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## Addictive Behaviors



## To drink or not to drink: Motives and expectancies for use and nonuse in adolescence

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## ABSTRACT

Drinking motives have a prominent role in cognitive models of adolescent and adult alcohol decision-making (Cooper, Russell, Skinner, & Windle, 1992; Cooper, 1994). The complementary construct of motivation not to drink has received less attention (Epler, Sher & Piasecki, 2009). We examined how abstinence motives interacted with drinking motives and alcohol expectancies to predict alcohol consumption in samples of US high school students ( $N > 2500$ ). Nondrinking motives predicted lower rates of lifetime and current alcohol use. Motives not to drink interacted with specific drinking motives, like social and coping motives, and alcohol expectancies to predict certain aspects of drinking behavior. For example, motives not to drink had the greatest impact on youth with weaker social motivations. Findings highlight the distinction between motives not to drink and other alcohol-related cognitions in predicting adolescent alcohol consumption. This work not only supports the utility of this construct in developing models of youth alcohol-related decision-making but also has implications for prevention programming.

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## 1. Introduction

Cox and Klinger (1988, 2004) proposed two motivational pathways impacting individual decisions to drink alcohol. Alcohol use motives, reasons based on beliefs that alcohol will increase positive affect or reduce negative affect, characterize one pathway to alcohol consumption. Numerous authors have demonstrated the influence of drinking motives on alcohol use and alcohol-related problems in adolescents and adults (e.g., Birch et al., 2004; Bradizza, Reifman, & Barnes, 1999; Cooper, Frone, Russell, & Mudar, 1995). The current four factor model, including social, coping, enhancement and conformity motives, has dominated this literature since the 1990s (Cooper, 1994). Despite the expansion of drinking motives in the literature, Cox and Klinger originally proposed a complementary influence in their model – motives not to drink. Through this pathway, reasons to abstain from drinking, based on beliefs of decreased positive affect or of increased negative affect from alcohol, should lead to reduced consumption. A number of different terms have been used to capture this construct (Epler, Sher, & Piasecki, 2009), including reasons to abstain/limit drinking (Amodeo, Kurtz, & Cutter, 1992), motives not to drink (Stritzke & Butt, 2001) and motivations for abstinence (Downey, Rosengren, & Donovan, 2000). Regardless of terminology, this construct needs to be understood

within the proposed motivational framework and within the context of alcohol use transitions (Bekman et al., 2010; Metrik, McCarthy, Frissell, MacPherson, & Brown, 2004).

With a focus on reasons for limiting or abstaining from drinking (RALD), Epler et al. (2009) examined the longitudinal influence of RALD on alcohol consumption from ages 18 to 34 years. Through confirmatory factor analysis, they validated a three-factor model of RALD including loss of control, adverse consequences and convictions in an undergraduate sample with and without a family history of substance use disorders. These three domains differentially predicted outcomes such that personal convictions, or motives based on upbringing or religion, were associated with greater abstinence, while reasons associated with avoidance of negative consequences predicted greater alcohol consumption. Given their longitudinal findings, the authors concluded that adverse consequences and loss of control reasons might be best considered indicators of problematic drinking rather than predictors of future behavior.

Less research has been done on the construct of motives not to drink in younger adolescents prior to the initiation of drinking or when drinking patterns are being established. Using Cox and Klinger's framework, Stritzke and Butt (2001) developed a five factor measure of motives not to drink in Australian adolescents, the Motives for Abstaining from Alcohol Questionnaire (MAAQ). MAAQ factors included fear of negative consequences (e.g., concerns about study and job performance, general health, getting in trouble), dispositional risk (e.g., aversions to alcohol due to medical conditions or family history of alcohol problems), family constraints (e.g., disapproval of family or friends), religious constraints (i.e., religious proscriptions), and indifference toward drinking. This measure was found to be

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generally invariant across drinkers and nondrinkers in evaluating decisions to not drink on all or some occasions. In mid-adolescents, drinking frequency was positively associated with family constraints and indifference, while quantity was inversely associated with a fear of negative consequences. Youth who endorsed more dispositional risk motives were more likely to be drinkers vs. abstainers, while religious constraints and indifference were associated with reduced odds of being a drinker. While the negative consequences and religious constraint factors were consistent with Epler's findings with older adolescents and young adults, the additional factors within the MAAQ might represent developmentally important differences between younger and older adolescents, drinking experience itself, or the explicit inclusion of youth family history positive for substance use disorders in the Epler sample.

Many other cognitive factors have been examined in relation to drinking behavior among youth and adults that are conceptually related to drinking motives. One substantial area of research, preceding work on motives to drink or not drink, is alcohol expectancies. Alcohol expectancies are learned connections between alcohol consumption and positive and negative outcomes, which become implicit memories and prime anticipatory responses in settings where alcohol may be consumed (Goldman, Brown, & Christiansen, 1987). Negative expectancies have been shown to be better predictors of drinking frequency, while positive expectancies are stronger predictors of the quantity of alcohol consumed during each drinking episode (Lee, Greely, & Oei, 1999). Developmentally, positive alcohol expectancies tend to increase throughout childhood with an upsurge during third to fifth grades (Dunn & Goldman, 1996, 1998, 2000; Müller, Smith, & Goldman, 1990). Lifespan work suggests that while positive alcohol expectancies most strongly influence alcohol consumption prior to age 35, negative alcohol expectancies become more dominant after this transition (Leigh & Stacy, 2004). More recently, work in high school students has shown that youth hold expectancies for cessation, or positive and negative outcomes for reducing or stopping drinking, that are associated with drinking behavior (Metrik et al., 2004). Complex relations have been found between drinking motives and alcohol expectancies in the prediction of drinking outcomes (Cronin, 1997; Kuntsche, Knibbe, Engels, & Gmel, 2007). However, interrelations between motives not to drink and alcohol expectancies have received less attention.

The goal of this paper was to examine the interaction of motives not to drink and other cognitive factors associated with alcohol consumption, alcohol expectancies (positive outcome and abstinence) and drinking motives, in the prediction of lifetime drinking status and current levels of use. We expected that motives and other cognitive factors would be differentially associated with drinking behavior, such that motives not to drink and expectancies for not drinking would be associated with lower alcohol consumption, while drinking motives and positive outcome expectancies would predict greater consumption. Given the diversity of findings on the relations between cognitive factors and use-related problems (Carey & Correia, 1997; Lewis et al., 2008; Read, Wood, Kahler, Maddock, & Palfai, 2003), we expected motives not to drink to be associated with fewer alcohol-related problems, but that motives to drink – particularly drinking to cope (Cooper et al., 1995; Cox, Hosier, Crossley, Kendall, & Roberts, 2006), and positive alcohol expectancies – would be related to greater problem endorsement (Brown, Christiansen, & Goldman, 1987; Metrik et al., 2004). As Cox and Klinger's (1988, 2004) original motivational model suggested interaction effects between these cognitions, we anticipated that drinking motives would moderate the relation between motives not to drink and alcohol consumption, whereby motives for abstinence would mitigate the impact of some drinking motives on drinking. We expected motives for abstinence to also assert protective effects in the context of expectancies, modulating risk conferred by positive outcome expectancies and greater protection in conjunction with expectancies for abstinence.

As the examination of motives not to drink is a burgeoning area, our secondary goal was to examine patterns of endorsement of these motives as a function of demographic characteristics and grade-related differences. Given differences in drinking behavior across the middle adolescent years (Brown et al., 2008), we expected fewer abstinence motives among students in higher grades, contemporaneous with increased drinking behavior, and to be higher among girls, consistent with cross-national work on gender differences in abstinence motives (Bernards, Graham, Kuendig, Hettige, & Obot, 2009). On the basis of previous work (e.g., Cooper, 1994; Epler et al., 2009; Stritzke & Butt, 2001), we predicted that motives for abstinence would be inversely related to motives to drink and positive expectancies for drinking, but positively associated with expectancies for not drinking.

## 2. Materials and methods Study 1

### 2.1. Participants

A school wide survey of alcohol and other drug use was conducted at a private, parochial high school in the Pacific Northwest in 2009. Approximately 75% of the student body reported being Catholic. Parents of the over 1200 students in the school, across ninth through twelfth grades, were invited to participate via letter and announcements in the school newsletter. Signed permission slips to the school were returned for 1117 (~91%) and 1088 assented to participate in the online survey (98% assent rate). Of the original 1088, 18 cases were dropped due to invalid responding (i.e., endorsed use of fake drug;  $n = 14$ ) or self-reported lack of honesty ( $n = 4$ ). One case was excluded from analysis as the participant did not respond to any items relating to this investigation. Sample characteristics are presented in Table 1.

### 2.2. Measures

#### 2.2.1. Demographics

Individual items queried student sex and grade. Race (e.g., Caucasian, African-American, etc.) and ethnicity ("Do you consider yourself Latino/a?") 0 –No, 1 –Yes) were asked separately. This strategy of disaggregating race and ethnicity was based on current National Institute of Health reporting guidelines. In addition, differential prediction of drinking behavior has been shown when separating race from ethnicity in adolescent samples (Anderson, Tomlinson, Robinson, & Brown, 2011). Given the demographic

**Table 1**  
Demographic and alcohol use characteristics by sample.

Demographics	Study 1	Study 2
	$n = 1069$	$n = 1582$
Age	$m = 15.6 (sd = 1.2)$	$m = 15.9 (sd = 1.2)$
Girls	48.8%	51.8%
Grade		
9th	29.1%	25.6%
10th	25.3%	26.3%
11th	23.4%	24.8%
12th	22.2%	23.3%
Race/ethnicity		
Caucasian	83.9%	71.3%
Asian-American	9.4%	16.9%
African-American	3.6%	0%
Hawaiian/Pacific Is.	2.6%	2.7%
Native American	0.5%	3.0%
Latino/a	5.3%	15.8%
Past 30-day alcohol use*	$m(sd)$	$m(sd)$
Frequency (days/mo)	2.8 (3.0)	4.6 (5.1)
Quantity/episode	3.7 (3.3)	4.7 (3.8)
HED	1.1 (2.5)	2.2 (3.6)

Note: Using the exclusionary criteria in place, the few African-American students in Sample 2 were excluded. HED: heavy episodic drinking. \*Rates for current drinkers.

composition of this sample, race was coded dichotomously (Caucasian vs. other) for analysis.

### 2.2.2. Alcohol use

To estimate the percentage of the sample with lifetime drinking experience, a single item asking about lifetime drinking frequency was drawn from the California Healthy Kids Survey (CHKS; WestEd, 2009), a statewide assessment of drinking behavior and health. This item was recoded into a dichotomous variable (0 – No lifetime drinking, 1 – More than one lifetime use episode). Given the skewed nature of the original data for current drinking behavior (past 30 days), we computed dichotomous variables for current drinking based on items from the CHKS querying frequency of past month drinking and heavy episodic drinking (4+ drinks per episode).

### 2.2.3. Problems from alcohol

Students were asked to report on whether they experienced problems from alcohol consumption (“During the past 30 days, did you have any physical, school, relationship, legal, or social problems because of alcohol?” [yes/no]). This item was derived from the 2009 version of the Oregon Healthy Teens Survey, another statewide assessment of health behaviors (Center for Health Statistics, Oregon Department of Human Services, 2009).

### 2.2.4. Drinking motives

The Drinking Motives Questionnaire-Revised (DMQ-R) asks participants to rate 20 reasons they might be motivated to drink alcohol on a five point scale ranging from 1 (Almost Never) to 5 (Almost Always; Cooper, 1994). This measure has been used extensively to assess drinking motives in adolescent and collegiate samples (Cooper, 1994; MacLean & Lecci, 2000). The DMQ-R contains four motive scales that demonstrated good to excellent reliability in this sample: social ( $\alpha = .96$ ;  $m = 1.93$ ,  $sd = 1.21$ ), coping ( $\alpha = .89$ ;  $m = 1.38$ ,  $sd = .74$ ), enhancement ( $\alpha = .96$ ;  $m = 1.88$ ,  $sd = 1.21$ ), and conformity ( $\alpha = .93$ ;  $m = 1.39$ ,  $sd = .76$ ). Scale scores ranged from 1 to 5.

### 2.2.5. Motives not to drink

Motives for Abstaining from Alcohol Questionnaire (MAAQ; Stritzke & Butt, 2001) was designed to assess reasons not to drink alcohol across five domains: fear of negative consequences (e.g., “Alcohol may affect my studies”), dispositional risk (e.g., “My doctor told me not to drink alcohol”), family constraints (e.g., “My family disapproves of drinking”), religious constraints (“Drinking alcohol is against my spiritual and religious beliefs”), and indifference towards alcohol (“I do not like the taste or smell of alcohol”). The five items provided earlier were selected on the basis of having the highest factor loading on the scale of interest in the initial validation sample. Mean values across these items were used in analysis ( $m = 2.10$ ,  $sd = .95$ ; range = 0–4) and were reliable in this sample ( $\alpha = .78$ ).

## 2.3. Procedures

School wide surveys were conducted across a three day period. Students with written parental consent were asked to report to one of three computer labs during assigned class periods (those without consent were assigned to a study hall). Research assistants directed students to read assent materials presented via computer, and if assenting, to complete the online survey. Students completed one of three versions of the survey (same items in differing orders); survey format was assigned to computer stations such that adjacent computers had different forms, increasing student privacy. If students indicated that they were nondrinkers on the second of two sequential items on lifetime drinking, they skipped quantity/frequency of drinking assessments and completed the remaining survey items. Surveys were presented using SurveyMonkey, an independent online

survey provider (SSL encryption). Participants were allowed to skip questions (after the required assent item) or stop at any time if they wished. All study procedures were approved by the Reed College Human Subjects Research Committee and the school administration.

## 2.4. Analytic strategy

To examine demographic differences on the variables of interest, chi-squares and ANOVAs were conducted. Twenty-eight participants were missing data on at least one independent variable and were considered missing completely at random. Multiple imputation (MI; Stata 11.0) compensated for patterns of missing data within the predictor variables (Schafer & Graham, 2002). Each missing value was replaced by a set of  $m > 1$  plausible values to generate  $m$  complete data and was combined to provide parameter estimates and standard errors in the regressions (Sinharay, Stern, & Russell, 2001). Thirty-five data sets were generated for multiple imputation using chained equations (van Buuren, Boshuizen, & Knook, 1999), a successful strategy in past investigations (Anderson, Ramo, Schulte, Cummins, & Brown, 2007, 2008; Anderson et al., 2011). Standard regression equations were evaluated using MI for all analyses in the study. All variables included within the interaction terms (e.g., nondrinking motives, social motives, etc.) were centered prior to generating the term (Aiken & West, 1991).

## 3. Results Study 1

Participating youth were approximately evenly distributed between girls and boys, predominantly Caucasian, and a relatively small percentage endorsed being Latino/a (Table 1). The distribution of students by grade matched the overall characteristics of the school population. When considered separately by grade, rates of alcohol consumption (lifetime and 30-day) were significantly lower than national comparison samples of 10th graders (lifetime: 51% vs. 58%,  $z = -2.30$ ,  $p = .02$ ; 30-day: 24% vs. 29%,  $z = -1.80$ ,  $p = .04$ ) but consistent with national averages for 12th grade students (lifetime: 74% vs. 72%,  $z = .74$ ,  $ns$ ; 30-day: 41% vs. 43%,  $z = -.67$ ,  $ns$ ; Monitoring the Future, Johnston, O'Malley, Bachman, & Schulenberg, 2009). Among current drinkers, students drank almost three days per month on average with almost four drinks per episode, and 41% endorsed heavy episodic drinking (Table 1).

Group differences emerged on aspects of alcohol-related cognition. Gender differences were found for motives not to drink, with greater endorsement of these motives by girls,  $t(1062) = 4.33$ ,  $p < .0001$ , but not for drinking motives. In general, endorsement of nondrinking motives decreased across grade,  $F(3, 1061) = 39.11$ ,  $p < .0001$ , while drinking motives increased across grade,  $F_s$  ranging from 7.01 (conformity) to 58.54 (social),  $ps < .0001$ . The sole racial and ethnic difference was that motives not to drink were lower among Caucasian participants,  $t(1048) = 2.19$ ,  $p < .0001$ .

The pattern of correlations between scales is presented in Table 2. As predicted, motives not to drink were inversely related to the drinking motives scales. It must be noted that the correlation between enhancement and coping motives was unusually high ( $r = .87$ ). Close examination of the data could not systematically account for the

**Table 2**  
Study 1: Correlations between motives scales ( $n = 1042$ ).

	SM	CM	EN	CNF
SM	—			
CM	.65	—		
EN	.89	.67	—	
CNF	.54	.59	.51	—
MND	-.46	-.28	-.48	-.18

Note: MND: motives not to drink; SM: social motives; CM: coping motives; EN: enhancement motives; CNF: conformity motives; all  $ps < .0001$ .

difference from previous studies and must be taken under advisement when considering these findings.

### 3.1. Lifetime drinking

Results of the MI regressions are presented in Table 3. Drinking initiation was more likely among students in the upper grades and Caucasians. Lifetime drinking was associated with stronger motivations for enhancement, but weaker coping and conformity motives. A significant interaction of motives not to drink and social motives emerged. Post hoc probing of the interaction suggested that there was a protective effect for nondrinking motives among youth with weaker social motives. There was no effect for motives not to drink for youth with stronger social motivations for drinking.

### 3.2. Current drinking status

While demographics were unrelated to current drinking status, those who drank in the past 30 days endorsed stronger enhancement motives and weaker conformity motives. Similar to the pattern for lifetime drinking, motives not to drink were protective in the context of low social motives, but had no effect for youth with greater social motivations. Youth with greater motivation not drink and stronger coping motives were less likely to drink in the past 30 days (Table 3). When coping motivation was low, nondrinking motives did not influence current drinking status.

### 3.3. Heavy episodic drinking and problems

When examining heavy episodic drinking and drinking problems among current drinkers as outcome variables, there were no significant interactions between types of motives. Boys and students with greater coping motives were more likely to engage in heavy episodic drinking. Problematic drinking was more likely for boys and students of color (Table 2).

### 3.4. Study 1 summary

As predicted, motives not to drink decreased with increasing grade in school and were more commonly endorsed by girls in this sample of private school students. Caucasian students endorsed weaker motives for abstinence than students of color. Associations between motives to drink and not drink were in the expected direction with motives to not drink being inversely related to drinking motives. The pattern of

associations for the DMQ-R scales was generally consistent with past investigations (Bradizza et al., 1999; Kuntsche, Knibbe, Gmel, & Engels, 2005). As in past research with teens, conformity motives predicted lower drinking rates among adolescents while coping motives were related to more hazardous drinking patterns (Cooper, 1994).

Motives not to drink interacted with social motives in predicting drinking initiation and being a current drinker, but were unrelated to hazardous and problematic drinking (specifically, drinking problems and heavy episodic drinking). Social motives exerted a strong influence on drinking status; motives for abstinence were only protective for youth with weaker social motivations. Motives for abstinence and seeing alcohol as a mechanism to cope protected against past 30-day alcohol consumption, but only for youth with high levels of coping motives. These complex interrelations will be considered in greater detail later.

There were two main issues with the generalizability of these findings for motives not to drink. First, the sample was recruited exclusively from a private Catholic school. While religious engagement has generally been seen as a protective factor against drinking, recent research suggests that religious affiliation may merely be a proxy for other familial and socioeconomic variables that affect alcohol use (Harden, 2010; Kendler & Myers, 2009; Wormington et al., in review). However, research with teens has shown religious constraint to be a strong motive for abstinence (Stritzke & Butt, 2001), but it is unknown whether our findings in a predominantly Catholic sample will replicate. Secondly, the single-item measure of alcohol-related problems was less than ideal. To address these concerns, we replicated this study using a more traditional measure of alcohol-related problems in a more diverse sample and extended the research by examining how motives not to drink performed in the context of alcohol expectancies and expectancies for abstinence, two well validated cognitive constructs associated with drinking.

## 4. Materials and methods Study 2

### 4.1. Participants

In 2009, 7234 ninth through twelfth grade students from five high schools in San Diego County completed surveys of health-related behaviors in three formats. A total of 1826 students completed the version of the survey including this study's measures. Of these, respondents were dropped from analyses if they responded inconsistently (i.e., saying no to lifetime drinking but yes to 30-day drinking) or did not provide data on outcome variables of interest

**Table 3**  
Study 1: Prediction of lifetime and current drinking using MI.

Variable	Drinking initiation			Current drinking			Heavy episodic drinking			Problems		
	OR	SE	<i>p</i>	OR	SE	<i>p</i>	OR	SE	<i>p</i>	OR	SE	<i>p</i>
Sex	.89	.15	.50	1.29	.24	.17	1.88	.62	.05	.24	.14	.02
Grade	1.20	.09	.02	1.00	.09	1.0	1.36	.23	.07	.79	.22	.38
White	1.66	.39	.03	1.45	.39	.16	1.43	.65	.43	.23	.15	.03
Latino/a	1.89	.68	.08	1.14	.45	.74	.56	.38	.39	.55	.68	.63
MND	.60	.10	.003	.62	.08	<.0001	.56	.19	.09	.34	.22	.10
SM	4.42	1.11	<.0001	2.78	.50	<.0001	1.64	.60	.17	.91	.16	.60
CM	.42	.11	.001	.88	.17	.53	2.17	.67	.01	.94	.12	.63
EM	1.95	.43	.003	1.66	.29	.004	1.39	.44	.30	1.18	.19	.30
CFM	.44	.10	<.0001	.44	.08	<.0001	.53	.20	.09	1.07	.11	.54
MND*SM	2.00	.60	.02	1.49	.27	.03	1.06	.35	.86	.98	.14	.89
MND*CM	.66	.18	.13	.66	.13	.03	1.40	.38	.21	.97	.10	.75
MND*EM	.69	.20	.21	1.14	.21	.49	.92	.30	.80	1.08	.15	.59
MND*CFM	1.45	.39	.17	1.04	.19	.85	.61	.24	.20	.88	.09	.23
Model Est.	<i>n</i> = 1065; $\chi^2$ (13) = 540.64 <i>p</i> < .0001			<i>n</i> = 1064; $\chi^2$ (13) = 361.62 <i>p</i> < .0001			<i>n</i> = 255; $\chi^2$ (13) = 80.31 <i>p</i> < .0001			<i>n</i> = 257; $\chi^2$ (13) = 32.25 <i>p</i> = .004		

Note: Predictors included within interaction terms were centered prior to entry; MND: motives not to drink; SM = social motives; CM = conformity motives; EM = enhancement motives; CFM = conformity motives; Model Est.: averaged model estimates across 35 imputed sets.

( $n = 244$ ; 13.3%). Included respondents were more likely to be girls,  $\chi^2(df = 1) = 28.00$ ,  $p < .0001$ , and Caucasian,  $\chi^2(df = 1) = 19.32$ ,  $p < .0001$ . In fact, this strategy resulted in the exclusion of the small number of African-American students within the sample. While excluded teens were statistically younger than included youth,  $F(1, 1814) = 10.94$ ,  $p < .001$ , the margin of difference (~2 months) between groups was not considered relevant as grade level did not differ between groups. Characteristics of the analytic sample ( $n = 1582$ ) can be found in Table 1.

## 4.2. Measures

### 4.2.1. Demographics

Items queried student sex, grade and race. In the California Healthy Kids Survey, students were allowed to endorse multiple races/ethnicities. Race was coded to mimic Study 1, whereby two variables were created to capture race and ethnicity separately (Caucasian vs. other & Latino/a vs. not).

### 4.2.2. Alcohol use and problems

While the operationalization of lifetime (0/1), current (0/1) and heavy episodic drinking status (0/1) was the same as Study 1, the samples differed on the items used to characterize alcohol-related problems. Asking participants, "During the past month, how many times have you had any of the following happen to you because of drinking alcohol?", assessed alcohol-related problems. Each item was recoded to presence or absence in the past month and summed. Students identified whether they had experienced any of the following six problems from drinking alcohol: nausea/illness, academic problems, difficulties with friend/romantic partner, getting into trouble at school or a school event, illegal behaviors, and drinking and driving ( $\alpha = .70$ ; range = 0–6).

### 4.2.3. Alcohol expectancies

Positive alcohol expectancies were assessed using six items drawn from the Alcohol Expectancy Scale for Adolescents (AEQ-A; Christiansen, Goldman, & Inn, 1982). These items, rated on a five point scale (1 –Strongly Disagree to 5 –Strongly Agree), represented the three highest loading items from the two scales most associated with high school drinking (Metrik et al., 2004): social facilitation (i.e., "parties are less fun," "act like better friends," "allows people to join in") and cognitive and motor improvement (i.e., "do things better," "understand things better," "better control anger"). These items were averaged to form an AEQ composite ( $\alpha = .74$ ;  $m = 2.06$ ;  $sd = .76$ ).

### 4.2.4. Expectancies for not drinking

Four items modified from the Cessation Expectancy Scale (CEQ; Metrik et al., 2004) assessed student perceptions of changes associated with cutting down or stopping drinking for teens by asking "How would each of these change if you cut down or stopped drinking alcohol?" on a five point scale (1 –A Lot Worse, 5 –A Lot Better). Modification of this scale allowed for the assessment of these expectancies among nondrinkers as well by asking "If you don't drink, or cut down or stopped drinking, what would happen?" Two of the highest loading items were selected from the global abstinence expectancy (i.e., "My future would be..." and "My self respect would be...") and peer/social abstinence expectancy (i.e., "Fitting in with others would be..." and "Getting dates would be...") subscales. Again, an average of these items were combined to form a CEQ composite ( $\alpha = .95$ ;  $m = 3.43$ ;  $sd = .90$ ).

### 4.2.5. Motives not to drink

The same measure was used as in Study 1 ( $\alpha = .82$ ;  $m = 2.10$ ;  $sd = 1.13$ ; range = 0–4).

## 4.3. Procedure

Parents in the school district were notified of the survey via mail. The California Healthy Kids Survey is a bi-annual survey assessment of health-related behaviors (e.g., alcohol and drug use, nutrition, activity level), school engagement, and behaviors related to the school environment (i.e., aggression, internet use, etc.; Anderson & Brown, 2011; D'Amico et al., 2006). Using California Department of Education procedures, parents who did not wish for their children to participate notified the school via phone, email, pre-addressed post card or returning a form to school (97% consent rate). Youth participation was voluntary and student assent was obtained at the time of the survey (96% assent). Three versions of the survey were administered; participants in this study were randomly assigned within each school to receive each version of the survey. Trained research staff from the University of California, San Diego (UCSD) administered surveys in classroom settings and the UCSD Institutional Review Board and participating school districts approved all procedures.

## 4.4. Analytic strategy

As the data in Study 2 were collected from socioeconomically diverse schools within a relatively large geographic area, the influence of school placement was examined first. Overall, schools differed as a function of the proportion of lifetime drinkers,  $\chi^2(df = 4) = 27.56$ ,  $p < .0001$ , current drinkers,  $\chi^2(df = 4) = 24.58$ ,  $p < .0001$ , heavy episodic drinking,  $\chi^2(df = 4) = 32.89$ ,  $p < .0001$ , and drinking-related problems,  $F(4, 1577) = 13.96$ ,  $p < .00001$ . As such, all regressions were conducted using HLM. The random-effects parameter (i.e., school placement) significantly influenced model estimation for lifetime and current drinking models. At the time of this work, multiple imputation with HLM in logit models was not supported in Stata 11.0. Given questions about the stability of logit models in the MI framework (Anderson et al., 2011), no correction for missingness was used for these analyses. Given that only .04% of the data were missing (i.e., sex or grade items only), we felt comfortable estimating these models with available data.

## 5. Study 2 results

Table 1 provides the demographic and alcohol use characteristics of this sample. Compared to the sample in Study 1, the California sample contained a similar proportion of girls (52% vs. 49%,  $z = 1.52$ ,  $ns$ ), had significantly fewer freshmen (26% vs. 29%,  $z = -1.70$ ,  $p < .05$ ) was somewhat more diverse (71% Caucasian vs. 84%,  $z = -7.72$ ,  $p < .0001$ ) and had a greater proportion of Latino/as (16% vs. 5%,  $z = 8.69$ ,  $p < .0001$ ). In 10th grade, lifetime alcohol consumption was lower than national comparison rates (52%,  $z = -2.43$ ,  $p < .01$ ) but not for 30-day drinking (32%,  $z = 1.32$ ,  $ns$ ). Twelfth grade students had similar lifetime (72%,  $z = .00$ ,  $ns$ ) and 30-day rates (45%;  $z = .77$ ,  $ns$ ) to national samples (Johnston et al., 2009). Current drinkers in this sample drank about five days per month, five drinks per occasion, and 57% engaged in heavy episodic drinking in the past 30 days.

Similar to Study 1, girls endorsed more motives not to drink,  $t(1574) = 4.27$ ,  $p < .0001$ , and greater expectancies for abstinence,  $t(1574) = 3.29$ ,  $p = .0005$ , than boys. Boys reported greater positive alcohol expectancies than girls,  $t(1574) = -5.65$ ,  $p < .0001$ . In general, endorsement of nondrinking motives,  $F(3, 1576) = 24.29$ ,  $p < .0001$ , and abstinence expectancies,  $F(3, 1576) = 17.94$ ,  $p < .0001$ , decreased across grade, while positive alcohol expectancies increased from 9th to 12th grade,  $F(3, 1576) = 18.10$ ,  $p < .0001$ . Caucasian students endorsed fewer motives,  $t(1580) = 6.64$ ,  $p < .0001$ , and expectancies for abstinence,  $t(1580) = 3.50$ ,  $p = .0002$ , than students of color, but had higher positive alcohol expectancies,  $t(1580) = -2.54$ ,  $p = .006$ . Latino/a students did not differ from other students on alcohol-related cognitions. As predicted, motives not to drink were inversely related

to alcohol expectancies,  $r = -.46$ ,  $p < .0001$ , and positively related to expectancies for abstinence,  $r = .38$ ,  $p < .0001$ .

### 5.1. Lifetime drinking

Table 4 depicts the parameter estimates for the regressions. The random effects variable (i.e., school) was significant for lifetime drinking status,  $\bar{\chi}^2 = 5.49$ ,  $p = .01$ . Drinking initiation was more likely among girls, students in the upper grades, Caucasians and Latino/as. Students with greater motivation for abstinence were less likely to have initiated drinking. The interaction between alcohol expectancies and expectancies for not drinking was significant, suggesting that while positive abstinence expectancies generally buffered the impact of positive alcohol expectancies, the effect was most pronounced for youth with high levels of alcohol expectancy endorsement.

### 5.2. Current drinking status

School placement was a significant influence on the model for current drinking,  $\bar{\chi}^2 = 8.59$ ,  $p = .002$ . Demographically, the same pattern emerged for past 30-day drinking as for drinking initiation with the added influence of positive alcohol expectancies leading to current drinking. Motives to abstain interacted with expectancies for cessation such that having both stronger motives not to drink and positive abstinence expectancies reduced the odds of being a current drinking to a greater extent than when expectancies for abstinence were less positive (Table 4).

### 5.3. Heavy episodic drinking and problems

Among current drinkers, students in the upper grades and those with more positive alcohol expectancies were more likely to engage in heavy episodic drinking. Again, the interaction of motives and

expectancies not to drink was significant. In contrast to the findings for current drinking status earlier, the nondrinking motives  $\times$  abstinence expectancies interaction pattern differed when considering current drinkers alone. The odds of being a heavy episodic drinker decreased for youth with stronger motives not to drink and weaker positive expectancies for cessation. Nondrinking motives did not exert a protective effect for youth already endorsing strong expectancies for cessation.

Problematic drinking was more likely for girls and those with higher positive alcohol expectancies, but less likely as levels of motivation for abstinence increased. School placement was not an influential factor within either of these models (Table 4).

### 5.4. Study 2 summary

Nondrinking motives were distinct from other related cognitive constructs, including expectancies for not drinking and positive outcomes from drinking, in this larger sample of youth. Motives not to drink varied as a function of grade, sex, and race, somewhat consistently with the findings from Study 1, and mirrored drinking behavior. Consistent with previous investigations (Anderson & Smith, 2006; Brown et al., 1987), positive alcohol expectancies were associated with greater alcohol consumption and problems. However, this picture was complicated by interaction effects for drinking status. Positive expectancies moderated the impact of nondrinking motives on drinking initiation, such that these motives had the greatest protective effect for those high in positive alcohol expectancies. For current drinking status and heavy episodic drinking, expectancies for abstinence moderated the relationship between nondrinking motives and likelihood of drinking in the past 30-days, but in different ways. In the general sample of youth, having both stronger motives and expectancies not to drink led to a decreased likelihood of current drinking. Among current drinkers, motives for abstinence were only effective in reducing heavy episodic drinking among youth with lower expectations that stopping drinking would lead to positive outcomes. These findings suggest that motives and expectancies for abstinence may play different roles for youth at different phases of alcohol engagement.

**Table 4**  
Study 2: Prediction of lifetime and current drinking using HLM.

Variable	Drinking			Initiation			Current			Drinking			Status				
	B	SE	p	B	SE	p	B	SE	p	B	SE	p	B	SE	p		
Sex	-.54	.13	<.0001	-.55	.13	<.0001	-.55	.13	<.0001	-.55	.13	<.0001	-.55	.13	<.0001		
Grade	.39	.06	<.0001	.39	.06	<.0001	.29	.06	<.0001	.29	.06	<.0001	.29	.06	<.0001		
White	.83	.16	<.0001	.85	.17	<.0001	.85	.17	<.0001	.85	.17	<.0001	.85	.17	<.0001		
Latino/a	.77	.19	<.0001	.43	.19	<.0001	.43	.19	<.0001	.43	.19	<.0001	.43	.19	<.0001		
MND	-.70	.07	<.0001	-.60	.07	<.0001	-.60	.07	<.0001	-.60	.07	<.0001	-.60	.07	<.0001		
PAE	.78	.10	<.0001	.89	.10	<.0001	.89	.10	<.0001	.89	.10	<.0001	.89	.10	<.0001		
AE	-.47	.09	<.0001	-.56	.09	<.0001	-.56	.09	<.0001	-.56	.09	<.0001	-.56	.09	<.0001		
MND*PAE	.04	.09	.66	-.04	.09	.70	-.04	.09	.70	-.04	.09	.70	-.04	.09	.70		
MND*AE	-.05	.07	.46	-.17	.08	.02	-.17	.08	.02	-.17	.08	.02	-.17	.08	.02		
AE*PAE	-.25	.11	.02	-.11	.11	.32	-.11	.11	.32	-.11	.11	.32	-.11	.11	.32		
$n = 1571$ Wald $\chi^2(10) = 377.22^*$						$n = 1575$ Wald $\chi^2(10) = 311.38^*$											
Variable	HED			Drinking			Problems										
	B	SE	p	B	SE	p	B	SE	p	B	SE	p					
Sex	.23	.19	.23	-.43	.11	<.0001	-.43	.11	<.0001	-.43	.11	<.0001					
Grade	.39	.10	<.0001	.07	.05	.19	.07	.05	.19	.07	.05	.19					
White	.34	.30	.24	-.04	.16	.83	-.04	.16	.83	-.04	.16	.83					
Latino/a	.35	.30	.24	.15	.17	.38	.15	.17	.38	.15	.17	.38					
MND	-.26	.15	.08	-.21	.08	.01	-.21	.08	.01	-.21	.08	.01					
PAE	.69	.22	.002	.29	.12	.01	.29	.12	.01	.29	.12	.01					
AE	-.13	.24	.58	-.11	.13	.38	-.11	.13	.38	-.11	.13	.38					
MND PAE	.01	.18	.94	.13	.09	.16	.13	.09	.16	.13	.09	.16					
MND AE	.46	.23	.05	.20	.11	.08	.20	.11	.08	.20	.11	.08					
AE PAE	.33	.34	.34	.01	.15	.94	.01	.15	.94	.01	.15	.94					
$n = 534$ Wald $\chi^2(10) = 63.63^*$						$n = 534$ Wald $\chi^2(10)^2 = 50.00^*$											

Note: Predictors included within interaction terms were centered prior to entry; HED: heavy episodic drinking; MND: motives not to drink; PAE: positive alcohol expectancies; AE: abstinence expectancies; \* $p < .0001$ .

## 6. Discussion

Motives not to drink were examined in two large survey samples, ranging from a private high school in the Pacific Northwest to several public high schools in an urban school district in Southern California. As hypothesized, motives not to drink were distinct from other cognitive constructs associated with youth drinking. Motives for abstinence, drinking motives, expectancies for use and expectancies for not drinking demonstrated differential associations with lifetime drinking status, current alcohol use, heavy episodic drinking and use-related problems. As expected from Cox and Klinger (1988, 2004), motives for abstinence performed well in conjunction with drinking motives in cross-sectional models of alcohol use and alcohol-related problems.

Interesting patterns of moderation emerged for lifetime and current drinking status. Generally protective, motives for abstinence seemingly had the greatest buffering effect for youth with weaker social motives to drink. These results suggest that even with enhanced motivation to avoid negative effects of alcohol use, social motivation was more influential in youth's decisions to drink. However, when the social saliency of alcohol use is reduced, the importance of potential negative effects of use took precedence. This is consistent with literature emphasizing the saliency of social motivations in adolescent decision-making, particularly with regards to risky behaviors, such as substance use (e.g., Steinberg, 2008).

In contrast, youth endorsing stronger motives not to drink in the context of more positive alcohol expectancies and positive expectancies for abstinence were less likely to drink than their peers. One potential interpretation of these findings is that youth who have

initiated drinking have more diverse cognitive structures around alcohol (Dunn & Goldman, 1998), leading to intriguing intersections of these factors when considering lifetime and current drinking. Interestingly, the nature of the interaction between motives and expectancies for abstinence differed when only considering youth with more recent experience with drinking; nondrinking motives were most influential for youth who were less likely to see cutting down or stopping drinking as positive. This finding has positive implications for the premise behind secondary prevention programming. If we can increase proximal reasons not to drink among youth who are already drinking, perhaps we can divert them from more hazardous drinking patterns, even if they cannot see the benefits of quitting drinking all together.

Surprisingly, youth endorsing stronger motives not to drink and greater coping motivation were less likely to drink in the past 30 days. This seeming synergy between reasons not to drink and drinking to cope is difficult to interpret. An exciting possibility for prevention would be if when youth are provided with sufficient reasons not to drink, the potential risk conferred by beliefs regarding drinking to cope would be reduced. However, this seems unlikely as motives not to drink were unrelated to hazardous drinking patterns among current drinkers. In sum, while motives not to drink were generally protective, evidence suggests that they have greater or less salience at different phases of drinking engagement for teens (Bekman et al., 2010). Further longitudinal work is needed to bridge the developmental period from late childhood to adulthood to better understand the process whereby motives for abstinence may influence patterns of alcohol consumption and drinking consequences as adolescents mature.

Research on motives not to drink has been hindered by a lack of consistency in the measurement of this construct (Epler et al., 2009) and a dearth of available measures developed explicitly for use with adolescents. To fully explore the models proposed by Cox and Klinger (1988, 2004), additional research is needed to explore comprehensive models of alcohol-related decision-making that incorporate motives for not drinking in conjunction with drinking motives. This investigation supports the inclusion of the less studied construct of nondrinking motives in research with this age group.

The strengths of this investigation reside in the examination of a variety of cognitive constructs associated with adolescent drinking in two large samples. However, the cross-sectional nature of this investigation limits the inferences we can make regarding risk and protection conferred by these factors. In addition, our use of an unvalidated short form of a measure of motives not to drink was not ideal. Smith, McCarthy, and Anderson (2000) described a number of methodological sins in the development of short forms. Germane to this particular measure, we attempted to select items that best represented the breadth of the factor of interest, examined the content of items selected on the basis of highest factor loadings, validated the short form in multiple samples, and were able to reduce the measure from 19 to 5 items, an important reduction considering school's mandated time-in-learning constraints. Despite all efforts to retain the spirit of the measure, it can be argued that we used a short form of a measure too early in its validation process, did not explicitly extract the short form from within the long form and did not compare the short form to the original long form in these samples. In addition, work within this area has suggested differential prediction of drinking behavior as a function of different subtypes of motives for abstinence (Epler et al., 2009; Stritzke & Butt, 2001). The measure presented here provides a unitary view of the construct, limiting its usefulness in future work examining subdomains of these motives. While other work has shown the utility of assessing a summary of motives across domains (Boyd, McCabe, Cranford, & Young, 2006), these factors should be considered when making decisions regarding the use of this measure of motives not to drink.

## 7. Conclusions

Further investigation into the interplay of motives for drinking or not drinking has the potential for use in primary and secondary prevention programs. Motivational enhancement techniques targeting drinking motives have been tested in middle school (D'Amico et al., 2006), high school (Brown, Anderson, Schulte, Sintov, & Frissell, 2005), and collegiate samples (e.g., Borsari & Carey, 2000, 2005). A greater understanding of the impact of reasons not to drink in drinking-related decision-making would contribute to the development of empirically supported prevention and intervention programs for youth. Our preliminary findings here suggest that assisting youth in identifying their motivations and beliefs about nonuse may have beneficial effects within the broader context of alcohol-related learning. Future research is needed into the dynamic interplay of these opposing motivations and beliefs in alcohol-related decision-making for adolescents.

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### Contributors

Dr. Anderson designed the protocol and collected the data for Study 1 and also designed aspects of the protocol for Study 2. She conducted all analyses and wrote substantial portions of the manuscript. Mr. Grunwald and Ms. Grant provided the original theoretical integration of motives not to drink into these models and provided aspects of the Introduction. Drs. Brown and Bekman designed the protocol for Study 2, collected the Study 2 data, and provided text revisions to the manuscript. All authors have approved the final manuscript.

### Conflict of interest

All authors declare that they have no conflicts of interest.

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