disease (Rehm et al., 2003), and fewer health utilization costs, especially among those with cardiovascular disease (Mukamai et al., 2006). Studies including younger and older adults have found that drinkers, and even heavy drinkers, are less likely to utilize health care than abstainers (Armstrong, Midanik, & Klatsky, 1998; Zarkin, Bray, Babor, & Higgins-Biddle, 2004). This could be because abstainers have ceased drinking or never drank due to health problems (Andreasson, 1998), or due to potential alcohol-related health benefits. There is controversy, however, over the magnitude and extent to which alcohol improves health (Cooper et al., 2009; Reid, Boutros, O'Connor, Cadariu, & Concato, 2002). Some of the proposed cardiovascular benefits from moderate drinking could be related to differences in health behaviors, such as increased physical activity among moderate drinkers (Barrett, Anda, Croft, Serdula, & Lane, 1995; Tivis & Tivis, 2008), or methodological limitations (Fillmore, Stockwell, Chikritzhs, Bostrom, & Kerr, 2007). The substantial literature indicating alcohol-related negative health effects suggests caution in touting the health benefits of alcohol, especially for older adults, and particularly for older people of color and older women.

Excessive alcohol consumption can lead to many damaging health conditions, including nutritional deficiencies, increased rates of heart disease and heart attacks, strokes, dementia, and liver diseases (Rehm et al., 2003; Smith, 1995). Increasing alcohol consumption is also related to higher risk of many cancers, including those of the mouth, esophagus, breast, and liver (Rehm et al., 2003). Using survey data from 69 countries, Boffetta et al. (2006) estimate that as many as 3.5 percent of cancer deaths are attributable to alcohol (Boffetta, Hashibe, La Vecchia, Zatonski, & Rehm, 2006). Drinking is also related to liver disease, pancreatitis, hypertension, and injury (Corrao, Bagnardi, Zambon, & La Vecchia, 2004).

These ill effects could be especially detrimental in older adults, as the biological process of aging increases susceptibility to the negative consequences of drinking (Spencer & Hutchison, 1999). Older adults, especially older women, have less lean body mass and bone density than younger adults, and aging-related physiologic changes in the liver impact how alcohol is metabolized (Blow & Barry, 2002; Smith, 1995). The total effect of these physiological changes is that older adults experience alcohol's effects at smaller doses than other segments of the population (Beullens & Aertgeerts, 2004). The interactive effects of aging processes and alcohol consumption have been found to cause significant sleep disorders in alcohol dependent older adults (Smith, 1995). Alcohol abusing older adults are more likely to have symptoms of dementia (Thomas & Rockwood, 2001), and may have more than twice the expected mortality rate (Moos, Brennan, & Mertens, 1994).

Older people of color may be more susceptible to alcohol-related negative health effects. Blacks and Mexican Americans are more likely to have or die from alcohol-related liver disease than Whites (NIAAA, 2006; Stinson, Grant, & Dufour, 2001), and Blacks experience more physical health problems than Whites drinking comparable amounts (Chartier, 2007). These disparities may be even more pronounced for Black men (Caetano & Clark, 1998; Herd, 1994), suggesting the need for investigation within racial/ethnic and gender categories.

Older women may also be at greater risk of developing alcohol-related physical health problems than men. When drinking equal amounts of alcohol, women are more likely to have

higher blood alcohol concentration and longer-lasting effects, due to differences in bodily composition, hormones, and alcohol metabolites (Greenfield, Manwani, & Nargiso, 2003; Walter, Dvorak, Gutierrez, Zitterl, & Lesch, 2005). As a result, women drinkers are more likely to develop liver disease (Becker et al., 1996), alcohol-related neurotoxicity (Hommer, 2003), and other physical health conditions (Bradley et al., 1998). These poorer health outcomes for women are seen among those drinking as low as an average of 2 drinks a day (Bradley et al., 1998). Although most evidence suggests that women experience worse alcohol-related health effects than men, one recent study found that older men experienced more health problems than older women as a result of drinking (Chartier, 2007). This inconsistency notwithstanding, it appears that gender plays a significant role in how alcohol affects health in older age.

Relationship of Health to Drinking in Older Age

Older adults drink less than younger adults (DHHS, 2008), likely partially due to worsening health in older age (i.e., the "sick quitter's phenomenon") (Schutte, Byrne, Brennan, & Moos, 2001). In a primary care sample, Satre and Arean (2005) found that older adults who had stopped drinking in the last 12 months were more likely to have health problems such as diabetes, heart problems and hypertension than those who were still drinking. These health problems were more influential than age in the decision to stop drinking. However, the effect of health on the decision to stop drinking may vary by race/ethnicity and gender. Blacks are more likely to stop drinking as result of poor health than Whites (Satre & Arean, 2005). Blacks are also more likely to stop drinking in older age overall (Pringle, Heller, Ahern, Gold, & Brown, 2006). Additionally, while one study found that the effect of health on stopping drinking did not differ by gender (Satre & Arean, 2005), others have found that men are more like to stop (Pringle et al., 2006) or decrease drinking in older age (Brennan, Schutte, Moos, & Moos, 2011).

Although the findings that health may cause many older adults to cease drinking indicates that those who drink may be in better health, the literature examining health status and drinking in older age is inconsistent. Some studies have found that older adult drinkers are in better health than abstainers (Satre, Gordon, & Weisner, 2007), potentially due to either lifelong health-related abstinence from alcohol or cessation of drinking due to health problems. Others have similarly found that older adults who drink moderately (Holahan et al., 2010) or even at-risk (Brennan & Moos, 1996; Brennan et al., 2011; Merrick et al., 2008b) may have better health than other drinkers or abstainers. It is unclear whether moderate drinkers are healthier and thus able to continue drinking, or whether moderate alcohol consumption itself may have direct health benefits for older adults.

This phenomenon may differ at the highest levels of drinking, however, as several studies have found that high-risk drinkers may have poorer self-rated health than low-risk drinkers (Kirchner et al., 2007; Sacco et al., 2009). It could be that older adults in poor health are drinking heavily to self-medicate (Aira, Hartikainen, & Sulkava, 2008; Immonen, Valvanne, & Pitkala, 2010). Conversely, heavy drinking older adults could be in poor health as a result of their drinking, and are either unable or unwilling to abstain.

Conceptual Framework

Although the precise causal mechanisms in the relationship between health and drinking in older age are unknown, it appears that this relationship is not uniform across all groups of older adults. Furthermore, as Mexican Americans and Blacks are generally in worse health than older Whites (Kington & Smith, 1997; McGee, Liao, Cao, & Cooper, 1999; Warner & Brown, 2011), it could be that differences in this relationship are reflective of lifelong disparities that cause poorer health in older age. Cumulative inequality theory argues that structural barriers

lead to differential access to opportunities and ability to accumulate wealth and relative advantage (Dannefer, 2003; Ferraro & Shippee, 2009; O'Rand, 1996). Individual, family, and community-level contexts in turn help determine the trajectory of these opportunities (or lack of opportunities) over the lifecourse. Using a cumulative inequality frame, this study examines potential racial/ethnic differences in the relationship between health and drinking as the result of structural inequalities.

This study also uses an intersectionality approach to investigating health and drinking in older age. Intersectionality emphasizes the overlapping of gender and racial/ethnic identities, arguing that many differences in status exist within the domains of race/ethnicity and gender (Collins, 1990; Crenshaw, 1991). To support this enterprise, this study explores interactions between race/ethnicity and gender to acknowledge and investigate potential differences.

Mediation Effects and Health

The proposed moderated mediation model is displayed in Figure 1. In general, older adults are in better health and are more likely to drink at-risk than those in poorer health (Brennan & Moos, 1996; Brennan et al., 2011; Merrick et al., 2008b), while older adults of color are in worse health (Kington & Smith, 1997; McGee et al., 1999; Warner & Brown, 2011), and less likely to drink at-risk than Whites (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman et al., 2004). Consequently, part of the explanation for why older adults of color are less likely than White older adults to drink at-risk could be explained by poorer health among older adults of color. Additionally, as older adults in worse health are more likely to engage in heavy episodic drinking than those in better health (Kirchner et al., 2007; Sacco et al., 2009), and older adults of color may be more likely to engage in heavy episodic drinking than Whites (Merrick et al., 2008; Blazer & Wu, 2009), disparities in rates of heavy episodic drinking could also be due to poorer health in older adults of color. Mediation analyses gauge the extent of which one variable is responsible for the relationship between an independent variable and an outcome (Baron & Kenny, 1986). Mediation processes can also differ by the presence of an additional variable, resulting in moderated mediation (MacKinnon, 2008). This model hypothesizes that the effect of race/ethnicity on at-risk or heavy episodic drinking in older age is partially mediated by health status. These proposed mediation effects are also hypothesized to vary by gender, as the negative health effects of drinking could be more pronounced in older women than older men (Redgrave, Swartz, & Romanoski, 2003).

Moderation Effects and Health

Figure 2 presents the hypothesized moderation model. Moderation is the process by which a variable "affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (Baron & Kenny, 1986, p. 1174). The evidence that older people of color and older women experience heightened negative effects from alcohol (Chartier, 2007; NIAAA, 2006; Stinson et al., 2001), suggests variation in how health impacts drinking in older age. For example, if older people of color and older women have more dramatic health responses to alcohol, those that are in poor health may be less likely to drink than White men in poor health. This difference may also be more significant for older women of color in comparison to White older women. Findings that Blacks (Satre & Arean, 2005) may be more likely to cease drinking as a result of poor health also indicate the possibility of moderation by gender and race/ethnicity in the relationship between health and at-risk or heavy episodic drinking in older age.

Current Study

Using cumulative inequality theory and an intersectionality approach as guides, this study uses nationally representative data of the community-dwelling U.S. population of adults aged 60 or older to better understand the role of health in racial/ethnic and gender-based variations in drinking in older age. Two models are tested: 1) the relationship between race/ethnicity and at-risk or heavy episodic drinking in older age is partially mediated by health, and that these mediated effects are moderated by gender; 2) the relationship between health and at-risk or heavy episodic drinking in older age is moderated by race/ethnicity and gender. Although the models conceptualize different underlying processes, they are not necessarily exclusive of each other, as each could partially explain racial/ethnic and gender based drinking rate differences in older age. This is the first known study using nationally representative data to formally test health-related mediation and moderation models as potential explanations for disparities in drinking in older age.

Methods

Sample

The 2005-2008 National Health and Nutrition Epidemiologic Survey (NHANES) was used to examine community-dwelling adults aged 60 or older. The NHANES is a cross-sectional, complex, stratified, clustered probability survey released in two-year waves that can be combined to increase sample sizes and examine rare occurrences. NHANES data is publically accessible and collected by the National Center for Health Statistics, a division of the Centers for Disease Control and Prevention. The NHANES randomly selects households from stratified sections of the United States, screens inhabitants of the households, and selects an average of 1.6 respondents per household for inclusion in the study. Most study questions are administered via face-to-face in-home interviews, while other information is collected at a mobile examination center, including physical examination data and a computer-administered questionnaire. The NHANES response rate was approximately 75.4 percent for the 2007-2008-survey wave. Additional sampling information is available at http://www.cdc.gov/nchs/data/nhanes/.

For this study, the 2005-2006, 2007-2008, and 2009-2010 waves of the survey were combined. As detailed in the NHANES analytic guidelines (NHANES, 2010), the NHANES during this time period is representative only of U.S. Hispanics of Mexican origin. Consequently, Hispanics with ancestry from other countries of origin were excluded from the final sample. Additionally, as alcohol consumption and health were key variables of interest in the study, and those who do not drink alcohol (i.e., abstainers) are generally in worse health than those who drink alcohol (Dawson, 2000), those who abstained from alcohol in the past 12 months were excluded from the study. The final sample size was 2,348.

Study Variables

Independent variables. The independent variables gender, race/ethnicity, and perceived health status were examined relative to at-risk and heavy episodic drinking in older age. ***Gender.*** Study interviewers coded respondents as female or male. ***Race/ethnicity.*** Respondents were asked which race they consider themselves to be and whether they are Hispanic or Latino. Responses were coded as White, Black, Mexican American, and Other or Multi-racial. Due to small numbers and resulting complete separations of data, the "Other or Multi-racial" category was not included in analyses. ***Physical health.*** Respondents were asked to rate their overall health compared to others their age as excellent, very good, good, fair, or poor, which were coded as a 5-point ordinal scale, 1=very good and 5=poor. This measure is highly predictive of mortality among older adults (Idler & Benyamini, 1997). While perceived health was initially

investigated as a non-parametric variable, due to complete separations of data and evidence that it's effect was predominately linear, perceived health was included in models as a continuous variable (Suchower & Copenhaver, 2007).

Dependent variables. Two dependent variables were selected for this study: at-risk drinking and heavy episodic drinking. ***At-risk drinking.*** Respondents were asked about the frequency ("In the past 12 months, how often did you drink any type of alcoholic beverage?") and quantity ("In the past 12 months, on those days that you drank alcoholic beverages, on the average, how many drinks did you have?") of alcohol consumption. At-risk drinking was defined as an average of more than 2 drinks per drinking episode or 7 or more drinks a week in the past 12 months (Moos, Schutte, Brennan, & Moos, 2009). ***Heavy episodic drinking.*** Respondents who drank a usual quantity of 4 or more alcoholic beverages per drinking episode or consumed 5 or more alcoholic beverages on a single occasion in the past 12 months were categorized as heavy episodic drinkers (Sacco et al., 2009).

Control variables. Variables that are known to be related to the independent and dependent variables based on existing literature and theory were controlled for in this analysis, including education, income, marital status, age, and depressive symptoms (Blazer & Wu, 2009; Choi & DiNitto, 2010; Sacco et al., 2009). ***Education.*** Respondents were asked for their highest level of education completed, which were coded as: less than high school graduate; high school graduate or GED; some college or 2-year degree; or 4-year college graduate or above. *Income.* Income was measured as total household income for the past year, including wages, salaries, Social Security income, retirement benefits, and any other sources. Responses were coded into three categories: under $20,000; $20,000-54,999; and $55,000 or above. ***Marital Status.*** Respondents' current martial statuses were coded into three categories: married or living in a marriage-like relationship; divorced or never married; and widowed. Age. Respondents' ages at the time of interview were collapsed into four categories: 60-64 (pre-retirement age); 65-69 (retirement age); 70-79 (post-retirement); and 80 or older (approaching and including the "oldest old"). ***Depressive Symptoms.*** The nine-item Patient Health Questionnaire (PHQ-9) (Kroenke & Spitzer, 2002) was used to assess depressive symptoms. The PHQ-9 has been validated with general populations (Kroenke, Spitzer, & Williams, 2001) and older adults (Phelan et al., 2010). Respondents were asked "Over the past two weeks, how often have you been bothered by: little interest or pleasure in doing things; feeling down, depressed, or hopeless; trouble falling or staying asleep, or sleeping too much; feeling tired or having little energy; poor appetite or overeating; feeling bad about yourself-or that you are a failure or have let yourself or your family down; trouble concentrating on things, such as reading the newspaper or watching TV; moving or speaking so slowly that other people could have noticed, or the opposite, being so fidgety or restless that you have been moving around a lot more than usual; thoughts that you would be better off dead or hurting yourself in some way?" Responses were scored from not at all=0 to nearly every day=3, creating a 27-point scale, 0=no depressive symptoms and 27=severe depressive symptoms.

Data Analysis

Analyses were conducted with the use of IBM SPSS Complex Samples (Version 19.0) and Mplus (Version 6.1), which account for the complex survey design and weighting of the NHANES (Siller & Tompkins, 2005). Survey year was included in initial multivariate models in order to control for historical effects, as advised by the NHANES analysis guidelines (NHANES, 2010).

The analysis was conducted in two phases. First, partial mediation models were tested to examine whether health mediated the relationship between race/ethnicity and at-risk and heavy episodic drinking, as well as whether this relationship differed by gender. The traditional method of establishing mediation, often known as the Baron and Kenny method (1986), has been criticized for ignoring the full range of mediating relationships (Zhao, Lynch, & Chen, 2010). In addition, the significance test recommended by Baron and Kenny for examining mediation (i.e., the Sobel test) relies on a standard normal distribution excluding many types of non-parametric data (Preacher & Hayes, 2004). This analysis utilized bootstrapping, a non-parametric sampling procedure that does not assume a normal sampling distribution (MacKinnon, 2008). Bootstrapping produces a large number of individual samples that are then used to approximate the sampling distribution of the indirect effect and create confidence intervals. For the mediation analyses, path analysis models using maximum-likelihood estimation were created in Mplus to examine the effect of mediators (Preacher & Hayes, 2008) on drinking levels in older adults, while controlling for demographic variables and accounting for complex survey weighting (Muthen, 2011).

For the second part of the analysis, weighted logistic regression models were created to examine whether the relationships between health and at-risk and heavy episodic drinking were moderated by race/ethnicity, as well as whether these relationships were further moderated by gender. Adjusted odds ratios were calculated of the main effects of model variables, and two-way and three-way interaction regression terms were used to tests moderation relationships. All significance values were examined at a 95 percent confidence level.

Sample Characteristics

Table 1 presents the sample characteristics of current drinkers aged 60 or older by gender and race/ethnicity. A series of gender-specific chi-square analyses between race/ethnicity and study variables revealed that there were no racial/ethnic-specific differences in rates of at-risk or heavy episodic drinking among older women. For older men, Blacks had the highest percentage of heavy episodic drinkers (50.5). Race/ethnicity was significant related to every other variable in the model for both men and women.

Results

Multivariate Results

Table 2 presents the adjusted odds of at-risk and heavy episodic drinking for older adult drinkers. Men, those with incomes under $20,000, and those aged 60-64 had significantly higher odds of at-risk drinking in older age. Those who were widowed (as compared to those who were married) had lower odds of at-risk drinking in older age. Male gender and younger age predicted higher odds of heavy episodic drinking than women and older age, respectively.

Mediation results. Tables 3-5 present the results of mediation analyses. Physical health did not mediate the relationship between race/ethnicity and at-risk drinking or heavy episodic drinking in older age. These relationships did not differ by gender. Although there was a significant direct effect among men for Mexican American race/ethnicity on at-risk (B=.144, SE=.05, p=.004) and heavy episodic drinking (B=.115, SE=.054, p=.032) indicating that Mexican American men are more likely to drink at both levels than White men, there were no significant indirect effects. Due to the complex survey weights in this analysis, a Chi-square test of model fit could not be calculated.

Moderation Results. Table 6 presents the moderation model results. There were no significant two-way interactions between perceived health and race/ethnicity in weighted logistic regression models examining at-risk or heavy episodic drinking among older adult drinkers.

There were significant three-way interactions between perceived health, race/ethnicity, and gender at both the at-risk (Wald F=3.932, p=.027) and heavy episodic drinking (Wald F=6.594, p=.003) levels.

Figure 3 presents the mean predicted probability of at-risk drinking by perceived health, race/ethnicity, and gender. Among men, as perceived health worsens, mean predicted probability of at-risk drinking increases for Mexican Americans and Blacks and decreases or remains the same for White men. Among women, the patterns for Mexican Americans and Whites were similar, although mean predicted probability of at-risk drinking among Black women did not linearly increase as perceived health worsened.

Figure 4 presents the mean predicted probability of heavy episodic drinking by perceived health, race/ethnicity, and gender. As with at-risk drinking, mean predicted probability of heavy episodic drinking increased as perceived health worsened for Mexican American men. Mean predicted probability of heavy episodic drinking lowered or remained the same for Black men as perceived health worsened and increased slightly for White men with the poorest perceived health. Among women, mean predicted probability of heavy episodic drinking remained stable as perceived health worsened.

Discussion

In this nationally representative study of White, Mexican American, and Black older adult current drinkers, two conceptual models hypothesizing that health and health variations partially explain racial/ethnic and gender-based differences in at-risk and heavy episodic drinking in older age were tested. Although some racial/ethnic and gender-based variation in risk of drinking in older age was identified, the support for these models was mixed.

Similar to other studies, there was a strong effect for gender on drinking in older age (Blazer & Wu, 2009; Choi & Dinitto, 2011). Older men from all racial/ethnic groups were more likely to both drink at-risk and engage in heavy episodic drinking compared to older women. Although other studies have found racial/ethnic-based variations in risk for drinking in older age (Breslow et al., 2003; Satre & Arean, 2005; Zimmerman et al., 2004), this study found only one racial/ethnic difference. Older Mexican American men were more likely to drink at-risk risk and engage in heavy episodic drinking than White men. Mexican American men could be more likely to drink at-risk or engage in heavy episodic drinking due to cultural ideas about alcohol, which consider men more masculine if they are able to consume large quantities of alcohol (Alaniz, 1994; Cuadrado & Lieberman, 1998). This phenomena could also be a combination of the traditional Mexican drinking pattern (high quantity/low frequency) with the more common American pattern (low quantity/high frequency) (Vega, Sribney, & Achara-Abrahams, 2003). This finding is important given the dearth of literature examining drinking in older age for Mexican Americans in particular, and general Hispanic populations overall (CSAT, 2010).

Moderated Mediation of Race/Ethnicity by Health and Gender

The hypothesis that health status would mediate the relationship between race/ethnicity and at-risk or heavy episodic drinking in older age, and that this mediation would differ by gender, was not supported. The increased risk of drinking in older age for Mexican American men was not partially explained by poorer health, even though Mexican American men were more likely to have poor health than White men. Although there was evidence of health disparities, as Mexican Americans and Blacks were more likely to be in poor health than Whites, these health disparities did not explain differences in drinking rates.

It is possible that no significant mediation was found because older adults of color stopped drinking due to overall poor health (Pringle et al., 2006) or alcohol-related health

problems (Satre & Arean, 2005). This also could explain why there were no effects for health on at-risk or heavy episodic drinking. In order to lessen this possibility, however, the threshold of older adulthood was set at 60 years of age, to help account for "weathering" or premature aging effects among older adults of color (Geronimus, 2001; Geronimus, Hicken, Keene, & Bound, 2006). More longitudinal research is needed to learn more about drinking trajectories in middle to older age, particularly from studies using an intersectionality approach that captures differences within racial/ethnic and gender domains.

Although health was not a significant mediator, there are other potential explanations for higher risk of drinking for Mexican American older men. Lower socioeconomic status is related to higher risk of heavy drinking in older age, and Mexican Americans are more likely to have lower incomes and educational attainment (Proctor & Dalaker, 2002). As predicted by cumulative inequality theory, lifelong socioeconomic disparities are related to several negative health behaviors in older age (Grundy & Holt, 2001). Consequently, future studies should examine the potential mediating effects of education and income on the relationship between race/ethnicity and heavy drinking in older age.

Moderation of Health by Race/Ethnicity and Gender

There was evidence to support the second model, as race/ethnicity and gender moderated the relationship between health and both at-risk and heavy episodic drinking in older age. At the at-risk drinking level, poorer health increased risk of at-risk drinking for Mexican American and Black men, while risk of at-risk drinking either declined or stayed at similar levels for White men in poorer health. Although overall risk of at-risk drinking for older women was significantly lower, a similar pattern emerged. Mexican American women were more likely to drink at-risk as health worsened, while White women in poorer health were less likely to drink at-risk. Unlike men, however, risk of at-risk drinking for Black women was similar for those in the best and worst of health.

While these findings are different than others that found that older at-risk drinkers are in better health (Brennan & Moos, 1996; Brennan et al., 2011; Merrick et al., 2008b), this could be due to the exclusion of abstainers, who generally are in worse health than current drinkers (Satre et al., 2007), in order to better hone in on how health relates to drinking among those who consume alcohol. It is more likely, however, that large numbers of Whites, whose risk of at-risk drinking decreased as health worsened, have masked important racial/ethnic differences in other studies.

Although current literature indicates that older adults in poor health are more likely to drink heavily (Kirchner et al., 2007; Sacco et al., 2009), this pattern was found only in White and Mexican American older men. Risk of heavy episodic drinking was (slightly lower) for White and Mexican American older women, and Black older men in poorer health. There was little difference by health status in risk of heavy episodic drinking for Black women. Again, it appears that the majority of literature on health's relationship with problematic drinking in older age does not accurately reflect substantial differences within racial/ethnic and gender groups.

Given the lack of research on Mexican American drinking in older adulthood (CSAT, 2010), it is unknown why poorer health is associated with higher risk of at-risk drinking (in both women and men) and heavy episodic drinking (in men). Limited evidence suggests that approximately half of older Mexican American women grew up in households where alcohol was used as a traditional medicine, although only two-thirds believe that alcohol has beneficial health effects (Hatchett, Holmes, Patterson, & Bryan-Young, 2011). However, those who believed in the salutatory effects of alcohol were more likely to be problem drinkers, indicating

that Mexican American women in poor health who drink at-risk may be self-medicating. Although this study only examined alcohol use in a community-sample of older Mexican American women, it is possible that these cultural ideas about the medicinal properties of alcohol cross gender lines, with the differences in patterns of heavy episodic drinking between Mexican American men and women reflective of gender-based drinking differences and the more severe effects of heavy consumption for older women. More research is needed to examine the relationship between health and drinking for Mexican American older adults, particularly studies that examine acculturation status, which appears to play a role in Mexican American drinking, especially for women (Mills & Caetano, 2012).

There was no significant main effect for health on either at-risk or heavy episodic drinking in older age, in contrast to other cross-sectional studies that found that at-risk drinking is related to better health (Brennan & Moos, 1996; Brennan et al., 2011; Merrick et al., 2008b), while heavy drinking is related to poorer health (Kirchner et al., 2007; Sacco et al., 2009). Thus while it appears that there is significant variation in how health relates to drinking in older age for different racial/ethnicities and genders, these differences may not be important overall for risk of problematic drinking in older age. More studies that do not combine racial/ethnic and gender based groups together are needed to further examine the magnitude of health's effect on at-risk and heavy episodic drinking in older age.

Limitations

Although this study is a unique formal examination of health, race/ethnicity, gender, and drinking in older age, the findings are somewhat limited. The NHANES survey only represents the community-dwelling population of the United States, which means that results are not generalizeable to older adults who are incarcerated or living in nursing homes. Findings also are only generalizeable to Whites, Mexican Americans (the largest Hispanic subgroup in the US (Guzman, 2001)), and Blacks. Although more research is necessary to understand these phenomena in other racial/ethnic groups, this study is rare in including specific and adequate representation of Mexican Americans, who may drink differently than other Hispanic subgroups (Caetano, Vaeth, & Rodriguez, 2012; Vaeth, Caetano, & Rodriguez, 2012).

The alcohol questions used in the NHANES may lead to underreporting among the heaviest drinkers (Midanik, 1994). Two drinking thresholds were examined, including one low enough (no more than 2 drink a day or 7 drinks in one week) to hopefully capture most of problem drinking older adults. Additionally, like all cross-sectional studies, this study is unable to definitely establish causation in variable relationships. More longitudinal research is needed to follow-up on this examination of mediation and moderation in the relationships between health, race/ethnicity, gender, and drinking in older age.

Finally, these findings should be considered in the context of older adult current drinkers, as those who abstained in the past year were excluded from the sample. As a result, the sample likely has a lower proportion of unhealthy older adults than studies including abstainers, as many older adults appear to stop drinking due to ill health (Pringle et al., 2006; Satre & Arean, 2005), and abstainers have been found to be in worse health than current drinkers (Dawson, 2000). Yet while this sample may be healthier than one including abstainers, by removing them from the sample, findings are better able to untangle the relationship between health and alcohol among those who drink.

Practice and Policy Implications

The individual and societal costs of problematic drinking by older adults are dramatic. In 1989, Medicare paid over 200 million dollars in claims primarily related to alcohol abuse, and

alcohol-related hospitalization for those over age 65 occur at the same rate as those for heart attacks (Adams & Kopstein, 1993). In light of the aging population and predicted increase in drinking in older age (Groerer, MA, Pemberton, & Folsom, 2002), it is imperative that behavioral health and health care providers working with older adults are knowledgeable about specific risks of drinking for different groups of older adults. In addition, recent evidence also suggests that the majority of drinking older adults may also be taking an alcohol-interactive prescription medication (Price Wolf, 2012; Smith, 2009), potentially compounding the negative health effects of drinking in older age.

Older men, who were more likely to drink at both levels and across all gender groups than older women, may be particularly in need of clinical assistance. As a recent longitudinal study suggests that older men may be uniquely vulnerable to alcohol-related health problems (Chartier, 2007), they may have more need of prevention and intervention efforts. Mexican American older men may also be in particular need of clinical attention. Although brief Screening, Behavioral Intervention and Referral to Treatment interventions have been found to be effective in primary care environments (Moyer, Finney, Swearingen, & Vergun, 2002), there have been few examinations of these interventions among older adults and older adults of color (Moore et al., 2011). In addition, older adults of color may be less likely to have a routine source of care, even though the vast majority of older adults are medically insured (Chen & Escarce, 2004). Heavy drinking older adults of color could consequently be less likely to be identified in primary care environments than acute care environments, potentially after alcohol-related health problems or injury have already occurred. As hypothesized in cumulative inequality theory, structural barriers present throughout the lifecourse may therefore impact timely receipt of intervention in drinking problems in older age.

Interventions should also pay attention to cultural differences among older adults, particularly for older adults of color. Mexican Americans (Gomberg, 2003) and Blacks (Herd & Grube, 1996) tend to be more religious than Whites and consequently may be inclined to view alcohol abuse as a sin versus a disease. Behavioral health and health providers should also try to include family members in intervention efforts, as older adults of color may also be more dependent on family systems for support (Kail & DeLaRosa, 1998; Sarkisian & Gerstel, 2004). Finally, substance abuse treatment involving confrontation may be uncomfortable for Mexican Americans, who value harmony (Kail & DeLaRosa, 1998).

Some older adults, particularly Mexican Americans and Black older men, may be using alcohol to self-medicate against health problems (Immonen et al., 2010). Very little is known, however, about drinking expectancies in older age across and between racial/ethnic and gender categories. It seems clear that behavioral health and health care providers working with Mexican American and Black male older adults in poor health should conduct on-going screenings for alcohol consumption. At the same time, providers should pay particular attention to drinking behaviors in White and Black women in good health, in order to help maintain wellness and prevent alcohol-related health consequences.

Conclusion

Health appears to play a significant role in drinking in older age. While health did not partially explain racial/ethnic and gender-based differences in risk for problematic drinking in older age, its effect varies substantially by and within racial/ethnic groups and gender. Combining all older adults and not examining within race/ethnicity gender-based differences may confound many health-related findings in the literature on drinking in older age. It is important to account for racial/ethnic and gender-based variation in models examining drinking

in older age in order to accurately understand variable relationships in an increasingly aging and diverse US population.

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Figure 1. Hypothesized moderated mediation model of race/ethnicity, health, gender, and at-risk/heavy episodic drinking in older age
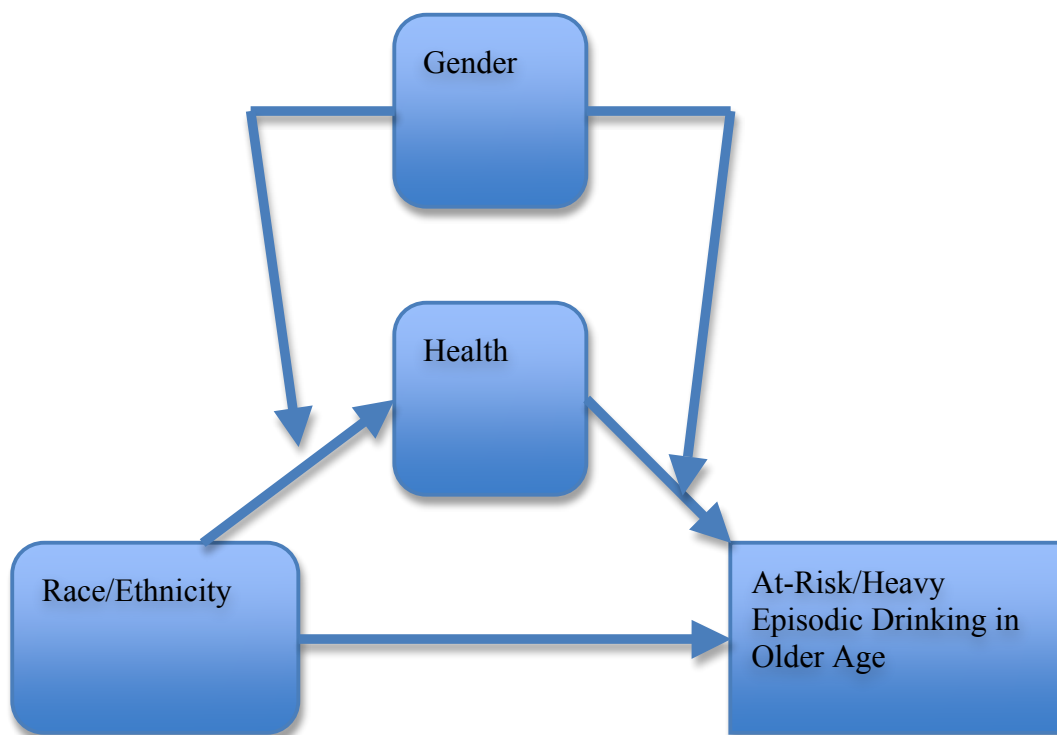
Figure 2. Hypothesized moderation model of health, race/racial/ethnicity, gender, and at-risk/heavy episodic drinking in older age
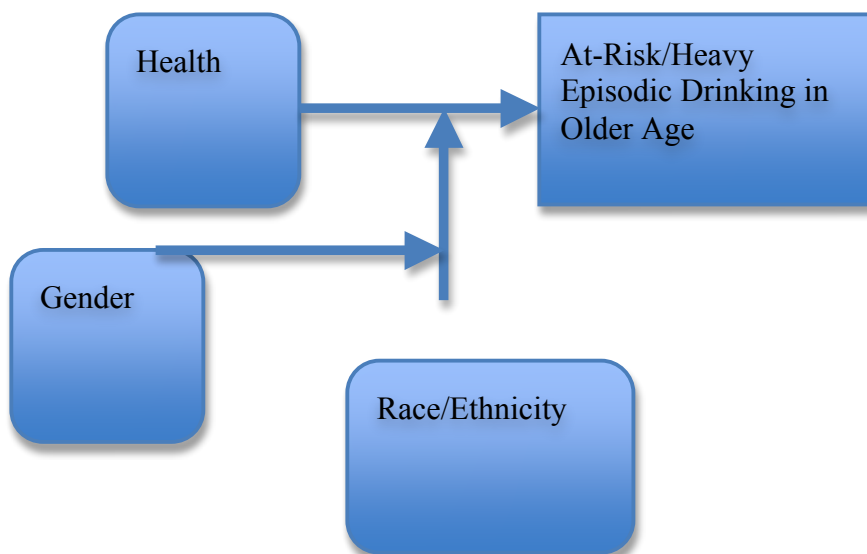
Figure 3. Mean predicted probability of at-risk drinking by race/ethnicity and self-reported health and gender
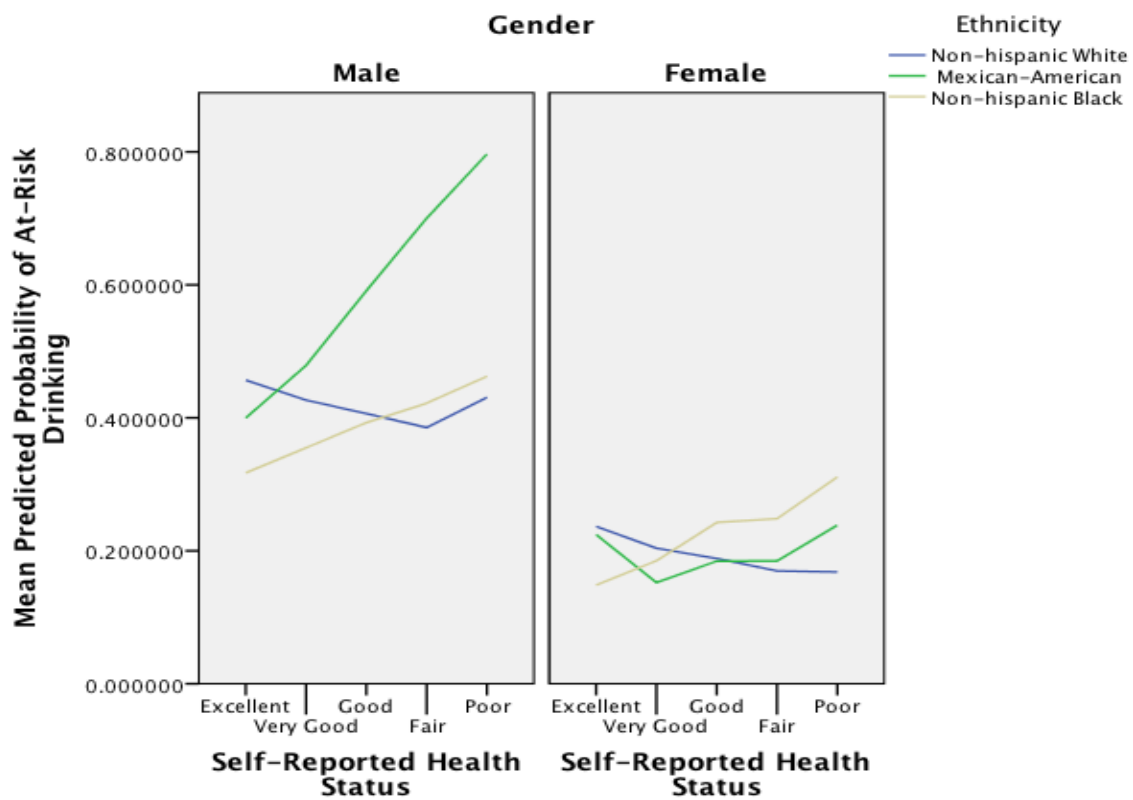
Figure 4. Mean predicted probability of heavy episodic drinking by race/ethnicity, self-reported health, and gender
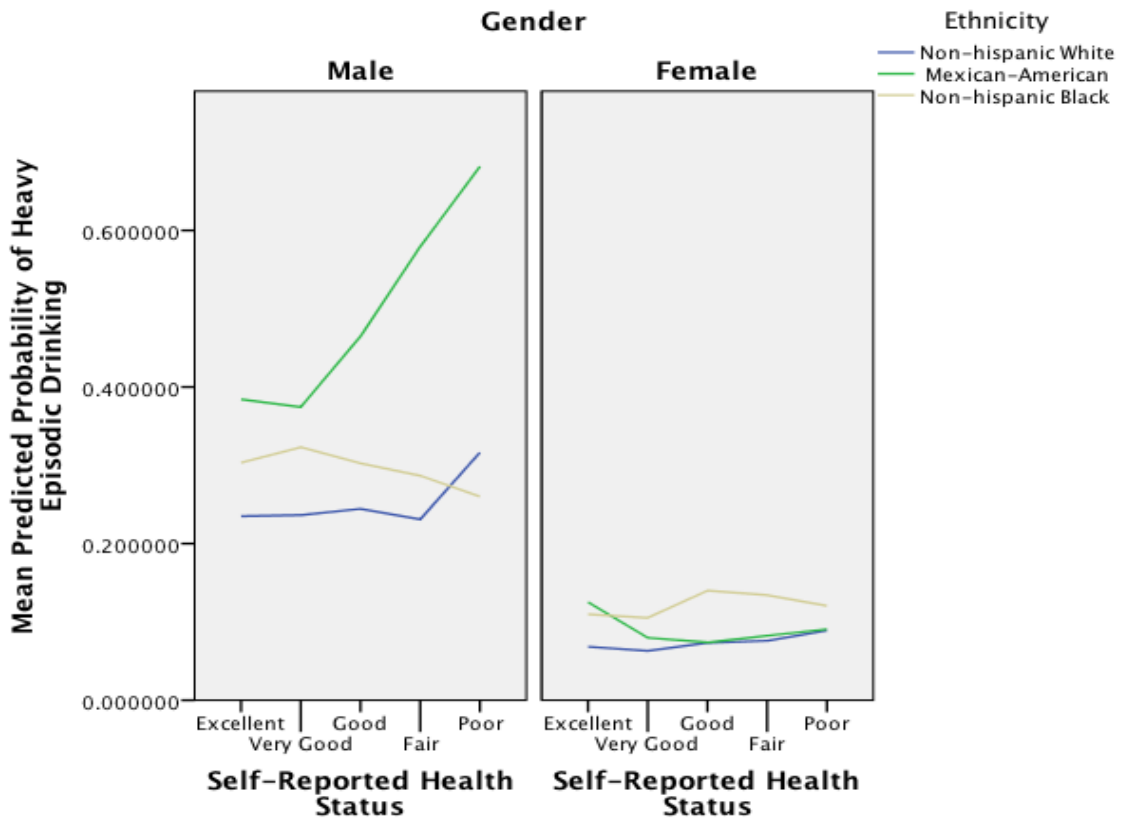
Table 1. Sample characteristics of current drinkers by gender and race/ethnicity, aged 60 or older (n=2,348)

	Men			Women		
	White	Mexican American	Black	White	Mexican American	Black
Education (%)***						
Less than High School	13.6	60.5	33	12.8	51.4	29.5
High School	24.6	13.9	26.4	27.5	20.8	22.8
Grad/GED	25	12.9	25.4	30.9	22.2	32.8
Some College/AA	36.8	12.8	15.1	28.7	5.5	14.8
College Grad+						
Income (%)***						
Under $20,000	9.9	26.5	19.9	12.6	37.9	34.8
$20,000-54,999	42.1	44	46.1	48.3	41.6	36.1
$55,000 plus	48	29.5	33.9	39	20.6	29.1
Marital Status (%)***						
Married	79.6	72.3	62.5	58.1	44.3	37.1
Widowed	6.7	8.6	12.7	25.3	26.9	26.7
Divorced/Never Married	13.7	19.1	24.8	16.6	28.7	36.2
Age (%)***						
60-64	31.5	41.7	38.9	31.1	48.4	44.3
65-69	24.8	27.5	26.4	23.9	20.5	23.1
70-79	31	25.8	27.6	30.4	24.8	23
80+	12.7	5	7.1	14.7	6.4	9.5
Health Status (%)***						
Excellent	14.2	8.9	6	13.1	2.1	5.6
Very Good	34.9	16.8	19	40.9	16.7	20.7
Good	36	32.4	38.4	33.8	39.6	38.3
Fair	12.2	34.8	27.7	10.5	34.8	32.9
Poor	2.6	7	8.9	1.8	6.8	2.5
At-Risk Drinking (%) (***men only)	41.7	38.1	60.8	20.4	17.4	22.9
High-Risk Drinking (%) (*** men only)	25.7	50.5	28.9	7.6	8.5	14.6
Depression (mean)***	1.81	2.12	1.95	2.32	3.54	3.15

***p<.001

Table 2. Odds of at-risk and heavy episodic drinking for older adult drinkers (n=2,348)

	At-Risk Drinking (95% CI)	Heavy Episodic Drinking (95% CI)
Gender (Female)		
Male	2.89*** (2.32-3.6)	6.106*** (4.519-8.251)
Race/ethnicity (White)		
Mexican American	1.24 (.93-1.67)	1.18 (.80-1.73)
Black	.87 (.61-1.24)	.83 (.54-1.30)
Education (College Grad+)		
Less than High School	1.28 (.88-1.84)	1.86 †(1.09-2.69)
High School Grad/GED	.97 (.68-1.38)	1.41 (.88-2.25)
Some College/AA	.96 (.69-1.33)	1.36 (.92-1.99)
Income ($20,000-54,999)		
Under $20,000	1.73** (1.28-2.34)	1.27 (.87-1.85)
$55,000 plus	1.03 (.80-1.32)	1.01 (.70-1.46)
Marital Status (Married)		
Widowed	.64* (.45-.91)	.96 (.55-1.66)
Divorced/Never Married	1.08 (.78-1.5)	1.20 (.87-1.66)
Age (80+)		
60-64	1.47**(.96-2.25)	12.009*** (6.95-20.75)
65-69	1.09 (.71-1.68)	4.83*** (2.71-8.62)
70-79	.88 (.56-1.3)	2.94*** (1.71-5.04)
Health Status	.90 (.78-1.03)	.97 (.81-1.16)
Depression	1.01 (98-1.05)	1.02 (.97-1.08)

†p<.10,*p<.05,**p<.01,***p<.001

Table 3. Mediation analysis of at-risk and heavy episodic drinking by race/ethnicity and health (mediator)

	At-risk Drinking			Heavy Episodic Drinking		
	Estimate	SE	p-value	Estimate	SE	p-value
Mexican American						
Direct Effect	.068	.035	.055†	0.018	.025	.470
Specific Indirect Effect	-.010	.007	.161	-.001	.004	.880
Black						
Direct Effect	-.021	.039	.586	-.020	.023	.384
Specific Indirect Effect	-.010	.007	.155	-.001	.004	.880
Total Indirect Effect	-.010	.007	.161	-.001	.004	.880
WRMR	5.361					

Note. Models control for age, gender, marital status, education, depression, and income.
†$p<.10$, *$p<.05$,** $p < .01$

Table 4. Mediation analysis of at-risk drinking by race/ethnicity and gender with health as mediator

	Men			Women		
	Estimate	SE	p-value	Estimate	SE	p-value
Mexican American						
Direct Effect	.144	.050	.004**	-.038	.046	.402
Specific Indirect Effect	-.011	.009	.199	-.007	.011	.483
Black						
Direct Effect	-.063	.051	.216	.035	.045	.437
Specific Indirect Effect	-.012	.009	.178	-.006	.009	.480
Total Indirect Effect	-.011	.009	.199	-.007	.011	.483
WRMR	5.571					

Note. Models control for age, marital status, education, depression, and income.
†p<.10, *p<.05,** p < .01

Table 5. Mediation analysis of heavy episodic drinking by race/ethnicity and gender with health as mediator

	Men			Women		
	Estimate	SE	p-value	Estimate	SE	p-value
Mexican American						
Direct Effect	.115	.054	.032*	-.034	.018	.055†
Spec. Indirect Effect	-.001	.007	.855	-.001	.004	.892
Black						
Direct Effect	-.045	.035	.201	.004	.024	.885
Spec. Indirect Effect	-.001	.007	.853	.000	.003	.893
Total Indirect Effect	-.001	.007	.853	-.007	.011	.483
WRMR	5.571					

Note. Models control for age, gender, marital status, education, depression, and income.
†p<.10, *p<.05,** p < .01

Table 6. Interaction effects of health, gender, and race/ethnicity on at-risk and heavy episodic drinking among older adult drinkers

	At-Risk Drinking Wald F	Heavy Episodic Drinking Wald F
Gender*Health	1.315	.091
Race/Ethnicity*Health	2.657† (p=.081)	.199
Gender*Health*Race/Ethnicity	3.932*	6.594**

†p<.10,*p<.05,**p<.01,***p<.001

Chapter 5: Discussion

Drinking in older age is a not a uniform behavior, instead there is considerable variation in factors that increase risk. Using three nationally representative analyses, this research focuses on racial/ethnic and gender differences in drinking and drinking behaviors in older age. The first analysis presents the only known national prevalence of drinking, at-risk drinking, and heavy episodic drinking while using an alcohol-interactive prescription drug (AIPD). Drinking while using an AIPD in older age appears to be surprisingly common, with unique risk factors for older women and older people of color. The findings of the second paper indicate that gender and social support are key modifiers in the relationships between depressive symptoms or impairment from depressive symptoms and heavy episodic drinking in older age, suggesting that research that does not examine gender moderation may obscure important distinctions. The third paper formally tests moderated mediation and moderation mechanisms as potential explanations for racial/ethnic differences in risk of heavy drinking in older age. These findings reveal significant racial/ethnic and gender-based variations in how health relates to at-risk and heavy episodic drinking in older age, with some populations particularly vulnerable to negative effects. Taken together, these findings make a strong case for specifically examining the roles of race/ethnicity and gender in any examination of drinking in older age and suggest many important avenues for future research and social work practice and policy.

Summary of Findings

This study examined five research questions, each with related hypotheses based upon existing literature and the guiding conceptual framework. Several of the study hypotheses were not supported by the data, which is not entirely unsurprising, given the dearth of research and inconsistency in the literature. The patterns revealed suggest that the findings of studies of drinking in older age that do not explicitly pay attention to racial/ethnic and gender variation may be missing crucial distinctions highly relevant to social work practice and policy.

Paper 1: Drinking and alcohol-interactive prescription drug use by older adults: Gender and racial/ethnic differences. This paper examined the population, gender-specific, and racial/ethnic-specific risk factors for any drinking, at-risk drinking, and heavy episodic drinking while using an alcohol-interactive prescription drug (AIPD). The findings represent the first known nationally representative prevalence of this drinking behavior among older adults and at several different drinking levels. The results confirm that drinking while using an AIPD is a significant problem behavior among older adults in the U.S. Indeed, they indicate that all research examining drinking in older age is implicitly examining drinking while using an AIPD, as a significant majority of the sample (approximately 73%) were chronic AIPD users. The stakes for drinking in older adulthood consequently may be even higher than previously supposed.

Due to findings in the literature suggesting significant differences in drinking behaviors between older women, older men, and older people of color, it was hypothesized that risk of drinking while using an alcohol-interactive drug would vary by gender and race/ethnicity, as well as by the level of drinking examined. This hypothesis was partially supported, as there appear to be several groups that are uniquely at risk of drinking while using an AIPD. Older men were more likely to drink while using an AIPD at all drinking levels and among all racial/ethnic groups. In addition, Whites were more likely to drink any alcohol while using an AIPD, and Mexican American older men and Black older women were more likely to engage in heavy episodic drinking while using an AIPD. There were no racial/ethnic differences at the at-risk

drinking level. This may be because multiple indicators of socioeconomic status (education and income) were controlled for in the analysis, both of which are correlated with race/ethnicity and effect drinking in older age (Blazer & Wu, 2009; Merrick et al., 2008b; Moos, Brennan, Schutte, & Moos, 2010).

As hypothesized, there were also gender and racial/ethnic-based variations in how model predictors related to drinking while using an AIPD in older age. Education appeared to better predict heavy episodic drinking while using an AIPD for older men, while there was limited evidence that income may be a better predictor for older women. Studies examining drinking in older age should consequently include multiple indicators of socioeconomic status, as cohort-specific factors influence how to best assess relative advantage.

It also appeared that social support may be more influential for older men for any drinking while using an AIPD and for older women at the heavy episodic drinking while using an AIPD level. This suggests that older women who engage in heavy episodic drinking while using an AIPD are at risk of enhanced negative consequences and are much more likely to lack social support. As the paper's other findings suggest that social support is significant for Whites only, it could be that there are also racial/ethnic-based differences in the relationship between social support and drinking while using an AIPD. Unfortunately, within-race/ethnicity gender differences could not be examined, as changes in the NHANES questionnaire did not allow for increasing the sample size of this analysis by including another survey wave.

In addition to social support, limited ability to attend social events outside of the home predicted drinking while using an AIPD for some older adults, but not others. Blacks (and potentially Black older women in particular) are at higher risk of at-risk drinking and heavy episodic drinking when they are somewhat limited in their ability to attend social events outside of their home. While White older adults are more likely to receive emotional support from family (Sarkisian & Gerstel, 2004), many Blacks receive support from faith-based organizations (Dilworth-Anderson, Williams, & Gibson, 2002). Limited mobility may consequently impact Blacks' receipt of the positive benefits of social interaction and influence more than for Whites. Future research should focus on how intersecting identities of racial/ethnic and gender relate to drinking while using an AIPD, including more sophisticated and precise measures of the social contexts of drinking.

Paper 2: Depressive symptoms and heavy episodic drinking in older adults: Do gender or social support matter? This analysis investigated whether depressive symptoms or perceived impairment from depressive symptoms are related to heavy episodic drinking, and whether these relationships differ by gender. Although the literature is unclear and limited, it was hypothesized that having more depressive symptoms or perceived impairment from depressive symptoms would increase odds of heavy episodic drinking in older age, and that these effects would be stronger for older men than older women. While both of these hypotheses were not supported by the data, the findings are important for understanding depression in older age and have significant implications.

There were no significant main effects for depressive symptoms variables, although the effect for perceived impairment from depressive symptoms on heavy episodic drinking in older age approached significance. However, this appears to be because of noteworthy gender modification in this relationship. Overall, older women with more depressive symptoms had higher risk of heavy episodic drinking, while older men with more depressive symptoms had lower risk. Although there are some variations in this pattern, the emerging picture suggests that depressed older women are in particular need of screening and intervention for alcohol problems.

It was also hypothesized that social support would buffer against the negative effects of depressive symptoms and perceived impairment from depressive symptoms on heavy episodic drinking, and that this relationship would vary by gender. Specifically, it was postulated that older adults with more depressive symptoms and high social support would be less likely to engage in heavy episodic drinking than older adults with more depressive symptoms and low social support, particularly for older men. This hypothesis was only partially supported. Although there was significant moderation in this relationship, social support appeared to buffer against impairment from depressive symptoms for older women, but not for older men, whose risk of heavy episodic drinking when impaired by depressive symptoms decreased at a steeper rate among those with low social support in comparison to those with high social support. Consequently, in contrast to the hypotheses, social support may be more beneficial for older women than older men. Social support appears to dramatically reduce the predicted probability of heavy episodic drinking among older women who are impaired by their depressive symptoms, suggesting that interventions targeting social relationships could be highly effective.

Although these results show strong gender variation in this relationship, the results from Paper 1 suggest that they may disguise potential racial/ethnic differences in the importance of social support. Specifically, it could be that the presence of social support may be more influential for White women. Due to the limited years when the depression and social support measures were administered in the same survey, the sample size could not be increased in order to investigate racial/ethnic-based differences in these relationships. Certainly the striking effect of gender in this analysis demonstrates that examinations of depression, social support, and drinking in older age that do not take gender into account are highly questionable.

Paper 3: Race/ethnicity, gender, and drinking in older age: The mediation and moderation effects of health. The final paper examined whether the relationship between race/ethnicity and at-risk or heavy episodic drinking in older age is partially mediated by health and moderated by gender. It was hypothesized that poorer health would partially mediate the relationship between Mexican American and Black race/ethnicity and lower risk of at-risk drinking in older adults. Additionally, it was postulated that this effect would invert at the heavy episodic drinking level, with poorer health increasing risk of heavy episodic drinking, and that both mediation effects would be stronger for older women.

Study findings did not support a moderated mediation effect, which was non-significant. Racial/ethnic based variation in risk for drinking in older age does not appear to be attributable to differences in health status. Thus the findings that Mexican American men and Black women are at higher risk of heavy episodic drinking while using an AIPD are likely due to other factors specific to these populations. Instead of accepting racial/ethnic disparities in drinking rates in older adulthood, researchers should focus explicitly on understanding why these disparities occur. Future research should examine other potential mediators to explain these disparities, such as socioeconomic status, stress, or mental health problems.

The relationship between health and at-risk or heavy episodic drinking in older age was moderated by race/ethnicity and gender, although not as hypothesized. It was hypothesized that older Mexican Americans, older Blacks, and older women in poor health would be less likely to drink at-risk and engage in heavy episodic drinking than older White men in poor health. In contrast, poorer health related to higher odds of at-risk drinking for older Mexican American men and older Black men and women. Poorer health also led to higher odds of heavy episodic drinking for older Mexican American men (and potentially White men). This significant variation in the relationship between health and drinking in older age has not been revealed in

previous studies, which have seldom examined racial/ethnic and gender based moderation. The findings suggest that Mexican American men and Blacks in poor health should be screened for alcohol abuse and may be at enhanced risk of negative health effects.

Overall Implications

There appears to be significant overlap and intersection between racial/ethnic and gender groups in risk of drinking in older age. This study's findings suggest that inconsistencies in the literature investigating drinking in older age are not just due to lack of research, but also to lack of focus on these important variations. It is crucial that future studies of drinking and drinking related behaviors in older age take an intersectionality approach. Additionally, it is important to consider the role of AIPD use in older age drinking, as it is highly prevalent and has the potential to compound negative outcomes.

Several study results lend support for a cumulative inequality framework in investigations of drinking in older age. There were a number of disparities in drinking behaviors with older adults of color. Specifically, Mexican American men and Black women had higher odds of drinking at the most potentially problematic level and were in worse health than Whites. The combination of poor health and heavy drinking for these populations may be particularly harmful. Although education and income were controlled for in the analyses, cumulative inequality theory and the idea of "weathering" argue that disparities are not only the result of low socioeconomic status, but also institutionalized racism and the cumulative effects of disadvantage over the life course. Although differences in health status did not explain differing risk for drinking in older age, socioeconomic status (both education and income), beliefs about the medicinal properties of high doses of alcohol (which could be related to worse quality of care or lack of health education), and other potential processes should be examined to help uncover underlying mechanisms.

Modification by individual, family, and social contexts may also play a role in drinking in older adults. Specially, social support is important in determining risk of drinking behaviors in older age, although it's importance may differ by gender and race/ethnicity. Unfortunately, outside of social support, very little is known about how social relationships and contexts relate to drinking in older age. Although the lack of variables examining these phenomena in the NHANES limited ability to investigate social contexts, it appears that the ability to attend social activities may be particularly important for some groups of older adults, particularly Blacks. More research is needed to understand whether Blacks with limited ability to attend social events are drinking out of loneliness or boredom, or because they do not have exposure to influences or individuals promoting abstinence.

Unfortunately this study was not able to examine how the larger environment impacts drinking in older adults, about which very little is known. Merrick et al. (2008a) found no differences in risk of heavy drinking in older age between those living in a metropolitan or rural area. This variable was very general, however, and did not capture any elements of the larger social or built environment that have been related to drinking in general populations (Ahern, Galea, Hubbard, Midanik, & Syme, 2008). Consequently, much remains unknown about when, why, and with whom older adults drink.

Overall, this study's findings suggest that several groups of older adults are specifically at risk of drinking in older age, including men, Mexican American men, and Black women. Additionally, while older women have lower risk in general, those who are depressed and have little social support are also particularly at-risk. Finally, Mexican American men and Blacks in poor health appear to be at greater risk of problematic drinking in older age.

Variation in Study Findings

Any study examining alcohol use in older age must account for potential variation among and between race/ethnicities and genders. The importance of this is apparent in this research, as some variation in findings between the papers suggest the need for fully intersectional approaches.

For example, in Paper 1, older men in poor health were less likely to engage in heavy episodic drinking while using an AIPD. The effect for older women was non-significant. This finding is consistent with recent longitudinal evidence suggesting that poor health at baseline predicts linear declines in alcohol consumption among older men but not older women (Brennan, Schutte, Moos, & Moos, 2011). Additionally, it could also indicate that older men do not self-medicate with alcohol, unlike the findings of other literature (Aira, Hartikainen, & Sulkava, 2008; Immonen, Valvanne, & Pitkala, 2010). The finding also suggests that older men may be more likely to be screened for alcohol use than older women due to their higher overall risk of heavy drinking, although evidence suggests that screening for problematic alcohol use in older age is limited (Duru et al., 2010).

Yet while male and female only analyses displayed a difference between the relationship between poor health and heavy drinking, this finding must be considered in light of the findings from Paper 3, which suggest that this relationship is also significantly moderated by race/ethnicity. As a result, researchers and practitioners might not be aware that drinking in older age appears to be a significant issue for Mexican American older men and Black older men and older women.   As one of these analyses examined heavy episodic drinking while using an AIPD and one examined heavy episodic drinking overall, it could be that the findings are not comparable, and that the racial/ethnic-based variation evidenced in Paper 3 would not be present in AIPD using older adults. Thus research that does not investigate how both race/ethnicity and gender moderate risk for drinking in older age should be viewed with caution.

Future Research Directions

Quantitative research. Drinking in older age is a complex social problem with significant variation in patterns of risk. More research that examines this variation through moderation analyses is needed particularly with nationally representative samples. Additionally, more studies should conduct mediation analyses to help uncover potential causal mechanisms determining risk of drinking in older age. As the prevalence of this problem increases, so should our understanding of why prevalence differs among groups, particularly for vulnerable older adults. Thus, studies should include samples that adequately represent older adults of color that are meaningfully differentiated. More research is especially needed for older adults of Asian, Native American, and multi-racial descent, who could not be examined in this study. Researchers should also focus on including a wide variety of predictive variables in models, particularly those that deal with alcohol expectancies, social contexts, and socioeconomic status. Longitudinal research would also be helpful to establish causal directions of findings as well as trajectories of drinking over the life course.

Qualitative research. In addition to enhanced epidemiologic and quantitative research, qualitative studies could potentially improve understanding the mechanisms, processes and meaning of drinking in older age. There are few known studies in this area, and interviews and field observations with older adults in a variety of setting are needed to develop grounded theoretical explanations of alcohol use and abuse in older adults. Focus groups might also be of benefit to identifying potential themes and concepts for future study.

Research directions in non-community samples. More research is also needed on older adults who do not live in the community and consequently are not represented by most national studies. Where an older adult lives can determine their access to alcohol as well as factors associated with mental and physical health that have been shown to relate to problem drinking. For example, many older adults live in assisted living facilities and skilled nursing facilities (Klein & Jess, 2002). A study of a veteran nursing home found that 36 percent of those whose charts were reviewed were problem drinkers at some point during their stay (Joseph, Atkinson, & Ganzini, 1995). While this number seems surprising high, the sample was primarily male and White, two characteristics that have been related to increased rates of alcohol abuse (although not always in this study). In addition, the authors describe that instead of limiting or forbidding alcohol intake, some nursing homes may give alcohol to residents to encourage social interaction or increase appetite. A follow-up study of this same sample indicated that many of these problem drinkers who were eventually released to independent living arrangements continued drinking at home, and others only stopped drinking after permanent institutionalization (Joseph, Rasmussen, Ganzini, & Atkinson, 1997).

Limited research indicates that there is wide divergence in alcohol policies at institutions housing older adults (Klein & Jess, 2002). Some require alcohol to be distributed like a medication, while others organize regular cocktail hours for residents. For those who are having difficulty adjusting to a transition into an institution, alcohol could serve as a coping agent. Nursing homes, especially those that fail to regulate the alcohol consumption of their clients, could potentially house significant rates of problem drinking and should be further studied to uncover the extent of this problem.

Prisons could also harbor high proportions of older adults with former or current alcohol abuse problems. An increasing number of inmates are over the age of 55; approximately 71 percent of whom may have an alcohol abuse or other substance abuse problem (Arndt, Turvey, & Flaum, 2002). Although the opportunity to drink or use substances illegally is likely more limited during imprisonment than in the general community, older adults could resume use unabated after release, especially if treatment is not offered during incarceration. Incarceration could provide an opportunity for interventions targeting older adults with alcohol abuse problems, and future research should examine trends of substance use before, during, and after imprisonment in this population.

Non-community-dwelling older adults could consequently be at risk of drinking in older age and related consequences. More research is needed to examine these settings, especially as they offer potentially fruitful options for group-based treatment and intervention.

Practice Implications

Although in recent years there has been increased research attention paid to drinking in older age, there is limited evidence of a similar emphasis within behavioral health or health practice realms. Part of this could relate to problems in diagnosing, recognizing and treatment alcohol abuse issues in older age. These implications might be particularly striking for older adults of color, although little is known about how cultural or race/ethnicity impact treatment receipt or success.

Problems recognizing alcohol problems in older adults. Until fairly recently, diagnostic manuals argued that alcohol use and related problems are exceedingly uncommon, in contrast to established evidence (Atkinson, 1990). This belief, which many providers may have been taught early in their careers, could lead to ineffective screening for alcohol abuse or related problems among older adults. Older adults in general are less often referred to substance abuse

consultations in hospitals than younger adults, even when admitted for trauma related to substance abuse (Weintraub et al., 2002). One study found that of the 21 percent of those 60 years of age or older who newly entered a hospital program and screened positive for alcohol dependence, only one-third were identified by their physicians as having alcohol-related problems (Curtis, Geller, Stokes, Levine, & Moore, 1989). Females, Whites, and those with higher education were less likely to be identified. Although this study did not find that Whites have higher risk of at-risk drinking in older age, others have (Breslow, Faden, & Smothers, 2003; Satre & Arean, 2005; Zimmerman, McDougall, & Becker, 2004), indicating that this population may need more screening instead of less. Other studies have also found that older women are less likely to be screened for substance use by regular health care providers (Blow & Barry, 2002; Brennan, Kagay, Geppert, & Moos, 2001). Although older women are less likely than older men to drink in older age, depressed older women, particularly those with little social support, appear to be at increased risk and should also be assessed.

This under-recognition may be the result of lack of training for providers. Few social workers are given trainings on working with older adults with alcohol problems, including those who report encountering older adults with these issues in their clinical practice (Schonfeld et al., 1993). Care providers may also minimize substance abuse in older patients, believing that older adults should be allowed to choose if they want to abuse alcohol (Klein & Jess, 2002). This attitude and a resulting lack of intervention with alcohol abusing older adults could shorten lifespans, however. Stopping drinking can have a positive effect on mortality risk, even if alcohol use has been chronic (Moos, Brennan, & Mertens, 1994).

In addition to under-recognition among providers, older alcohol abusers may be more likely to deny problems than younger abusers, as they might perceive more social stigma in chemical dependency (Solomon & Stark, 1993). Social stigma could also disproportionally affect older women (Ridlon, 1988), and older women of color (Aira et al., 2008; Herd & Grube, 1996). Mexican Americans may also view alcohol abuse as a sin (Gomberg, 2003), thus increasing reluctance to discuss alcohol related problems with practitioners. This is particularly worrisome given the higher risk of problematic drinking for Mexican American men in this study. More training, particularly training that emphasizes culturally appropriate practice, is needed for the range of providers working with older adults.

Problems in diagnosing alcohol problems in older age. Even enhanced training, however, will be inadequate without improvements in instruments and diagnostic tools assessing problematic alcohol use in older age. The Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV-TR) is the current standard for diagnostic appraisal in the U.S. and includes a diagnostic rubric that differentiates between alcohol dependence and alcohol abuse (American Psychiatric Association, 2000). Although utilized by most mental health professionals, hospitals, and insurance companies, DSM-IV-TR criteria may be inappropriate for use with elderly populations. As a result, many standard screening instruments used by research studies and clinical professionals might also be ineffective at capturing alcohol abuse problems in older adults.

Review of diagnostic criteria. The DSM-IV-TR suggests that alcohol dependence should be diagnosed when three or more of the following circumstances are met: (1) increased tolerance for alcohol; (2) symptoms of withdrawal from alcohol; (3) increases in quantity and frequency of drinking; (4) the individual wants to reduce or abstain from drinking, or has unsuccessfully tried to stop drinking; (5) significant amounts of time are spent to get alcohol, drink alcohol, use alcohol, or recover from use; (6) impairment in work, social, or other activities

usually pursued by the individual; (7) and finally, that drinking persists even when the individual is aware of adverse health or mental health consequences (American Psychiatric Association, 2000). As some researchers have suggested, however, there is indication that these criteria may have limited relevance for older adults (Graham, 1986). For example, older adults may have decreased alcohol tolerance due to the physiological processes of aging, and would consequently not demonstrate increased tolerance (criteria 1) (Patterson & Jeste, 1999). The second and third criteria might also be problematic for diagnosing older adults (Beullens & Aertgeerts, 2004). Symptoms of alcohol withdrawal may be masked or distorted by health problems and/or the use of prescription medications, while older adults experience alcohol's effects at lower doses and for potentially longer time frames (Morton, Jones, & Manganaro, 1996). These factors suggest that quantity and frequency criteria might need to be altered in order to fairly assess alcohol-using older adults. Other criteria that may also be unsuitable are those that investigate occupational and social impairment as a result of alcohol use. Because older adults may be retired or have less social interactions, these factors may be less meaningful for diagnosing dependence (Stall, 1987). Overall, four of the seven criteria for alcohol dependence in the DSM-IV-TR could be unsuitable for older populations. As the fulfillment of at least three of these criteria is required for a diagnosis, it appears that many older adults could fail to obtain a dependence diagnosis, even if they are using alcohol in a way that adversely impacts their health and quality of life.

For similar reasons, older adults may also fail to receive a diagnosis of alcohol abuse relative to the rest of the population. The criteria for alcohol abuse include: (1) using alcohol despite significant impairment in social, work, or family-related tasks; (2) drinking in situations where it is physically unsafe to do so; (3) drinking despite legal consequences; (4) and continuing to drink in the presence of problems in personal relationships (American Psychiatric Association, 2000). As in the case of alcohol dependence, several of these criteria, especially those involving social or occupational problems, could be less relevant for older adults. For example, social consequences of alcohol abuse impacting personal relationships may not be as applicable for older adults, who might have fewer social outlets and resources (Stall, 1987). In addition, older adults may be less able to self-assess cognitive deficits than younger populations, and unable to evaluate whether alcohol has led to significant impairment in work or other tasks (Brandt & Provost, 1985). However, only one of these criteria is required for diagnosing alcohol abuse, and as it may be physically risky for older adults to drink more than two drinks a day, alcohol abuse is easier to diagnose in this population (NIAAA, 1995). This assumes, however, that those screening older adults for alcohol abuse and dependence are aware of the lower recommended guidelines for those over 65, which may be not be the case due to the lack of training in this area (Schonfeld, Rohrer, Zima, & Speigel, 1993).

The possibility that the DSM-IV-TR guidelines for diagnosing alcohol dependence in older adults may be inappropriate suggests a need for further research in this area. If older adults are not meeting these criteria, is it because they are not actually alcohol dependent? Should a new set of criteria, which takes into account the special circumstances of older adults, be constructed? The potential severity of alcohol-related health problems and prevalence of AIPD use, however, suggests that older adults who use alcohol, even at small amounts, may be at particular risk. These older adults may not be eligible for chemical dependency services, however, as insurers typically require a diagnosis before approving treatment (Sasso & Lyons, 2002). Consequently, many older adults may be in a precarious position without access to appropriate care.

Some of these problems could be improved with the release of the DSM-V, expected in the spring of 2013. Although in the DSM-IV-TR older adults may be more likely to be diagnosed as alcohol abusers than alcohol dependent, this category was considered unreliable for the general population (Hasin & Beseler, 2009). Consequently, the proposed DSM-V will include only one alcohol-related diagnosis, "Alcohol Use Disorder" (APA, 2012). In order to be diagnosed with Alcohol Use Disorder, individuals will need to have the following:

A. A problematic pattern of alcohol use leading to clinically significant impairment or distress.

B. Two (or more) of the following occurring within a 12-month period:

1. Alcohol is often taken in larger amounts or over a longer period than was intended

2. There is a persistent desire or unsuccessful effort to cut down or control alcohol use

3. A great deal of time is spent in activities necessary to obtain alcohol, use the substance, or recover from its effects

4. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to alcohol use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)

5. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance

6. Important social, occupational, or recreational activities are given up or reduced because of alcohol use

7. Recurrent alcohol use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use

8. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance

9. Tolerance, as defined by either or both of the following:

a. A need for markedly increased amounts of alcohol to achieve intoxication or desired effect

b. Markedly diminished effect with continued use of the same amount of the substance

10. Withdrawal, as manifested by either of the following:

a. The characteristic withdrawal syndrome for alcohol (refer to Criteria A and B of the criteria set for Withdrawal)

b. The same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms

11. Craving or a strong desire or urge to use alcohol (APA, 2012)

There are several similarities between the proposed criteria and those in the DSM-IV-TR. Criteria 9, "Tolerance" and criteria 10, "Withdrawal" could still be problematic for assessment with older populations, as could those focusing on role fulfillment. Consequently, it is unknown whether adaptation of these proposed criteria will improve diagnostic validity in older adults or even if these precise criteria will be adapted. Future exploration of diagnostic criteria in older adults should all focus older people of color and older women in order to capture potential differences in alcohol-related problems.

Review of screening instruments for alcohol problems in older age. Problems with diagnostic tools are often related to problems with screening instruments. There are a variety of screening instruments used by both researchers and clinical professionals to assess alcohol abuse and dependence (Beullens & Aertgeerts, 2004). These include short instruments designed to be used with many populations, such as the CAGE (Ewing, 1984), as well as some particularly created for use with older adults, such as the MAST geriatric instrument (Blow et al., 1992). Both of these screeners are designed to detect any alcohol-related disorder in the respondent's lifetime, and not just current problems (Morton et al., 1996). Consequently, if the "aging-out" of alcohol abuse problems seen in earlier cohorts is also true for today's older adults, these instruments may screen positive for individuals who used alcohol problematically in the past but have cut down or abstained from use in older age. Despite this concern, in the last ten years several researchers have investigated the appropriateness of these tools in older adult populations and a variety of clinical settings. In a hospital-based study of randomly selected older adults, Luttrell et al. (1997) found that both the MAST-G and CAGE screeners were insensitive for their sample. This finding is in contrast to several others, however, that have found both of these instruments to be relatively appropriate for older adults (Joseph, Ganzini, & Atkinson, 1995; Morton et al., 1996). These studies had intermediate ranges for sensitivity and specificity: the MAST-G had a sensitivity ranging from 70-93 percent and specificity ranging from 65-81 percent, while the CAGE had a sensitivity ranging from 63-82 percent and specificity ranging from 82-90 percent. A literature review focusing on screening instruments for older adults found that both instruments could be used with older adults, although some minimal alterations should be made (Beullens & Aertgeerts, 2004). Another study found that the MAST instrument, which is similar to the MAST-G but not specifically geared towards older adults, is also sensitive and specific in detecting substance use disorders in older Brazilian men (Hirata, Almeida, Funari, & Klein, 2001). The authors of this study recommended using this instrument in conjunction with another tool that measures current alcohol use. In most cases, these instruments were validated according to the DSM's alcohol dependence criteria (Beullens & Aertgeerts, 2004; Morton et al., 1996). As many of these criteria are of questionable value with older adults, researchers and clinicians who use these screening instruments should do so with caution.

The current literature validating alcohol dependence screening tools for older adults is also hampered by a lack of diversity in study sites. Most of these studies used populations from inpatient hospitals or outpatient clinics (Beullens & Aertgeerts, 2004; Joseph, Ganzini et al., 1995; Luttrell et al., 1997; Morton et al., 1996), that were not representative of the U.S. older population, potentially obscuring important racial/ethnic or gender based differences for adequate assessment. More research is needed on how to best screen for alcohol-related problems in older adults, including studies that explicitly ground instrument development in well-articulated and conceptualized theory. Sensitive and specific instruments should be created and validated with diverse samples of older adults from a variety of settings. These instruments should be applicable to practice settings as well as research interests, allowing for increased synergy between these domains.

Intervention and treatment for alcohol-related problems in older age. There is little consensus over where and how providers should intervene with older adults experiencing alcohol-related problems. Brief screening interventions could be helpful for some older adults, and although research is limited, treatments designed specifically for older adults are promising (Moore et al., 2011). While social workers are placed in diverse settings with vulnerable older adults, there is little research on social work practice with alcohol-abusing older adults. For

many older adults any drinking is potentially dangerous. Universal screening by clinicians (especially when prescribing an AIPD), social workers, and other health and behavioral health providers could help older adults receive needed treatment.

Brief interventions. Screening, Brief Intervention, and Referral to Treatment (SBIRT) interventions in primary care, emergency departments, and social service organizations serving older adults are a possible avenue for future research. SBIRT interventions are relatively quick and effective in a variety of settings and with a variety of populations (Cherpitel, 2007; Moyer & Finney, 2004/2005; Moyer et al., 2002). However, unless SBIRT interventions utilize screening instruments appropriate for older adults, they may under-estimate the problem. To address this problem, a recent randomized controlled intervention trial examined alcohol problems specifically among older adults in primary care (Moore et al., 2011). Older adults were screened for problems using an instrument designed with this population in mind. For example, in addition to quantity/frequency questions and problem assessment, the instrument asked whether older adults were taking a medication that interacts with alcohol. Although it is important that this intervention emphasized the potential role prescription drugs play in enhancing risk, it is unlikely that older adults, particularly those with lower education levels, will be able to accurately self-report whether their medications are alcohol-interactive. After screening, older adults were randomized to receive either an informational pamphlet or a multiple-component intervention including alcohol diaries, consultation with physicians, and follow up telephone interventions. Although the initial results for this intervention were positive, they were more limited at a 12-month follow-up (Moore et al., 2011).

Social work intervention in alcohol-related problems in older age. Although primary care intervention could be beneficial, an exclusive focus on this setting could disproportionally impact older adults of color and those with low socioeconomic status (Chen & Escarce, 2004), who may not have a primary care physician. Social workers who work in community-based organizations serving low-income older adults have unique access to older adults who may be missed by other screening efforts. Unfortunately, few social workers, even those working in gerontology settings, are trained in interventions for substance abuse problems in older adults (Memmott, 2003). Social work programs across the U.S. should prioritize including substance abuse information and training into their curriculum, particularly for older adults. The person-in-environment perspective could be especially beneficial for this population, as social relationships appear to be important in determining risk. Additionally, social work's attention to diversity, social justice, and culturally inclusive practice will be crucial to intervene effectively with older adults of color, who may be particularly at risk. For example, inclusion of the family system in treatment efforts may be especially important for Mexican Americans, who value family solidarity (Kail & DeLaRosa, 1998). Older adults in general and older adults of color in particular may be uncomfortable in confrontational treatment arenas, which are fairly common in chemical dependency treatment (Kail & DeLaRosa, 1998). Social work intervention, with a focus on flexibility and meeting client needs, is uniquely poised to help older adults with alcohol-related problems.

Substance abuse treatment services for older adults. Surprisingly little research has examined the efficacy of substance abuse treatment for older adults, as well as what type of treatment environment might be ideal for this population. A longitudinal study of alcohol abusing older adults found that only 12 percent received any type of treatment, even though the majority of the sample moved in and out of periods of problem drinking over the ten-year period (Schutte et al., 2001). This could indicate that older adults do not easily fit into the chronic and

progressive disease model of alcohol dependence (Jellinek, 1960) that is frequently adopted by treatment programs. However, those who died during the follow-up period were more likely to have worse baseline drinking problems and poorer mental health, indicating that treatment of some kind would likely be beneficial to those with severe problems in order to prevent early mortality (Schutte et al., 2001).

Engaging older adults in treatment may also be uniquely difficult. One study investigated whether older Medicare beneficiaries utilize outpatient mental health services after being diagnosed with substance abuse during an inpatient stay (Brennan et al., 2001). Results found that less than one-half of participants ever received treatment from a formal or community source. Thus, few Medicare recipients are receiving the standard of care for older individuals with substance abuse diagnoses. Older women were less likely to have substance-use problems identified by regular health care providers, but were more likely to receive outpatient mental health care. The authors were unable to specifically identify why Medicare beneficiaries are not attending treatment, hypothesizing that ill health may play a role.   As the findings of this study indicate however, among some groups, particularly White women, those who drink at-risk or engage in heavy episodic drinking are more likely to be in better health, suggesting that different types of older adults may have different barriers to treatment. For example, for some older adults higher co-payments could act as a barrier to treatment (Sasso & Lyons, 2002). This could be especially relevant for older adults with less disposable income. Brennan et al. (2001) also found that those who received outpatient treatment shortly after diagnosis were more likely to be re-hospitalized with alcohol-related conditions, indicating that outpatient treatment may not sufficient for this population.

Older adults could also feel uncomfortable in treatment environments or face stigma when they attend treatment. A study of older males who screened positive for substance abuse and were referred to treatment found that younger and non-married men were more likely to show an interest in attending treatment (Satre, Knight, Dickson-Fuhrmann, & Jarvik, 2003). This could be because younger older men might be more likely to perceive that they will "fit in" at non- age-specific treatment centers than the oldest old. In addition, married men may feel more social stigma about attending substance abuse treatment than non-married men. It is unknown, however, if these same findings would extend to older women; as with many of the studies on this subject, women were not part of the sample. A more recent study comparing substance abusing older male veterans who initiated treatment versus substance abusing older male veterans who did not initiate treatment found that those who initiated treatment were more educated and were more likely to have better mini mental status exam scores (Satre, Knight, Dickson-Fuhrmann, & Jarvik, 2004). As those with more education tend to have higher incomes, this implies that poorer older adults with more cognitive decline may be less likely to receive treatment services. In general, the overall study sample had below normal cognitive scores, raising doubt as to whether traditional group talk therapy and other treatment mainstays will be as beneficial for older adults with cognitive deficits and decline.

Some studies have found impressive 6-month abstinence rates for older adults, especially older women who engaged in non-age-specific treatment (Satre, Mertens, & Weisner, 2004). Other studies have found, however, that some traditional elements of substance abuse treatment may not be as salient for older adults as for other treatment populations (Brennan & Moos, 1996). One of the few studies investigating older adult-specific substance abuse treatment observed that older adults can have problems in non-specific treatment environments, and may not respond positively to confrontational models (Blow et al., 2000). In that study, a little more

than half of the sample was abstinent 6 months post-treatment, with relapses tending to occur more in social contexts. Although far from definitive, the majority of evidence suggests that age-specific treatment may be beneficial for older adults even though access to this type of treatment is limited due to the small number of programs and lack of insurance coverage. Consequently, treatment programs should offer older-adult specific group-based treatment, and train providers in dealing with aging-related issues. In addition, more program and treatment evaluations are needed from a broad spectrum of agencies serving older adults. Focus groups could be useful in investigating why older adults do or do not choose treatment, as well as their thoughts and expectations regarding older adult-specific treatment services.

In summary, there are several practice measures that could help establish more effective treatment mechanisms for older adults. For example, enhanced training efforts for care providers could improve under-recognition and misdiagnosis. Direct practice social work programs would benefit from infusing gerontological issues into the general social work curriculum, as many social workers will work in gerontological, health, or mental health settings where they will encounter older adults abusing substances. Medical and nursing schools might also include information in their curricula to improve detection of alcohol problems among older adults in health care settings. Finally, substance abuse treatment programs should examine how the needs and expectations of older adult clients may differ from those of their general treatment population and develop senior-specific treatment services.

Policy Implications

In addition to improvements in the assessment and treatment realms, larger scale measures are needed. Many older adults may be unaware of lowered federal drinking recommendations for their age group (Masters, 2003). Public information campaigns could help disseminate this information. Because social relationships play a role in risk, campaigns might focus on helping family and friends identify potential alcohol problems in older adults. These campaigns could provide information on the unique physiological issues of older adults that lead to their diminished drinking capacity in comparison to the general population. In addition groups such as the American Medical Association or older adult-focused advocacy agencies could institute reviews of "best practices" for prescribing prescription drugs to older adults in order to draw attention to the need for alcohol-screening when prescribing an alcohol-interactive prescription drug.

Although drinking while using an AIPD in older age is a prevalent concern, rates could decrease in the future, not through prevention and intervention measures, but through decreased use of prescription drugs. The prices of prescriptions commonly used by older adults are rising at approximately double the inflation rate (Schondelmeyer & Purvis, 2012), potentially decreasing use among groups of disadvantaged older adults. However, potential expansions to Medicaid under the Affordable Care Act could help offset this decline.

The increase in integrated health care and electronic health records proposed under the Affordable Care Act could also help alleviate alcohol problems in older adults. Enhanced cooperation between health and behavioral health care environments could improve assessment and treatment efforts (O'Brien, Ingoglia, & Jarvis, 2010). Electronic health records could lead to better monitoring of whether and how alcohol screenings are being conducted, especially when new AIPDs are prescribed. Finally, the requirement that health care plans offer comparable behavioral health treatment could provide more opportunities for older adults to receive treatment for alcohol-related problems (O'Brien et al., 2010; Policy, 2010).

Limitations

This study provides an initial view into a problem about which little is known. As with all research, however, the study has limitations. The NHANES survey is not representative of institutionalized older adults, and these analyses are not representative of Hispanics not of Mexican descent and Asian American, Native American, and multi-racial older adults (NHANES, 2010). The alcohol measures may underestimate drinking in some older adults (Midanik, 1994), and all of the survey questions are vulnerable to self-report bias.

Additionally, as argued by the "weathering concept", by focusing only on older adults, this study could be excluding many vulnerable groups who are more likely to die before reaching older age (Geronimus, 2001). Consequently, racial/ethnic-based comparisons may really be comparing the healthiest disadvantaged older adults with both healthy and unhealthy advantaged older adults (i.e., survival bias), potentially obscuring significant differences (Jeffreys, 1996). All of the analyses are cross-sectional, which limits ability to rule out cohort specific effects (O'Connell, Chin, Cunningham, & Lawlor, 2003). While this study was able to uncover risk factors and differences in risk factors between gender and racial/ethnic groups, it cannot establish causality in these relationships. Although hypotheses were based on theory and current literature, in many cases the actual relationships between variables could be reversed (e.g., heavy drinking causing depression, lack of social support, poorer health, and lower socioeconomic status). In addition, these analyses cannot prove the validity of lifecourse theories such as cumulative inequality theory without longitudinal data.

Conclusion

Older age can provide many benefits. Aging is not simply a process of decline, as older adults are happier, less angry, and less stressed than younger adults (Stone, Schwartz, Broderick & Deaton, 2010). Problematic drinking in older adulthood, however, could negate the positive benefits of aging by decreasing health and well-being. Alcohol use in older adulthood may be even more problematic that previously thought due to the concurrent use of alcohol-interactive prescription medications. Although drinking in older age is potentially harmful for all older adults, risk factors for drinking and drinking related behaviors differ dramatically by race/ethnicity and gender. Research investigating drinking in older adults must account for this variation in order to help improve understanding, strengthen assessment efforts, and optimize treatment opportunities.

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