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Trajectories and Correlates of Reasons for Abstaining or Limiting Drinking During Adolescence

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Abstract

Introduction—Our aim was to enhance understanding of the trajectory of reasons for abstaining and limiting drinking (RALD) over the course of adolescence and how RALD levels or trajectories may differ based on lifetime experience with alcohol and/or gender.

Methods—Participants were 1023 middle school students (52% female) who completed online surveys at baseline and five follow-ups over a 3-year period, assessing lifetime sip and full drink of alcohol and RALD. Hierarchical linear models were used to estimate change over time in total RALD and RALD subscales (upbringing, performance/control). Between-person (gender and drinking status) correlates of average RALD and change in RALD over time were considered.

Results—RALD total and subscale scores significantly decreased over time (ages 10.5-16.5). Drinking experience in both milestones (sip, full drink) was found to be a significant moderator of change in RALD over time; decline was fastest among adolescents reporting lifetime experience with drinking. Boys reported lower RALD, though the pace of change in RALD across time did not differ by gender.

Conclusions—This was the first study to report prospective changes in the cognitive domain of RALD among young adolescents. That change over time in RALD is moderated by drinking experience is a marker of risk among those with earlier drinking experience. Findings highlight the importance of considering sipping, not just consumption of full drink, as a pivotal developmental milestone. Prevention efforts that target RALD are implicated and parent-based intervention strategies may be beneficial.

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Contributors

Dr. Kristina Jackson designed the study and oversaw data collection. Dr. Jennifer Merrill conceptualized the research question, conducted the statistical analysis and wrote the first draft of the manuscript. Dr. Scott Martin assisted with literature searches and manuscript drafts. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All authors declare that they have no conflicts of interest.

Keywords

adolescence; reasons for abstaining/limiting drinking; drinking milestones; gender

Introduction

Adolescence (Brown et al., 2008; Windle, et al., 2008) is an important developmental period in which to study drinking, as alcohol use can presage future heavy drinking, alcohol use disorders, and other problem behavior (Blomeyer et al., 2011; Brook et al., 2010; 9Heron et al., 2012; Hingson, et al., 2006; Mason & Spoth, 2012). Sixteen to 20% of youth report that they first consumed alcohol prior to age 13 (Eaton et al., 2012; Substance Abuse and Mental Health Services Administration, 2012). Drinking prevalence is high even among very young adolescents, with 10%, 16%, and 29% of fourth, fifth, and sixth graders, respectively, reporting having tried more than a sip of alcohol (Donovan et al., 2004). Between eighth and twelfth grade, lifetime prevalence of alcohol use increases from 33% to 70%, and the percent of adolescents who report being drunk increases from 15% to 51% (Johnston, et al., 2012). Understanding such increases in risk behavior remains an important task.

Cognitions related to drinking also change during adolescence, not only impacting, but also being impacted by alcohol use. For example, explicit positive cognitions regarding alcohol (i.e., expectancies) are higher, while negative cognitions are lower for students in later grades among both abstainers and drinkers (Thush & Wiers, 2007). Drinking motives also increase over time among adolescents (Cooper, 1994; Cooper et al., 2008; Schelleman-Offermans, et al., 2011). A potentially important but relatively understudied cognitive factor is one's reasons for abstaining or limiting drinking (RALD; Epler, et al., 2009). The goals of the present study are to enhance understanding of the trajectory of RALD over adolescence and how RALD levels or trajectories differ based on lifetime experience with alcohol and/or gender.

Reasons for Abstaining or Limiting Drinking (RALD)

A great deal of research on adolescent cognitions about drinking emphasizes motives for drinking (for review see Kuntsche, et al., 2005). However, drinking motivations may be less developed for those who have limited drinking experience, making RALD more relevant for young adolescents. An understanding of factors that insulate against vs promote risky drinking is essential for effective prevention program development. The literature on RALD among younger adolescents is particularly limited, despite the fact that younger adolescence is a time period during which cognitions about alcohol use may be particularly dynamic.

Across studies, multiple domains of RALD have been proposed and observed, including personal and social motives; upbringing, religious, or moral concerns; need for self-control and performance goals; past problems; and risk of harm (Epler et al. 2009, Greenfield, et al., 1989; Huang et al., 2009, 2011; Palfai, & Ralston, 2011; Stritzke and Butt, 2001). One of the earliest measures was developed in a sample of college students (Greenfield, et al., 1989) and later used among adolescents, though without examining the factor structure in this population (Chassin & Barrerra, 1993). In the present study, given inconsistencies across the

literature and the likelihood that RALD may differ for younger adolescents, we factor analyzed a modified version of this measure in our sample prior to running substantive analyses.

Change in RALD over Time

As youth age and obtain information related to alcohol use both vicariously (via the media, observing friends and family members) and through personal experience with alcohol (Dawson, 2000), the extent to which they endorse RALD may also change. A dynamic reciprocal interplay may occur such that RALD influence actual drinking behavior while experience with drinking shapes cognitions such as RALD. One of the few examinations of RALD among adolescents was cross-sectional, demonstrating that students in higher grades report fewer non-drinking motives (Anderson, Grunwald, Bekman, Brown, & Grant, 2011). Similar results have been observed using longitudinal data among college students (Epler, et al., 2009; Huang, et al., 2011). To our knowledge, no study has used *longitudinal adolescent samples* to examine *within-person change over time* in endorsement rates of RALD. This is important, as between-person age/grade differences may not mirror the patterns observed in within-person trajectories of RALD over time.

Correlates of RALD

Gender—Research findings are mixed, with evidence for lower endorsement of RALD by males in some (Anderson et al., 2011; Bekman et al., 2011) but not all adolescent samples (Stritzke & Butt, 2001). Males also report lower RALD in general population (Bernards, Graham, Kuendig, Hettige, & Obot, 2009) and college student samples (Greenfield et al., 1989), though one study observed this to hold true only for one subscale of RALD (Epler et al., 2009). In this study, only mean levels of Loss of Control reasons (beliefs that one would become rude or obnoxious, lose control, become alcoholic, and get into trouble) were lower for males; Adverse Consequences (drinking costs too much, worry about becoming ill, and interferes with responsibilities), and Convictions (religion and friends against drinking) were not. Regarding age changes in RALD, Epler et al. (2009) also demonstrated that Loss of Control RALD decreased more quickly over time among women.

Alcohol Consumption—Direct drinking experience may influence alcohol-related cognitions such as RALD. Other alcohol-related cognitions, such as expectancies, increase as a function of increased drinking (Smith et al., 1995). According to self-perception theory (Bem, 1972), upon noticing that one is engaging in a behavior, an individual may conclude that he or she has a positive attitude toward that behavior. Positive attitudes may also develop if negative consequences are not experienced, or through interactions with peers who drink and in turn hold and share their own positive attitudes, or via parental permissiveness. As such, adolescents who have used alcohol, for a range of reasons, may begin to rate RALD as less important. Further, *decreases* in RALD over time may occur more quickly among those youth who have experience with drinking.

Cross-sectional research suggests that higher RALD is associated with lower rates of drinking among both adolescents (Anderson et al., 2011; Stritzke and Butt, 2001) and college students (Greenfield et al., 1989; Huang et al., 2011). However, prospective

investigations are critical. While transitions in drinking patterns relate to RALD for emerging adults (Epler and Sher, 2011; Epler et al., 2009) little longitudinal research examines the ways in which alcohol use may precede RALD. Anderson et al (2013) examined the link between alcohol use and RALD 3-years later in three cohorts, ages 15, 18, and 21. Higher baseline alcohol consumption was related to lower RALD in the domains of Loss of Control and Adverse Consequences in the youngest cohort, and in the domain of Convictions for the middle cohort. The ways in which alcohol use influences RALD in younger adolescents and across less coarse age intervals is unknown.

The Present Study

First, we hypothesized that RALD would decline over the course of adolescence (ages 10.5-16.5). Second, we hypothesized that boys and adolescents with experience with alcohol (both lifetime history of sipping and consuming a full drink) would report lower RALD on average. We also expected adolescents with experience with alcohol would have a steeper decline, but did not have *a priori* hypotheses about the influence of gender on the slope of RALD over time. Given the findings in the literature showing differential decline by domain, we conducted an exploratory examination of the change in and prediction not only of total RALD scores, but also of RALD subscale scores, deriving subscales on the basis of empirical factor analysis.

Method

Participants

Participants were 1023 students (52% female) sampled from six middle schools and invited to take part in a three-year study on alcohol initiation and progression. Enrollment took place in five cohorts at six month intervals, during 2009-2011. Three schools were suburban ($n=508$), two were rural ($n=231$), and one was an urban inner-city school ($n=284$). Consent return rates ranged from 34% (suburban) to 47% (rural); the portion of returned forms that included consent to participate ranged from 54% (rural) to 72% (suburban) and the enrollment rate ranged from 79% (urban) to 94% (suburban). Average age at enrollment was 12.5 ($SD=0.95$; $Range=10.5-15.5$), and participants were roughly equally divided across the three grades (33%, 32%, and 35% in 6th, 7th, and 8th grades, respectively). Seventy-six percent of the participants were Caucasian, 5% were African American, 8% were mixed race-ethnicity, and 12% were Other race/ethnicity; 12% self-identified as Hispanic. As reported elsewhere (Jackson, Colby, Barnett & Abar, 2015), the sample was largely representative of the schools from which they were drawn, particularly with respect to gender and grade distribution but with some evidence that our sample is more racially diverse but less disadvantaged.

Procedure

All project procedures were approved by the Brown University Institutional Review Board. Participants were compensated \$25 for completing a two-hour in-person group orientation session held in a classroom after school, including the baseline survey (Wave 1; W1), completed on laptops provided by study staff. Participants received a \$20 giftcard for each follow-up web-survey (approximately 45-minutes), completed semi-annually.

Retention rates were high (92%, 88%, 85%, 83%, and 83% at W2-W6). Failure to complete W2, W3, W4, or W6 surveys was associated with male gender. Those who failed to complete the W2, W3, or W6 survey were also more likely to be non-White, and those who failed to complete the W6 survey also were more likely to report a lifetime full drink. RALD total and subscale scores were lower among those who failed to complete the W4 survey (all p 's < .01). There were no differences at any time point by lifetime sip status.

Measures

Alcohol Use—At each time point, participants reported whether they had ever had a sip or a full drink of alcohol, not including consumption as part of a religious service.¹ Given evidence that sipping alcohol and consuming a full drink are distinct milestones (Jackson, Barnett, Colby, Abar, & Roberts, 2013), variables were created to indicate whether the participant reported a lifetime sip or full drink at any point during the study.

Reasons for Abstaining/Limiting Drinking (RALD)—RALD was assessed with 12 items adapted from previous research (Chassin & Barrera, 1993; Greenfield, Guydish, & Temple, 1989). Response options ranged from Not True (1) to True and Very Important (4). An exploratory factor analysis with varimax rotation was conducted to determine the factor structure of the RALD measure at W1. Both the Kaiser-Guttman rule and scree plot suggested a two-factor solution, which was readily interpretable and did not include item crossloadings. Subscales were: (1) Performance/Control (Seen the negative effects of someone else's drinking, Like to feel in control of myself, Drinking reduces performance in sports, Drinking interferes with studies, Drinking heavily is a sign of personal weakness) and (2) Upbringing (Don't want to get drunk, Brought up not to drink, religion discourages or is against drinking, Not old enough to drink legally, Part of a group that doesn't drink much, Wouldn't want to disappoint parents, Drinking is something that bad kids do)². Items were averaged to create scale scores. Factor loadings on the subscales ranged from .51-.76. The two factors were correlated at .56 at W1. Across waves, Cronbach's alphas ranged from .83 to .92 for the total scale, .78 to .88 for Upbringing, and .69 to .83 for Performance/Control.

Data Analytic Plan

The HLM 7.01 program (Raudenbush, Bryk, & Congdon, 2013) was used to conduct hierarchical linear modeling (HLM) with full maximum likelihood estimation. While HLM requires complete data at Level 2, it can handle missing data at Level 1; observations with missing data on variables included in a given model were listwise deleted and models were estimated making use of incomplete data in way that does not bias estimates, assuming that data are missing at random. We tested two sets of HLM models predicting total RALD and the RALD subscales, one set examining lifetime experience with sipping alcohol and one

¹The option "only for religious purposes" was not available at Wave 1 for the first school cohort (N=231), inflating sipping rates for this group. For this subsample, the Wave 1 response was recoded for 24 cases with a response at a later wave of "Yes, but part of a religious service only," to "No" (i.e., non-sippers).

²In comparison to Greenfield et al (1989), our single factor Performance/Control subscale combines most of the items of the Performance and Self-control factors, with the exception of the item "I don't want to get drunk." In Greenfield's study, this item loaded on the Self-Control factor, while here it loaded on the Upbringing factor.

considering lifetime experience with a full drink. The Level 1 (within-person) portion of the model only included half-age (calculated based on survey and birth date) as a marker of time³. We set the intercept at age at 15 because this represented an age that balanced drinking baserates with the number of participants contributing an age 15 report. This allowed a test of whether lifetime alcohol use is associated with RALD at age 15. The Level 2 (between-persons) portion of the HLM model included gender as well as a dichotomous indicator of lifetime sip or full drink of alcohol. We included alcohol use at Level 2 (between-persons) as base rates and frequency of alcohol use in the sample were not high enough to treat it as time-varying. Models also included a cross-level interaction between alcohol use (sip or drink, Level 2) and time (Level 1), to test whether the decline in the slope of RALD over time would be steeper among those with drinking experience. Finally, we tested an exploratory cross-level interaction between gender (Level 2) and time, to see if the slope of RALD over time was steeper for either gender. Level 2 effects were centered using weighted effects coding to remove collinearity with interaction terms and so that main effects could be evaluated in the context of significant interactions (Aiken & West, 1991).

Results

Descriptives

Prevalence of sipping was 42% at W1 and 66% at W6; prevalence of consuming a full drink was 8% at W1 and 28% at W6. The average age of first sip was 10.8 ($SD=3.0$) and average age of first full drink was 13.2 ($SD=1.9$). Of those who completed a survey within a given age, a lifetime sip was reported by 29% by age 11, 36% by age 12, 45% by age 13, 56% by age 14, 66% by age 15, 78% by age 16 and 80% by age 17. A lifetime full drink was reported by 2% by age 11, 3% by age 12, 8% by age 13, 15% by age 14, 30% by age 15, 44% by age 16 and 47% by age 17. Correlations, means and standard deviations of study variables are provided in Table 1.

Average levels of RALD total and subscale scores at each half-age by alcohol use status are shown in Figure 1. In general, adolescents who reported consuming a full drink at any time point had the lowest average levels of RALD and the fastest decline in RALD, while those who reported never having sipped alcohol had the highest average levels and least decline in RALD. On average, performance/control RALD *increased* over time among those who reported never having had a sip or full drink.⁴

Multilevel Models

Multilevel model results are displayed in Tables 2 (sip) and 3 (full drink).

³There were very few assessments at the oldest ages (15 reports at age 17, 2 at age 17.5 and 1 at age 18). These data points were dropped from the data set used for analyses, so as not to introduce bias from the small number of assessments collected at the oldest ages.

⁴Descriptive examination of mean trajectories of RALD suggested slightly different patterns for those who started T1 at age 10.5 ($N=14$) and those who started at 14.5 or older ($N=24$), given the cohort sequential nature of the design that enrolled 6th, 7th, and 8th graders (the majority of whom were age 11-14 at T1). We removed these individuals from calculation of means plotted in Figure 1, as we did not want these extreme cases to bias the means. HLM model results are presented based on the full sample, included these youngest and oldest starters in the sample. However, we reran final models after excluding these individuals, and the significance and pattern of findings did not change.

Within-person change over time—RALD total and subscale scores significantly decreased as a function of half-age. However, these effects were qualified by significant interactions with lifetime sip or drink, across all three outcomes, as described below.

Correlates of mean levels of RALD—Generally, boys reported lower total RALD and RALD subscale scores. Experience with alcohol (sip and full drink) was associated with lower total RALD and subscale scores. However, these alcohol use effects were qualified by significant interactions with time, as described below.

Correlates of decline in RALD over time—Exploratory models with the addition of a gender $\times$ time interaction indicated that gender did not moderate change in the subscales or total RALD scores over time. In sip and full drink models, alcohol experience $\times$ time interactions were significant for all three RALD outcomes, suggesting that the decline in all three outcomes over time is faster among adolescents who report a lifetime sip or full drink⁵. Model implied interactions are depicted graphically in Figure 2.

Discussion

This was the first study to prospectively examine change over time in RALD during adolescence. We found evidence that RALD decreased across time on average; however, change in RALD over time was moderated by lifetime experience with alcohol, including endorsement of both a sip and a full drink. Males reported lower RALD than females in this study, but the extent of *change* in RALD over time did not differ by gender.

Declines over time in RALD were evident in both models examining within-person changes over the course of adolescence and descriptive plots of mean levels of RALD across time. Upbringing reasons showed the most pronounced decline. Such developmental changes in upbringing RALD may be due to increases in the acceptability of drinking among peers coupled with the shift away from parents and toward peers. Testing whether peer norms and parenting account for the age effects for RALD is an interesting future direction. Importantly, change in RALD over time was conditional on experience with alcohol. Adolescents who had ever sipped or drank alcohol had a steeper decline in RALD across ages 10.5 to 16.5, compared to those who had never done so. Having lifetime experience with alcohol is associated with change in alcohol-related cognitions in a direction that may then be supportive of continued drinking (i.e., the loss of reasons *not* to drink). Teens who have consumed alcohol likely affiliate with peers who also drink (Curran, Stice, & Chassin, 1997), perhaps providing an influence on motives for rather than against drinking.

We also observed that those who had reported ever consuming alcohol (either just a sip or a full drink) had lower RALD on average than those who had not. In line with self-perception theory, upon acknowledging that one has consumed alcohol, perhaps he/she comes to believe that upbringing or performance/control reasons not to drink must not be personally

⁵Many of those who had a sip by T6 also had a full drink (N=289). As such, we conducted a sensitivity analysis and ran the sip models looking only at sippers (who never had a full drink) vs nonsippers (who never had a full drink). The significance and magnitude of most effects of sipping on RALD overall and subscale means remained similar, with the exception that the effect of sipping (in the absence of a full drink) was no longer significantly associated with RALD performance/control.

important. It is also possible that drinking in the context of peers who hold positive attitudes, parental permissiveness regarding alcohol, or lack of experience of negative consequences upon new drinking experience, also influence one's own attitudes toward drinking and result in reporting lower RALD. Examining such mechanisms of the association between drinking and RALD is an important next step. It will also be critical for future research to disentangle the directionality of the associations between drinking and RALD. In the present study, we examined the influence of lifetime alcohol use behavior on alcohol-related cognitions due to fairly low baserates in our time-varying measure of drinking, but it is likely that established RALD precede the decision to consume alcohol. Other studies show reciprocal relations between drinking and drinking-related cognitions (Aas et al., 1998; Epler et al., 2009; Smith et al., 1995).

Finally, we observed that on average, males report fewer RALD than females, consistent with prior research among high schoolers (Anderson et al., 2011; Bekman et al., 2011). Yet, age-related decreases in RALD did not differ by gender – that is, the rate of developmental decline in reasons to not drink was the same for males and females. This is in contrast to Epler et al.'s (2009) findings with young adults, where a faster decline in Loss of Control RALD was observed for women than for men. It is possible that such differentiation in the rate of change does not appear until later in development.

Limitations and Future Directions

Self-reports of drinking among adolescents can be prone to memory/recall bias, comprehension problems, and social desirability. However, we relied on good rapport, encouragement to take surveys in private, and assurances of confidentiality to increase the validity of reports. We were unable to examine the timing of one's first sip and/or drink, as a portion of participants had already used alcohol prior to enrolling in our longitudinal study. This leaves it unclear as to whether a sip or drink immediately precedes a change in one's RALD; we only examined whether a lifetime sip or full drink was a correlate of this cognitive variable at age 15. Future research should employ study designs that allow for tests of potential bidirectional effects of alcohol use and RALD among adolescents. Another interesting future direction is to examine slopes in RALD prior to and after the transition to first drink, perhaps hypothesizing that the decline in RALD would accelerate after exposure to alcohol. Though our sample was more racially diverse than the school populations from which students were drawn, the majority was Caucasian and non-Hispanic; this work should be replicated in a more ethnically and racially diverse sample of young adolescents. Future research also could benefit from more comprehensive examination of factors (e.g., perceptions that alcohol use is normative among peers, parental permissiveness, experience of negative consequences) that may predict individual differences and rates of change in RALD over the course of adolescence.

Practical Implications and Conclusions

As findings suggest that RALD naturalistically decline across adolescence, prevention efforts targeting RALD are indicated. Such efforts could involve teaching students at a young age about the impact of alcohol on performance and self-control, for example. Students who have had even just a sip of alcohol at some point during their lifetime display

a faster decline in RALD across ages 10.5-16.5, suggesting that parents should discourage even sipping behavior as well as discuss reasons to abstain from alcohol with their children. Parent-based interventions have been shown to be effective among early (Koning et al., 2009; 2011) and late adolescents (Ichiyama et al., 2009; Turrissi, et al., 2001). Such interventions may benefit from components highlighting parental communication regarding RALD over the course of adolescence, in order to maintain the salience of such reasons, and hopefully curb increases in drinking behavior that are typical among this age group.

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Highlights

- Reasons for abstaining/limiting drinking (RALD) declined over adolescence
- Decline in RALD was fastest among adolescents with lifetime drinking experience
- Boys reported lower RALD than girls
- The pace of change in RALD across time did not differ by gender

Figure 1.

Mean RALD total and subscale scores across time (raw data) by whether participant reported any lifetime full drink and/or sip across the course of the study. *Note:* the small group of individuals who started the study at age 10.5 or 14.5 or older were excluded from calculating plotted means in these graphs.

(a)

(b)

Figure 2. Model implied graphs of interactions between time and lifetime full drink or sip in the prediction of (a) total RALD, (b) performance/control RALD, and (c) upbringing RALD.

Table 1

Bivariate correlations and RALD descriptive statistics

	1	2	3	4	5	M%	SD
1. RALD combined						2.96	.57
2. RALD Upbringing	.95**					2.69	.60
3. RALD Performance/Control	.92**	.75**				2.97	.62
4. Male Gender	-.06	-.05	-.07*			48%	
5. Lifetime Sip	-.16**	-.24**	-.04	-.07*		66%	
6. Lifetime Full Drink	-.35**	-.42**	-.21**	-.13**	.44**	28%	

Note: RALD scores were averaged across all waves in order to calculate descriptive statistics and correlations; Gender coded as 1=Male, 0=Female,

*
p<.05,

**
p<.01

Table 2

Models using Lifetime Sip as a Correlate

Correlates	Total RALD			RALD Perf/Control			RALD Upbringing		
	B	SE	p	B	SE	p	B	SE	p
Intercept	2.81	0.02	<.001	2.91	0.02	<.001	2.74	0.02	<.001
L1 Time (Half-age)	−0.12	0.01	<.001	−0.06	0.01	<.001	−0.16	0.01	<.001
L2 Male Gender	−0.07	0.03	.04	−0.07	0.04	.07	−0.07	0.03	.05
L2 Ever Sip	−0.34	0.05	<.001	−0.24	0.05	<.001	−0.42	0.05	<.001
L2 Ever Sip × L1 Time	−0.12	0.02	<.001	−0.13	0.02	<.001	−0.11	0.02	<.001

Note: L1=Level 1 (within-person), L2=Level 2 (between-person)

Table 3

Models using Lifetime Full Drink as a Correlate

Correlates	Total RALD			RALD Perf/Control			RALD Upbringing		
	B	SE	p	B	SE	p	B	SE	p
Intercept	2.83	0.02	<.001	2.93	0.02	<.001	2.76	0.20	<.001
L1 Time (Half-age)	-0.11	0.01	<.001	-0.06	0.01	<.001	-0.15	0.01	<.001
L2 Male Gender	-10.09	0.03	<.01	-0.09	0.04	.02	-0.10	0.03	<.01
L2 Ever Drink	-0.54	0.05	<.001	-0.43	0.05	<.001	-0.63	0.05	<.001
L2 Ever Drink × L1 Time	-0.13	0.02	<.001	-0.13	0.02	<.001	-0.13	0.02	<.001

Note: L1=Level 1 (within-person), L2=Level 2 (between-person)