Full length article

Mediation of effects of the level of response to alcohol and impulsivity 15 years later in 36-year-old men: Implications for prevention efforts

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A B S T R A C T

Background: Although the prevalence of alcohol use disorders (AUDs) has increased in older individuals in the recent decade, there are few programs to mitigate that increase. The current analyses evaluate the feasibility of applying to older drinkers elements of an approach to prevent heavier drinking in young adults by focusing on mediators of effects of two risk factors for alcohol problems, low levels of response to alcohol (low LRs) and higher impulsivity.
Methods: Data were extracted from the San Diego Prospective Study (SDPS). Structural Equation Models evaluated relationships among age 36 low LRs and higher impulsivity; age 46 perceived peer drinking, alcohol expectancies, and drinking to cope; and age 51 alcohol problems, even after controlling for age 36 alcohol problems.
Results: Relationships of age 36 low LRs to later alcohol problems was both direct and linked to age 46 heavy drinking peers. LR also operated indirectly through peer drinking to alcohol expectancies and drinking to cope. Age 36 impulsivity had no direct path to later alcohol problems and operated primarily through mediation by alcohol expectancies and via expectancies to drinking to cope. After controlling for age 36 alcohol problems, the low LR and impulsivity results remained robust.
Conclusions: Programs for mitigating increases in alcohol problems in middle-age drinkers should consider identifying individuals with low LRs and/or higher impulsivity and implementing prevention approaches similar to a program used in young adults. The approach should emphasize some different mediators for older drinkers with low LRs and those with higher impulsivity.

1. Introduction

Historically, risks for heavy drinking and alcohol problems have been thought to decrease with age, although with great variability between individuals (Brennan et al., 2011). Regarding the latter, about 25% of drinkers in their forties drink daily, and a similar proportion consume > five drinks per occasion (Breslow et al., 2003, 2017; Grant et al., 2015; Molander et al., 2010). Even if quantities consumed decreased, with age higher blood alcohol concentrations (BACs) are likely to be observed per drink (Bielefeld et al., 2015).

Over the last decade individuals age 45 and older in the U.S. actually increased their prior-year high-risk drinking by over 50%, and their alcohol use disorders (AUDs) by almost 100% (Grant et al., 2017). Such increases are especially concerning in older individuals as they are more vulnerable to alcohol's psychomotor effects, with increased risks for falls (Boissoneault et al., 2014). They also have chronic medical conditions and take multiple prescription medications that might interact adversely with alcohol (Avendano et al., 2009). Older individuals

who drink heavily have at least a 70% increase in their 20-year morbidity, a figure that is even higher for those who previously were more moderate drinkers (Holahan et al., 2010, 2015).

The rapid increase in high-risk drinking and AUDs in individuals in their fifth decade highlights a need to work to prevent future alcohol-related problems in this group. One approach is to identify characteristics that predict future alcohol-related adverse outcomes, establish how they operate over time to enhance alcohol problems (e.g., mediators of the risk), and work to change those mediators (Conrod et al., 2013; Schuckit et al., 2016). This paradigm has had promising results in young adults, especially for those carrying enhanced risks for future alcohol problems through how they react to alcohol (Savage et al., 2015; Schuckit et al., 2016). Prominent among the several alcohol response phenotypes that relate to future alcohol problems (King et al., 2016), is the low level of response (low LR) to alcohol (Quinn and Fromme, 2011; Ray et al., 2010). Low LRs can be seen early in the drinking career and before intersession tolerance and AUDs are likely to have developed, and they predict future heavy drinking (Schuckit et al.,
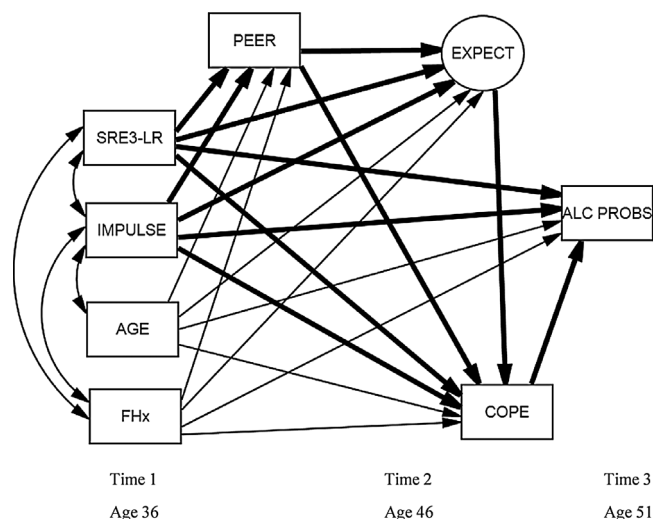
Fig. 1. Hypothesized Model*.
Indicated in bold are the primary hypothesized pathways that potentially impact on prevention efforts in middle age drinkers. Variables include Time 1 SRE3-LR (level of response to alcohol using the prior 3 months of drinking Self-Report of the Effects of Alcohol questionnaire)and impulsivity (IMPLUSE) as they relate directly to Time 3 alcohol problems (ALC PROBS) and via partial mediation by Time 2 perceived peer drinking (PEER), alcohol expectancies (EXPECT), and drinking to cope (COPE). The remaining Time 1 variables, Age and Family History Alcohol Use Disorder (FHx), are baseline covariates in the model. The variables used here are described in Table 2. In the model manifest variables (directly measured values) are represented by rectangles and the latent variable (as generated by confirmatory factor analyses in the SEM measurement model) by a circle.
*Modified from the Hypothesized Model in Schuckit et al. (2017), Alcoholism: Clinical and Experimental Research.

2008, 2007). A second characteristic linked to later problematic drinking is impulsivity, or a tendency to act without appropriate forethought, a phenotype also seen early in life that predicts later alcohol problems (Salvatore et al., 2015; Sher et al., 2005).

As demonstrated in the hypothesized model in Fig. 1, based on prior prospective studies (Schuckit et al., 2012, 2011, 2009, 2004) we predicted that low LRs would contribute to drinkers consuming as much alcohol as needed to achieve the effect they wanted (e.g., feeling drunk or intoxicated). This would have direct effects on later heavy drinking and impact on future excessive alcohol consumption through several mediators of the impact of a low LR. These include: 1) associating with heavier drinking peers who become models of how heavier drinking is a desirable behavior; 2) developing expectations that the most desirable effects of alcohol occur at high BACs with subsequent seeking high alcohol levels to achieve those desired effects; and 3) as alcohol quantities escalate and problems develop, drinkers turn to alcohol to diminish resulting distress. Our group and others have also proposed similar mediators of how impulsivity relates to later heavy drinking and associated problems (e.g., Schuckit et al., in press, 2004; Sher, 1991; Zucker et al., 1995).

We recently reported that teaching young adult drinkers how to determine if they had a low LR to alcohol and working with them to dampen the impact of heavy drinking peers, change their positive expectancies of alcohol's effects, and avoid using alcohol to cope with stress was associated with subsequent decreases in drinking quantities and alcohol-related blackouts (Goncalves et al., 2017; Savage et al., 2015; Schuckit et al., 2016). We also used prospective structural equation models (SEMs) in young adults to compare whether the relationships of low LR and impulsivity to adverse alcohol outcomes were mediated by the same characteristics (Schuckit et al., in press). We found that low LRs had direct links to alcohol problems four years later, with the effect of LR also partially mediated through the perception of heavier peer drinking. However, impulsivity had no direct relationship

to later alcohol problems, with the effect on adverse alcohol outcomes mediated primarily through alcohol expectancies. In the SEM, LR was not directly related to expectancies and impulsivity did not relate to peer drinking (Schuckit et al., in press). Similar education-based approaches to decreasing alcohol-related problems in adolescents have also been reported (Conrod et al., 2013)

These results raise the question of whether similar approaches might be useful in preventing alcohol problems in older adults whose vulnerability toward heavy drinking relates to low LRs or impulsivity. The first step in addressing this issue is to ask whether the influence of peers, alcohol expectancies and coping mechanisms might be good targets for change in older drinkers because they remain in flux in middle age and beyond. There are data that indicate that peers do change with age as adult children hold increasingly important roles, marriages end and new relationships begin, and older friends and relatives pass away (e.g., Carstensen, 1992; Steinberg and Monahan, 2007). Alcohol expectancies are also likely to change with increasing age, with potentially less salience on beliefs regarding positive and more emphasis on negative effects of alcohol as people age and are likely to develop higher BACs per drink (Leigh and Stacy, 2004; Pabst et al., 2010). Also, stresses are likely to increase as drinkers grow older, especially regarding chronic rather than episodic stresses along with changes in coping strategies (Aldwin et al., 1996; Martin et al., 2008). In addition, studies support the continuing importance of impulsivity in individuals in middle age and beyond (Lufi et al., 2015).

The second step when considering whether to apply to older drinkers the prevention strategy recently used in young adults is to prospectively evaluate whether older drinkers demonstrate relationships between earlier LRs and levels of impulsivity and later drinking practices, and if those relationships might be at least partially mediated by intermediate time characteristics. For this we turned to prospective data available for 36-year-old men in the San Diego Prospective Study (SDPS) (Schuckit and Gold, 1988; Schuckit et al., 2004). With the earlier youth sample results in mind (Schuckit et al., in press), the analyses use the same hypothesized model that includes similar Time 1 (age 36) LR and impulsivity-related predictors and appropriate covariates, the same Time 2 (age 46) intermediate variables, and the same Time 3 (age 51) alcohol problems. Based on the earlier findings with young adults (Schuckit et al., in press) the analyses tested the following hypotheses: 1) Time 1 LR and impulsivity will correlate with alcohol problems at Time 3, a step necessary to evaluate the additional hypotheses; 2) LR, but not impulsivity, will have a direct path to Time 3 alcohol problems in the SEM; 3) The relationship of Time 1 LR to Time 3 alcohol problems will be partially mediated by Time 2 perceived peer drinking patterns; 4) The relationship of impulsivity to Time 3 alcohol problems will be partially mediated by higher Time 2 alcohol expectancies; and 5) Both LR and impulsivity will contribute significantly to the SEM results.

2. Material and methods

2.1. The sample

Data were generated from average age 36, 46, and 51 follow-ups of SDPS probands. The original protocol, which received approval from the University of California, San Diego (UCSD) Human Subject's Protection Committee at each stage of the work, began in 1978 by selecting drinking but not alcohol dependent 18-to-25-year-old male UCSD students and nonacademic staff. Half of these participants had an alcohol dependent father, with each such subject matched with a family history negative control regarding demography, recent drinking, and drug use histories (Schuckit and Gold, 1988). By June 1988, 453 probands had been identified and evaluated for their LR to alcohol using alcohol challenges (Schuckit and Gold, 1988). These men, and an additional informant for each, were interviewed ten years after study entry and then every five years to determine their drinking quantities,