Late-Life and Life History Predictors of Older Adults of High-Risk Alcohol Consumption and Drinking Problems

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Abstract

Aims—This prospective, longitudinal study focused on late-life and life history predictors of high-risk alcohol consumption and drinking problems during a 20-year interval as adults matured from age 55–65 to age 75–85.

Design, Setting, Participants—A sample of older community residents (N=719) who had consumed alcohol in the past year or shortly before was surveyed at baseline and 10 years and 20 years later.

Measurements—At each contact point, participants completed an inventory that assessed their alcohol consumption, drinking problems, and personal and life context factors. Participants also provided information about their life history of drinking and help-seeking.

Results—Older adults who, at baseline, had more friends who approved of drinking, relied on substances for tension reduction, and had more financial resources were more likely to engage in high-risk alcohol consumption and to incur drinking problems at 10-year and 20-year follow-ups. With respect to life history factors, drinking problems by age 50 were associated with a higher likelihood of late-life high-risk alcohol consumption and drinking problems; having tried to cut down on drinking and participation in Alcoholics Anonymous were associated with a lower likelihood of high-risk consumption and problems.

Conclusion—Specific late-life and life history factors can identify older adults likely to engage in excessive alcohol consumption 10 and 20 years later. Targeted screening that considers current alcohol consumption and life context, and history of drinking problems and help-seeking, could help identify older adults at higher risk for excessive or problematic drinking.

Keywords

Aging; alcohol consumption; drinking problems; life history; help-seeking

1. Introduction

In general, older adults' alcohol consumption tends to decline with age; nonetheless a significant number of older individuals engage in high-risk alcohol consumption that exceeds current US national guidelines and recommendations (Breslow and Smothers, 2004; Zhang et

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al., 2008). However, we still know relatively little about the extent to which late-life personal and social factors predict high-risk alcohol consumption and drinking problems among adults as they mature from age 55–65 to age 75–85. In addition, more information is needed about how well life history indices of drinking and help-seeking predict excessive alcohol consumption and associated problems among older adults, and whether late-life indices add to or interact with the prediction obtained from life history factors.

We focus on these issues here by describing changes in high-risk alcohol consumption and drinking problems among older adults over a 20-year interval from age 55–65 to age 75–85. We then address four main questions. (1) What theory-based, late-life factors predict high-risk alcohol consumption and drinking problems among older adults? (2) How well do life history factors, such as heavy drinking prior to age 50 and help-seeking, predict late-life alcohol consumption and drinking problems? (3) Do late-life factors add to the prediction of late-life drinking behavior over and above the prediction afforded by life history factors? (4) Are there interactions between late-life and life history predictors of late-life drinking patterns, such that, for example, a history of drinking problems alters the likelihood that late-life financial resources will be associated with high-risk consumption or drinking problems 10 years or 20 years later.

1.1. Late-Life Predictors of Alcohol Consumption and Drinking Problems

Several theories, including social learning, stress and coping, and social control theory, have been used to identify personal and social factors associated with the development and maintenance of excessive alcohol consumption and drinking problems among young and middle-age adults (Moos, 2007). With few exceptions, (Preston and Goodfellow, 2006), these theories have not been applied to consider alcohol-related behavior among older adults. Here, we consider potential predictors of late-life high-risk alcohol consumption and drinking problems associated with these three theories. We expect to find developmental continuity in that predictors identified as important among young and middle-age adults will also emerge as salient among older adults.

1.1.2. Social Learning Theory—According to social learning theory, alcohol use develops and is maintained by specific attitudes and behaviors of an individual's social network members, especially family members and friends. In essence, the theory proposes that engagement in social and leisure activities with family members and friends who approve of and model drinking behavior is a salient predictor of alcohol use and misuse (Bandura, 1997; Maisto et al., 1999). There is extensive evidence in support of these processes among young and middle-age adults (Bullers et al., 2001; McCrady, 2004; Mohr et al., 2001).

Among older adults, cross-sectional studies indicate that participation in social activities and drinking for social reasons is associated with more alcohol consumption (Busby et al., 1988; Graham et al., 1996). In addition, family members and friends who drink and espouse positive drinking norms tend to be linked to more frequent and heavier concurrent alcohol consumption among older adults (Akers et al., 1989; Stall, 1986). Among older adult couples, husbands and wives whose partners drink consume alcohol more frequently and in larger amounts than do those with abstinent partners (Graham & Braun, 1999). We assess two variables relevant to social learning theory: participation in social activities and friends' approval of drinking.

1.1.3. Stress and Coping Theory—Stress and coping theory posits that problematic life circumstances may arouse distress and alienation, which may eventually lead to coping-based alcohol use among individuals who lack more adaptive coping skills and who try to avoid facing problems or negative affect. For such individuals, alcohol use can be a form of avoidance coping that involves self-medication to reduce anxiety and depression (Moos, 2007). Among

mixed-age adults, more reliance on stress-related drinking to cope with depression and distress and on general avoidance coping is associated with more alcohol consumption and drinking problems (Carpenter and Hasin, 1999; Holahan et al., 2003; Trim et al., 2008). Comparable findings have been identified among older adults, many of whom cite personal effects reasons for drinking, including for relief of anxiety or pain (Brennan et al., 2005; Graham et al., 1996; Lemke and Moos, 2003). Here, we assess both reliance on substances to reduce tension and general avoidance coping.

1.1.4. Social Control Theory—Social control theory assumes that a network of social bonds, such as with family, friends, and religion, serves an important regulatory function that motivates individuals to engage in socially appropriate behavior. When such bonds are weak or absent, individuals are less likely to adhere to accepted standards and tend to engage in risky behavior, such as excessive use of alcohol (Rook et al., 1990). According to the theory, strong ties to religion provide an especially important bond and, in fact, have been consistently associated with less alcohol consumption among young and middle-age adults (Booth et al., 2004; Mason and Windle, 2001; Pardini et al., 2000). Consistent with these findings, Krause (1991) noted that religious involvement was associated with less concurrent alcohol consumption among older adults.

Financial resources generally reflect some social bonding and, as such, might be associated with fewer drinking problems. This prediction is also consistent with behavior economic theory, which posits that financial resources encompass rewards that can substitute for the reinforcements associated with alcohol use (Bickel and Vuchinich, 2000). However, financial resources also are an enabling factor for the purchase of alcoholic beverages and thus might be associated with more alcohol consumption. Studies of mixed-age individuals tend to show inconsistent findings; both fewer (Droomers et al., 1999; Moos and Moos, 2007) and more (Kunz and Graham, 1998; Veenstra et al., 2006) financial resources have been linked with higher alcohol consumption. Among older adults, there is some evidence of a connection between more financial resources and more alcohol consumption (Busby et al., 1988; Stall, 1986). We focus here on religious involvement and financial resources as potential predictors of late-life alcohol consumption and drinking problems.

1.1.5. Baseline Alcohol Consumption—In addition to these theory-based predictors, we consider baseline alcohol consumption in late-life as a predictor of subsequent excessive consumption and drinking problems. Although overall average levels of consumption decline with age, there is some stability in the amount of alcohol consumption among both mixed-age and older adults (Kerr et al., 2002). In addition, higher alcohol intake has been associated with an elevated likelihood of drinking problems among both mixed-age (Dawson, 2000; Midanik, 1999) and older adults (Chermack et al., 1996; Hilton, 1987; Walton et al., 2000). However, relatively little is known about how well late-life consumption predicts high-risk use of alcohol or drinking problems over subsequent 10-year or 20-year intervals in late life.

1.2. Life History Predictors of Alcohol Consumption and Drinking Problems

Several studies have obtained lifetime histories of individuals' alcohol consumption and alcohol-related consequences (Jacob et al., 2006; Lemmens, 1998; Russell et al., 1997), but we are unaware of research using information about the development and course of drinking through middle age to predict late-life drinking patterns. Individuals who have engaged in moderate to heavy drinking or have incurred drinking problems earlier in life might be expected to have a higher likelihood of late-late high risk alcohol consumption and drinking problems. However, due to the stigma associated with heavy drinking and drinking problems, many of these individuals may successfully reduce their drinking either by their own efforts or by obtaining help (Schutte et al., 2006).

With respect to help-seeking, there is substantial evidence that participation in treatment and self-help groups, such as AA, has beneficial effects for younger and middle-age adults (Finney et al., 2007; Moos, 2008). It is less clear whether the benefits of having received these sources of help might still be evident in old age. We focus here on whether older adults who were advised to and tried to cut down on their drinking, and those who received informal help from family members and friends or participated in professional treatment or AA, are less likely to engage in high-risk alcohol consumptions or incur drinking problems in late-life.

In prior work based on earlier follow-ups of the overall sample on which we focus here, we found that friends' approval of drinking, avoidance coping, and prior drinking problems were associated with a higher likelihood of subsequent drinking problems, whereas having obtained help from family members and friends was associated with a lower likelihood of subsequent problems (Moos et al., 2004). We extend this work here by focusing on the associations between theory-based personal and social late-life factors, life history of drinking and help-seeking, and high-risk alcohol consumption and drinking problems at 10-year and 20-year follow-ups. Because we thought that a history of heavier or problem drinking might potentiate the effect of current life context factors, we also considered interactions between late-life and these life history factors in predicting late-life high risk alcohol consumption and drinking problems.

2. Method

2.1. Participants

A sample of 1,884 late-middle-aged community residents (55–65 years old at baseline) was recruited to participate in a study of late-life alcohol consumption and drinking problems and the influence of life history factors on these domains. The sample was composed of individuals who had consumed alcohol in the past year or shortly before and had had outpatient contact with a health care facility within the last three years. The sample was comparable to similarly aged community samples with regard to such health characteristics as prevalence of chronic illness and hospitalization. Informed consent was obtained from all participants; additional details about recruitment are available elsewhere (Moos et al., 1991).

We contacted these individuals again 10 years and 20 years later. By the 10-year follow-up, 489 individuals had died and, by the 20-year follow-up, an additional 480 individuals had died. Of the 915 participants who were still living, 76 (8.3%) were in such poor health that they could not participate in the 20-year follow-up. Of the remaining 839 participants, 719 (85.7%) completed the 20-year follow-up. At all three waves (baseline, 10 years, 20 years), the data were collected by a combination of mail surveys with telephone follow-up to obtain complete data. The baseline data were collected between 1986 and 1988, the 10-year data were collected between 1996 and 1998, and the 20-year data were collected between 2006 and 2008.

The 20-year follow-up sample was composed of 320 women and 399 men who were born between 1921 and 1933. At baseline, these participants were just under 61 years of age on average; almost 90% were Caucasian and about 75% were currently married. The majority (81%) had at least a high school education. A total of 60% were employed and their average family income was $44,000.

Compared to the 120 surviving individuals who were not followed at 20 years, those who were followed (N=719) were more likely to be Caucasian (93% to 86%), to have completed high school (81% to 73%), and to have been employed at baseline (60% to 42%). However, there were no significant group differences at baseline in the frequency or amount of alcohol individuals consumed or in the proportion of individuals who had drinking problems.

2.2. Measures of Alcohol Consumption and Drinking Problems

Alcohol consumption was assessed by items adapted from the Health and Daily Living Form (HDL; Moos et al., 1992). The frequency of alcohol consumption was assessed by responses to three questions asking how often per week (never, less than once, once or twice, three to four times, nearly every day) participants consumed wine, beer, and hard liquor in the last month. The amount of alcohol consumption was assessed by items that tapped the usual number of drinks of wine (in glasses), beer (in glasses or cans), and hard liquor (in shots) consumed on days in the last month when the individual drank that beverage. The number of drinks consumed per day and per week was assessed by combining information about the frequency and amount of consumption of each beverage.

We used this information to classify individuals into whether or not their level of alcohol consumption exceeded the relatively liberal guideline of more than 3 drinks per day or more than 14 drinks per week (American Geriatric Society, 2003; National Institute on Alcohol Abuse and Alcoholism, 2007). Evidence supporting the validity of these types of self-report measures of alcohol consumption has been reported for mixed-age and older adults (Babor et al., 1987; Stacy et al., 1985; Werch, 1989).

Drinking problems in the last 12 months were assessed with items rated on a 5-point scale varying from never (0) to often (4) drawn from the Drinking Problems Index (DPI). The DPI has been used in a number of studies and has high internal consistency (alpha = 0.94) and good construct and predictive validity (Finney et al., 1991; see also Bamberger et al., 2006; Kopera-Frye et al., 1999). More specifically, Drinking problems were assessed by 12 items that tapped functioning problems, such as whether the individual skipped meals, neglected daily activities, or had had a fall or accident due to drinking; and interpersonal problems, such as whether family members or friends had expressed worries about the participant's drinking or a friend had been lost due to drinking. The 12-item DPI has high internal consistency (alpha = .92; average corrected item-total score correlations = .71 with a range from .58 to .78) and moderate to high stability over 1-year, 3-year, and 4-year intervals (rs = .56, .57, and .53, respectively).

2.3. Measures of Late-Life Predictors of Drinking Problems

Social activities was assessed by two sets of items drawn from the HDL (Moos et al., 1992) that asked individuals whether or not they had participated together with family members or friends in any of 12 activities, such as going to a party or picnic, attending a meeting of a club or organization, playing a card game, helping out on some project, or going to a concert or museum (Mean = 4.60; SD = 2.27; alpha = .82).

Friends' approval of drinking was measured by four items rated on 4-point scales assessing how many of the individual's friends were drinkers, social drinkers, and heavy drinkers, and how many approved of heavy drinking (Mean = 5.77; SD = 2.12).

Reliance on substances for tension reduction was composed of three items that tapped whether or not the individual smoked, used tranquillizers, or drank alcohol to reduce tension (35.2% yes).

Avoidance coping was assessed using 12 items drawn from the Coping Responses Inventory (Moos, 1993), a measure that taps individuals' attempts to cope with a recent focal stressor. Items assessed the tendency to avoid thinking about a problem (e.g., "I tried to forget about the whole thing") and to reduce tension by expressing negative feelings (e.g., "I yelled or shouted to let off steam"). Items were scored on 4-point scales ranging from "no" to "yes, fairly often" and were summed (Mean = 4.71; SD = 2.93; alpha = .75).

Religious involvement was tapped by a 5-point item drawn from the HDL (Moos et al., 1992) asking individuals how often they attend religious services, from never (scored 0) to every week (scored 4) (Mean = 1.60; SD = 1.55).

Financial resources were assessed by asking participants about their total annual family income (in 8 categories) and six 4-point items drawn from the Life Stressors and Social Resources Inventory (Moos and Moos, 1994) that tapped the perceived adequacy of finances, such as whether individuals thought they had enough money to afford daily necessities, such as adequate food and clothing, medical and dental care, and furniture or household appliances (Mean = 20.35; SD = 5.75; alpha = .84).

2.4 Measures of Life History Predictors of Late-Life Drinking Problems

With respect to lifetime drinking history, we assessed respondents' perceived amount of drinking (5-point scale varying from none to very heavy) during three life intervals: teen, early adult (20–35), and early middle age (36–50) years. Lifetime drinking problems by age 50 were tapped with 28 items designed to reflect aspects of DSM-III-R alcohol dependence or abuse. We developed indices to reflect the number of life intervals in which individuals engaged in moderate to heavy drinking (Mean = 1.16; SD = .91) or experienced drinking problems (Mean = .72; SD = .82) by age 50.

With respect to help-seeking, we assessed whether or not participants had ever been advised to cut down (27.8%)or tried to cut down (43.4%) on drinking and how much support they received when they tried to cut down on their drinking (rated on 5-point scales varying from none = 0 to a lot = 4) from family members and friends (Mean = 1.31; SD = 3.19), professional sources (physician, psychologist, hospital/clinic; Mean = .50; SD = 1.64), and Alcoholics Anonymous (AA; Mean = .13; SD = .66). A subset of 139 individuals completed the lifetime drinking history items twice with an average 30-day interval between assessments. The test-retest reliabilities of the above indices varied from .59 to .97 and averaged .73.

2.5. Analytic Plan

For descriptive purposes, we present two-way repeated measures analyses of variance (RMANOVAs) on high-risk alcohol consumption (that is, whether or not respondents exceeded 3 or more drinks per day or 14 or more drinks per week) and drinking problems at the 10-year and 20-year follow-up. These RMANOVAs examined changes in the indices from baseline to the 20-year follow-up, gender differences, and gender by time interactions.

We then conducted three sets of logistic regression analyses predicting the 10-year and 20-year follow-up criteria. After controlling for age, gender, and marital status, the predictors in the first set of regressions were baseline (late-life) alcohol consumption and the personal and life context indices, and the criteria were whether or not the respondent engaged in (a) high-risk alcohol consumption (exceeding 3 drinks per day or 14 drinks per week) or (b) incurred drinking problems. The second set of logistic regression analyses examined life history indices of drinking and help-seeking as predictors of high-risk alcohol consumption and drinking problems at the 10-year and 20-year follow-ups.

Next, we conducted a third set of logistic regression analyses to examine the extent to which selected late-life indices contributed to the prediction of the 10-year and 20-year criteria independently of life history indices. We also used zero-centered interaction terms to identify potential interactions between the six theory-based late-life indices and the two life history of drinking indices.

Finally, we considered the potential effects of attrition and mortality by comparing baseline characteristics of 20-year participants with those of individuals who participated in the 10-year

follow-up but died or dropped out prior to the 20-year follow-up. We conducted RMANOVAs comparable to those described earlier to examine changes from baseline to the 10-year follow-up in high-risk alcohol consumption and drinking problems among these individuals, and conducted comparable logistic regression analyses to examine the late-life and life history predictors of high-risk alcohol consumption and drinking problems among these individuals at the 10-year follow-up.

3.0 Results

3.1. Changes in Alcohol Consumption and Drinking Problems

There was a decline in the proportion of individuals who consumed alcohol in excess of 3 drinks per day or 14 drinks per week and in the proportion who reported drinking problems (Table 1). Men were more likely to engage in high-risk alcohol consumption and to experience drinking problems; however, the decline in these indices over the 20 years was comparable for women and men. As expected, high-risk alcohol consumption and drinking problems were moderately correlated (rs = .44 and .32 at the 10-year and 20-year follow-up, respectively).

3.2. Late-Life Predictors of Alcohol Consumption and Drinking Problems

After controlling for age, gender, and marital status, more baseline alcohol consumption was associated with a higher likelihood of 10-year high-risk consumption and drinking problems (Table 2). Baseline indices of more participation in social activities, friends' approval of drinking, and reliance on substances for tension reduction predicted a higher likelihood of 10-year excessive consumption and drinking problems, as did low religious involvement. More financial resources predicted a higher likelihood of 10-year excessive alcohol consumption.

At the 20-year follow-up, baseline alcohol consumption and friends' approval of drinking were still positively associated with both criteria (Table 2). Individuals who relied more on substances for tension reduction and had more financial resources at baseline were more likely to engage in high-risk alcohol consumption at the 20-year follow-up.

3.3. Life History Predictors of Late-Life Drinking Problems

After controlling for age, gender, and marital status (not shown), a history of drinking problems by age 50 predicted both of the 10-year criteria (Table 3). Having been advised to cut down on drinking predicted a higher likelihood of high-risk alcohol consumption and drinking problems; in contrast actually having tried to cut down on drinking predicted a lower likelihood of meeting these two criteria. Whereas obtaining help from family members and friends and from professional sources were essentially unrelated to the 10-year criteria, obtaining help from AA was associated with a lower likelihood of high-risk alcohol consumption and drinking problems.

Turning to the 20-year outcomes, a history of drinking problems by age 50 and having been advised to cut down on drinking still predicted a higher likelihood of high-risk alcohol consumption and drinking problems (Table 3). Actually having tried to cut down on drinking and having obtained help from AA predicted a lower likelihood of 20-year high-risk alcohol consumption.

3.4. Combining Life History and Late-Life Predictors

We conducted hierarchical logistic regression analyses to examine the extent to which the late-life indices provided an increment to the prediction of the 10-year and 20-year criteria after the life history indices had been considered. After controlling for age, gender, and marital status (step 1), we entered the most consistent statistically significant life history predictors in step 2 and the most consistent statistically significant baseline (late-life) predictors in step 3. Drinking

problems by age 50 and having been advised to cut down on drinking were associated with high-risk alcohol consumption and drinking problems at both follow-ups (Table 4). Having tried to cut down on drinking and obtaining help from AA were associated with a lower likelihood of high-risk consumption and drinking problems. After the demographic indices were considered, these variables predicted an average increment of 12% and 5% of the variance in the 10-year and 20-year criteria, respectively

The late-life indices added significantly to the prediction of each of the criteria (Table 4). Baseline alcohol consumption, friends' approval of drinking, reliance on substances for tension reduction, and financial resources each tended to predict more high-risk alcohol consumption and drinking problems. These late-life indices independently accounted for increments of 15% and 14% of the variance in the 10-year and 20-year criteria, respectively.

There also were consistent significant interactions between the life history of drinking indices and late-life financial resources. Among individuals who had no history of drinking problems, more baseline financial resources were associated with a decline in the likelihood of drinking problems; however, among individuals who had a history of drinking problems, more baseline financial resources were associated with a higher likelihood of 10-year drinking problems (Figure 1). These findings held at the 20-year follow-up and also applied to individuals who had a history of moderate to heavy drinking; that is, when each of these sets of individuals had more financial resources at baseline they were more likely to continue to engage in high-risk drinking and/or to have drinking problems.

3.5. Attrition and Mortality

Among individuals who completed the 10-year follow-up but died or dropped out prior to the 20-year follow-up (N = 582), there were significant declines between baseline and 10 years in the prevalence of high-risk alcohol consumption and drinking problems (all ps < .01), as we found among survivors. Moreover, among these individuals the predictors of 10-year high-risk alcohol consumption and drinking problems were comparable to those among survivors. The main difference in findings was that, in the subgroup of individuals who died or dropped out, baseline financial resources were not significantly associated with 10-year high-risk alcohol consumption, whereas having received help from family members and friends was associated with a lower likelihood of 10-year high-risk alcohol consumption and drinking problems.

4.0 Discussion

Although our sample of older adults reduced their drinking over the 20 years as they matured from age 55–65 to 75–85, many individuals continued to consume alcohol in excess of 3 drinks per day or 14 drinks per week, which exceeds recommended drinking guidelines for older adults (American Geriatrics Society, 2003; National Institute on Alcohol Abuse and Alcoholism, 2007). In fact, between 10% and 30% of participants still engaged in high-risk drinking and/or experienced drinking problems at the 20-year follow-up when they were 75–85 years of age. These findings are consistent with prior studies (Breslow and Smothers, 2004; Zhang et al., 2008) and indicate that, on average, older adults consume less alcohol as they age, but that a relatively high proportion continue to engage in excessive alcohol consumption.

4.1. Late-Life Predictors of Alcohol Consumption and Drinking Problems

Even though, on average, participants moderated their drinking patterns, there was considerable inter-individual stability in late-life alcohol consumption; higher baseline levels of consumption predicted high-risk consumption and drinking problems 10 years and 20 years later. This relative stability is consistent with prior studies on mixed-age and older adults (Kerr

et al., 2002) and indicates that high levels of alcohol consumption in late-middle-age are an important indicator of subsequent risk of problematic alcohol use.

Comparable to research on younger and middle-age adults, late-life variables associated with social learning, stress and coping, and social control theories predicted high-risk alcohol consumption and drinking problems among older adults even after demographic factors and baseline late-life alcohol consumption was controlled. One of the most consistent predictors was social network members' approval of drinking.

Family members and friends who consume more alcohol and espouse heavy drinking norms promote drinking among individuals at all stages of the life span, including old age (Akers et al., 1989; Graham and Braun, 1999; McCrady, 2004; Mohr et al., 2001). Comparable to recommendations for young and middle-age adults, our findings suggest that high-risk older adults who wish to reduce their alcohol consumption should embed themselves in a social network composed of low- or non-drinking peers.

Reliance on substances for tension reduction was another strong predictor, which is consistent with the finding that many older adults cite personal effects reasons for drinking, including to relieve anxiety or pain (Brennan et al., 2005; Graham et al., 1996). Moreover, in an earlier study of the larger sample from which this cohort was drawn, reliance on alcohol to reduce pain was associated with more alcohol consumption and drinking problems (Moos et al., in press). More generally, drinking to cope with anxiety and depression appears to be a major factor contributing to high-risk drinking and alcohol-related problems among both mixed-age (Holahan et al., 2001; 2003; Trim et al., 2008) and older (Lemke and Moos, 2003) adults.

Religious involvement was modestly protective against high-risk alcohol consumption and drinking problems (Krause, 1991), which parallels prior findings on young and middle-age adults (Booth et al., 2004; Mason and Windle, 2001; Pardini et al., 2000). Consistent with both social control and social learning theories, religious involvement likely provides more opportunity for contact with individuals who disapprove of heavy drinking and may also provide models for effective coping with distress.

Financial resources were not only a general risk factor for excessive alcohol consumption, but also potentiated the risk for individuals with a history of heavy drinking and drinking problems. These findings support the idea that adequate finances may be an enabling factor that promotes involvement with alcohol among older adults (Busby et al., 1988; Stall, 1986). Older adults in more difficult financial circumstances may restrict their purchase of alcoholic beverages and be less inclined to attend alcohol-related social activities.

Future studies could usefully evaluate whether older adults with more financial resources are more susceptible to positive alcohol-related expectancies, have a heavier drinking social network and friends who approve of and model heavy drinking, rely more on alcohol to manage distress, and consume alcohol more quickly. Thus, when financial resources provide ample opportunity to obtain alcohol, these individuals may be less able to constrain their alcohol consumption. According to social control and behavior economic theories, financial resources should encompass rewards that can protect an individual from high-risk behavior such as excessive alcohol use. However, our findings are more consistent with the idea that financial resources may loosen the bonds of social control and enable individuals to pursue more independence.

More broadly, we have tried to identify predictors of changes in older adults drinking patterns that appear to be associated with three well-known theories that have been applied to understand the development and maintenance of excessive alcohol use (Moos, 2007). However, the mechanisms underlying the apparent effects of friends' approval of drinking could be

associated with the social bonds and surveillance posited by social control theory as well as with the norms and role modeling posited by social learning theory. Similarly, the influence of religious involvement could be a function of role modeling as well as the formation of social bonds. Thus, although social learning, stress and coping, and social control theories appear to hold promise for understanding heavy drinking among older adults, much more work is needed to specify the key variables involved and to understand the mechanisms by which they exert their influence.

4.2. Life History Predictors of Alcohol Consumption and Drinking Problems

A history of drinking problems by age 50 was associated with high-risk alcohol consumption and drinking problems in late-life. This finding is consistent with prior evidence on the relative stability of individual drinking patterns from young adulthood to middle age (Sartor et al., 2003) and extends the evidence for relative stability into old age. However, there also are fluctuations in drinking patterns as individuals mature into old age, as suggested by our finding that moderate to heavy drinking by age 50 did not independently predict the 10-year or 20-year criteria.

Individuals who incur alcohol-related problems are more likely to be advised to cut down on drinking; however, in and of itself, such advice does not appear to reduce the likelihood of continued excessive alcohol consumption. Moreover, obtaining informal support from family members and friends or from participating in professional treatment did not protect older adults from high-risk alcohol consumption or drinking problems. In general, treatment for alcohol use disorders is relatively effective (Finney et al., 2007); however, there also are high relapse rates and individuals who obtained informal support or treatment earlier in their life may not have been sufficiently motivated to continue to moderate their excessive drinking.

On a more hopeful note, individuals who tried to cut down on or stop drinking, and those who obtained support from AA, were less likely to engage in high-risk drinking or to have late-life drinking problems. These findings support the idea that many individuals experience remission from drinking problems through a process of "natural recovery" that does not necessarily involve professional treatment. In fact, we found earlier that a majority of remitted older problem drinkers attained remission without formal treatment (Schutte et al., 2006). The findings are also consistent with a growing body of evidence showing that participation in self-help groups, especially AA, is associated with long-term remission (Moos, 2008; Moos and Moos, 2006). The fact that friends' drinking habits have a strong influence on older adults' drinking may help to explain the salutary effects of AA, which tends to integrate an individual into a circle of sober individuals.

Taken together, after demographic factors were considered, life history predictors accounted for significant increments of the variance in high-risk alcohol consumption and drinking problems. Due to the continuing life changes in old age, this prediction was somewhat weaker at the 20-year than at the 10-year follow-up. Moreover, due to the fluctuating nature of drinking patterns and their responsiveness to near-term influences, baseline late-life factors tended to be stronger incremental predictors of the criteria than were the life history factors. Thus, late-life factors need to be considered in screening procedures that attempt to identify older adults at high risk for late-life drinking problems.

4.3. Limitations and Conclusions

Our findings are of interest, but some limitations need to be considered. We excluded lifetime abstainers and recruited a community sample of individuals who had consumed alcohol in the past year or shortly before. Thus, the prevalence of high-risk drinking and drinking problems is higher than in a representative sample and cannot be taken as a population estimate.

Furthermore, our sample was drawn from one geographic area in the United States and was composed mainly of Caucasian and relatively well-educated individuals; the findings are specific to this cohort and need to be replicated on more diverse groups of older adults with different prior drinking experiences.

A substantial proportion of our baseline sample died or did not participate in the 20-year follow-up. However, there were no significant differences at baseline in alcohol consumption or drinking problems between surviving individuals who were or were not followed at 20 years. More important, results for individuals who completed the 10-year follow-up but died or dropped out prior to the 20-year follow-up were comparable among the survivors.

Although we did not address this issue here, it is likely that there are reciprocal relationships between alcohol-related problems and some of the predictors, such as friends' approval of drinking and reliance on substances to reduce tension (Brennan et al., 1999). Further, the life history predictors of late-life drinking problems must be interpreted in light of the retrospective nature of the life history information. However, the life history information was reasonably reliable; there also is growing evidence that self-reported drinking behavior, including lifetime drinking behavior, is reasonably valid (Chaikelson et al., 1994; Jacob et al., 2006; Koenig et al., 2009; Liu et al., 1996).

On average, the prevalence of high-risk drinking declined with age; nevertheless, many of the older adults in our sample engaged in excessive alcohol consumption and incurred drinking problems. Our findings suggest that a combination of late-life and life history information may best facilitate efforts to identify older adults for their risk of excessive drinking. Interventions for late-life drinking problems can be effective; late-life problem drinkers respond to treatment and AA as well as or better than middle-aged or younger individuals do (Lemke and Moos, 2002; 2003). A timely, brief intervention from a health care provider (Whitlock et al., 2004) and/or participation in a self-help or mutual support group (Moos, 2008) can result in a significant decline in alcohol consumption and thus reduce the risk of late-life drinking problems.

References

Akers RL, La Greca AJ, Cochran J, Sellers C. Social learning theory and alcohol behavior among the elderly. Sociol Quart 1989;30:625–638.

American Geriatrics Society. Clinical Guidelines: Alcohol Use Disorders in Older Adults. 2003 [accessed on April 16, 2009]. www.americangeriatrics.org/products/positionpapers/alcohol.shtml

Babor TF, Stephens RS, Marlatt A. Verbal report methods in clinical research on alcoholism: Response bias and its minimization. J Stud Alcohol 1987;48:410–424. [PubMed: 3312821]

Bamberger PA, Sonnenstuhl WJ, Vashdi D. Screening older, blue-collar workers for drinking problems: An assessment of the efficacy of the Drinking Problems Index. J Occupat Health Psychol 2006;11:119–134.

Bandura, A. Self-efficacy: The exercise of control. New York: Freeman; 1997.

Bickel, WK.; Vuchinich, RE. Reframing Health Behavior Change with Behavior Economics. Erlbaum; Mahwah, NJ: 2000.

Booth BM, Curran GM, Han X. Predictors of short-term course of drinking in untreated rural and urban at-risk drinkers: Effects of gender, illegal drug use, and psychiatric comorbidity. J Stud Alcohol 2004;65:63–73. [PubMed: 15000505]

Brennan P, Schutte K, Moos R. Reciprocal relations between stressors and drinking behavior: A three-wave panel study of older women and men. Addiction 1999;94:737–749. [PubMed: 10563039]

Brennan P, Schutte K, Moos R. Pain and the use of alcohol to manage pain: Prevalence and 3-year outcomes among older problem and nonproblem drinkers. Addiction 2005;100:788–797.
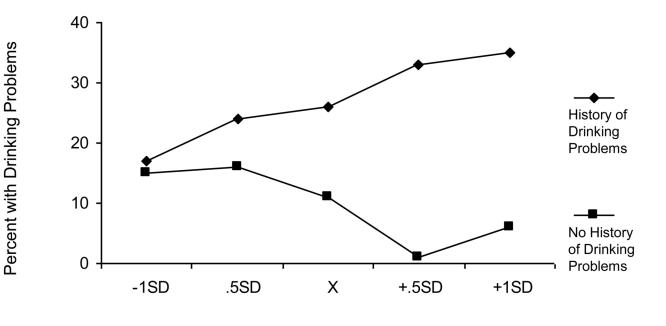
Breslow RA, Smothers B. Drinking patterns of older Americans: National Health Interview surveys, 1997–2001. J Stud Alcohol 2004;65:232–240. [PubMed: 15151355]

Bullers S, Cooper ML, Russell M. Social network drinking and adult alcohol involvement: A longitudinal exploration of the direction of influence. Addict Behav 2001;26:181–199. [PubMed: 11316376]

Busby WJ, Campbell AJ, Borrie MJ, Spears GFS. Alcohol use in a community-based sample of subjects aged 70 years and older. J Am Geriatric Soc 1988;36:301–305.

Carpenter KM, Hasin DS. Drinking to cope with negative affect and DSM-IV alcohol use disorders: A test of three alternative explanations. J Stud Alcohol 1999;60:694–704. [PubMed: 10487740]

Chaikelson JS, Arbuckle TY, Lapidus S, Gold DP. Measurement of lifetime alcohol consumption. J Stud Alcohol 1994;55:133–140. [PubMed: 8189733]

Chermack ST, Blow FC, Hill EM, Mudd SA. The relationship between alcohol symptoms and consumption among older drinkers. Alcohol Clin Exp Res 1996;20:1153–1158. [PubMed: 8904963]

Dawson D. Alternative measures and models of hazardous consumption. J Subst Abuse 2000;12:79–91. [PubMed: 11288476]

Droomers M, Schrijvers CT, Stronks K, van de Mheen D, Mackenbach JP. Educational differences in excessive alcohol consumption: The role of psychosocial and material stressors. Preventive Med 1999;29:1–10.

Finney, J.; Wilbourne, P.; Moos, R. Psychosocial treatments for substance use disorders. In: Nathan, P.; Gorman, J., editors. A Guide to Treatments that Work. 3. Oxford, New York: Oxford; 2007. p. 179-202.

Finney J, Moos R, Brennan P. The Drinking Problems Index: A measure to assess alcohol-related problems among older adults. J Subst, Abuse 1991;3:431–440.

Graham K, Braun K. Concordance of use of alcohol and other substances among older adult couples. Addict Behav 1999;24:839–856. [PubMed: 10628517]

Graham K, Clarke D, Bois C, Carver V, Dolinki L, Smythe C, Harrison S, Marshman J, Brett P. Addictive behavior of older adults. Addict Behav 1996;21:331–348. [PubMed: 8883484]

Hilton ME. Demographic characteristics and the frequency of heavy drinking as predictors of self-reported drinking problems. Br J Addiction 1987;82:913–925.

Holahan CJ, Moos R, Holahan CK, Cronkite R, Randall PK. Drinking to cope, emotional distress, and alcohol use and abuse: A 10-year model. J Stud Alcohol 2001;62:190–198. [PubMed: 11327185]

Holahan CJ, Moos R, Holahan CK, Cronkite R, Randall PK. Drinking to cope and alcohol use and abuse in unipolar depression: A 10-year model. J Abnorm Psychol 2003;112:159–165. [PubMed: 12653424]

Jacob T, Seilhamer RA, Barger K, Howell DN. Reliability of Lifetime Drinking history among alcohol dependent men. Psychol Addict Behav 2006;20:333–337. [PubMed: 16938072]

Kerr WC, Fillmore KM, Bostrom A. Stability of alcohol consumption over time: Evidence from three longitudinal surveys from the United States. J Stud Alcohol 2002;63:325–333. [PubMed: 12086133]

Koenig LB, Jacob T, Haber JR. Validity of the lifetime drinking history: A comparison of retrospective and prospective quantity-frequency measures. J Stud Alcohol Drugs 2009;70:296–303. [PubMed: 19261242]

Kopera-Frye K, Wiscott R, Sterans HL. Can the Drinking Problems Index provide valuable therapeutic information for recovering alcoholic adults? Aging Ment Health 1999;3:246–256.

Krause N. Stress, religiosity, and abstinence from alcohol. Psychol Aging 1991;6:134–144. [PubMed: 2029362]

Kunz JL, Graham K. Drinking patterns, psychosocial characteristics, and alcohol consequences. Addiction 1998;93:1079–1090. [PubMed: 9744138]

Lemke S, Moos R. Prognoses of older patients in mixed-age alcoholism treatment programs. J Subst Abuse Treat 2002;22:33–43. [PubMed: 11849905]

Lemke S, Moos R. Treatment outcomes at 1-year and 5-years for older patients with alcohol use disorders. J Subst Abuse Treat 2003;24:43–50. [PubMed: 12646329]

Lemmens PH. Measuring lifetime drinking histories. Alcohol Clin Exp Res 1998;22:29S–36S. [PubMed: 9603304]

Liu S, Serdula MK, Byers T, Williamson DF, Mokdad AH, Flanders WD. Reliability of alcohol intake as recalled from 10 years in the past. Am J Epidemiology 1996;143:177–186.

Maisto, SA.; Carey, KB.; Bradizza, CM. Social learning theory. In: Leonard, KE.; Blane, HT., editors. Psychological Theories of Drinking and Alcoholism. 2. Guilford; New York: 1999. p. 106-163.

Mason WA, Windle M. Family, religious, school, and peer influences on adolescent alcohol use: A longitudinal study. J Stud Alcohol 2001;62:44–53. [PubMed: 11271963]

McCrady BS. To have but one true friend: Implications for practice of research on alcohol use disorders and social networks. Psychol Addict Behav 2004;18:113–121. [PubMed: 15238053]

Midanik L. Drunkenness, feeling the effects, and 5+ measures. Addiction 1999;94:887–897. [PubMed: 10665077]

Mohr CD, Averna S, Kenny DA, Del Boca FK. "Getting by (or getting high) with a little help from my friends": An examination of adult alcoholics' friends. J Stud Alcohol 2001;62:637–645. [PubMed: 11702803]

Moos, R. Psychological Assessment Resources. Odessa, FL: 1993. Coping Responses Inventory Adult Form Manual.

Moos R. Theory-based processes that promote remission of substance use disorders. Clin Psychol Rev 2007;27:537–551. [PubMed: 17254686]

Moos R. Active ingredients of substance use focused self-help groups. Addiction 2008;103:387–396. [PubMed: 18269361]

Moos R, Brennan P, Moos B. Short-term processes of remission and nonremission among late-life problem drinkers. Alcohol Clin Exp Res 1991;15:948–955. [PubMed: 1789391]

Moos R, Brennan P, Schutte K, Moos B. Older adults' health and late-life drinking patterns: A 20-year perspective. Aging Ment Health. in press.

Moos, R.; Cronkite, R.; Finney, J. Health and Daily Living Form manual. 2. Mind Garden; Palo Alto, CA: 1992.

Moos, R.; Moos, B. Life Stressors and Social Resources Inventory: Adult Form manual. Psychological Assessment Resources; Odessa, FL: 1994.

Moos R, Moos B. Participation in treatment and Alcoholics Anonymous: A 16-year follow-up of initially untreated individuals. J Clin Psychol 2006;62:735–750. [PubMed: 16538654]

Moos R, Moos B. Protective resources and long-term recovery from alcohol use disorders. Drug Alcohol Depend 2007;86:46–54. [PubMed: 16769181]

Moos R, Schutte K, Brennan P, Moos B. Ten-year patterns of alcohol consumption and drinking problems among older women and men. Addiction 2004;99:829–838. [PubMed: 15200578]

National Institute on Alcohol Abuse and Alcoholism. Helping patients who drink too much. A clinician's guide. Updated 2005 edition. (U. S. Department of Health and Human Services, National Institutes of Health Publication No. 07-3769). U.S. Government Printing Office; Washington, DC: 2007.

Pardini D, Plante T, Sherman A, Stump J. Religious faith and spirituality in substance abuse recovery: Determining the mental health benefits. J Subst Abuse Treat 2000;19:347–354. [PubMed: 11166499]

Preston P, Goodfellow M. Cohort comparisons: Social learning explanations for alcohol use among adolescents and older adults. Addict Behav 2006;31:2268–2283. [PubMed: 16647823]

Rook KS, Thuras PD, Lewis MA. Social control, health risk taking, and psychological distress among the elderly. Psychol Aging 1990;5:327–334. [PubMed: 2242237]

Russell M, Marshall JR, Trevisan M, Freudenheim JL, Chan AW, Markovic N, Vana JE, Priore RI. Test-retest reliability of the Cognitive Lifetime Drinking History. Am J Epidemiol 1997;146:975–981. [PubMed: 9400340]

Sartor CE, Jacobs T, Bucholz KK. Drinking course in alcohol-dependent men from adolescence to midlife. J Stud Alcohol 2003;64:712–719. [PubMed: 14572194]

Schutte K, Moos R, Brennan P. Predictors of untreated remission from late-life drinking problems. J Stud Alcohol 2006;67:354–362. [PubMed: 16608144]

Stacy AW, Widaman KF, Hays R, DiMatteo MR. Validity of self-reports of alcohol and other drug use: A multitrait multimethod assessment. J Personal Soc Psychol 1985;49:219–232.

Stall, R. Respondent-identified reasons for change and stability in alcohol consumption as a concomitant of the aging process. In: Janes, CR.; Stall, R.; Gifford, SM., editors. Anthropology and Epidemiology. Reidel; Boston, MA: 1986. p. 275-301.

Trim RS, Schuckit MA, Smith TL. Level of response to alcohol within the context of alcohol-related domains: An examination of longitudinal approaches assessing changes over time. Alcohol: Clin Exp Res 2008;32:472–480. [PubMed: 18302725]

Veenstra MY, Lemmens PH, Friesema IH, Garretsen HF, Knottnerus JA, Zwietering PJ. A literature overview of the relationship between life events and alcohol use in the general population. Alcohol Alcoholism 2006;41:455–463.

Walton MA, Mudd SA, Blow FC, Chermack ST, Gomberg E. Stability in the drinking habits of older problem drinkers recruited from non-treatment settings. J Subst Abuse Treat 2000;18:169–177. [PubMed: 10716100]

Werch CE. Quantity-frequency and diary measures of alcohol consumption for elderly drinkers. Int J Addictions 1989;24:859–865.

Whitlock EP, Polen MR, Green CA, Orleans T, Klein J. Behavioral counseling interventions in primary care to reduce risky/harmful alcohol use by adults. Annals Internal Med 2004;140:557–568.

Zhang Y, Guo X, Saitz R, Levy D, Sartini E, Niu J, Ellison RC. Secular trends in alcohol consumption over 50 years: The Framingham study. Am J Med 2008;121:695–701. [PubMed: 18691483]

Figure 1.
Interaction of Baseline Financial Resources and History of Drinking Problems on Late-Life Drinking Problems

Table 1

Alcohol Consumption and Drinking Problems of Women (N=314) and Men (N=391) over the 20-Year Interval

Alcohol-Related Index	Assessment Interval			F (time)	F (gender)	F (int)
	Baseline	10 Yrs	20 Yrs			
Consumption of 3+/day and/or 14+/week (%)				40.25**	69.55**	< 1
Women	26.1	19.7	11.8			
Men	49.2	43.8	31.8			
Drinking Problems (% yes)				58.77**	23.78**	1.74
Women	24.8	11.5	10.2			
Men	38.4	24.3	17.9			

**
p < .01

Table 2

Logistic Regression Analyses of Baseline Predictors of 10-Year and 20-Year High Risk Alcohol Consumption and Drinking Problems

Baseline Indices	10-Year Criteria		20-Year Criteria	
	3+Drks/Day 14+ Drks/Wk (N = 707)	Drinking Problems (N = 707)	3+Drks/Day 14+ Drks/Wk (N = 715)	Drinking Problems (N = 715)
Age (in years)	.93[*]	.99	.96	.92[*]
Gender (1 = female)	.25[**]	.34[**]	.29[**]	.44[**]
Marital Status (1 = married)	.86	.83	1.13	.55[*]
Alcohol Consumption	1.86[**]	1.39[**]	1.94[**]	1.24[**]
Social Activities	1.10[*]	1.09[†]	1.07	1.07
Friends' Approval of Drinking	1.15[**]	1.18[**]	1.16[**]	1.19[**]
Substances for Tension Reduction	1.80[**]	2.92[**]	1.47[†]	1.37
Avoidance Coping	1.04	1.05	1.05	1.02
Religious Involvement	.89[†]	.85[*]	.97	.94
Financial Resources	1.08[**]	1.03	1.07[**]	1.05[†]
Model Chi Square	203.40[**]	122.99[**]	173.37[**]	59.53[**]
Degrees of freedom	10	10	10	10
Nagelkerke R^2	.35	.26	.33	.14

Note. Entries are odds ratios.

[†] p < .10;

[*] p < .05;

[**] p < .01

Table 3

Logistic Regression Analyses of Life History Predictors of 10-Year and 20-Year High-Risk Alcohol Consumption and Drinking Problems

Predictors	10-Year Criteria		20-Year Criteria	
	3+Drks/Day 14+ Drks/Wk (N = 708)	Drinking Problems (N = 708)	3+Drks/Day 14+ Drks/Wk (N = 716)	Drinking Problems (N = 716)
History of Drinking				
Moderate to Heavy Drinking by Age 50	1.09	.85	1.22†	1.03
Drinking Problems by age 50	1.56**	2.04**	1.35*	1.37*
History of Help-Seeking				
Advised to Cut Down	1.76*	4.98**	1.82*	1.97*
Tried to Cut Down	.64†	.60†	.57*	.88
Help from Family and Friends	.98	.92†	.94	.93
Professional Help	1.09	1.09	1.10	1.02
Help from AA	.47**	.52**	.50*	.56†
Model Chi Square	94.26**	100.41**	74.64**	37.30**
Degrees of freedom	10	10	10	10
Nagelkerke R^2	.17	.21	.15	.09

Note. Entries are odds ratios that control for age, gender, and marital status.

†p < .10;

*p < .05;

**p < .01

Table 4

Logistic Regression Analyses of Late-Life and Life History Predictors of 10-Year and 20-Year Alcohol Consumption and Drinking Problems

Predictors	10-Year Criteria		20-Year Criteria	
	3+Drks/Day 14 + Drks/Wk (N = 707)	Drinking Problems (N = 707)	3+Drks/Day 14 + Drks/Wk (N = 715)	Drinking Problems (N = 715)
Step 1. Demographics				
Block Chi Square	54.15**	19.16**	43.73**	17.56**
Nagelkerke R^2	.10	.04	.09	.04
Step 2. History of Drinking and Help Seeking				
Drinking Problems by age 50	1.63**	1.92**	1.47**	1.39*
Advised to Cut Down	1.85**	4.78**	1.85*	1.88*
Tried to Cut Down	.65*	.51*	.55*	.78
Help from AA	.50**	.53**	.51**	.52**
Block Chi Square	39.32**	77.41**	25.79**	17.52**
Increment in Nagelkerke R^2	.07	.17	.05	.05
Step 3. Late-Life Predictors				
Alcohol Consumption	1.82**	1.35**	1.97**	1.24**
Friends' Approval	1.15**	1.17**	1.16**	1.17**
Substances for Tension Reduction	1.80**	2.54**	1.53†	1.30
Financial Resources	1.08**	1.03	1.06**	1.05*
Block Chi Square	118.98**	61.85**	116.69**	31.20**
Increment in Nagelkerke R^2	.19	.12	.21	.07

Note. Entries are odds ratios.

† p < .10;

* p < .05;

** p < .01.