Popularity as a Predictor of Early Alcohol Use and Moderator of Other Risk Processes

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ABSTRACT. Objective: This study tested the relationship between popularity and early adolescent alcohol use and examined whether popularity moderated the influence of several risk processes. **Method:** Longitudinal data provided by 1,196 youth (590 girls) were analyzed to assess main and interactive effects of popularity, friends' alcohol use attitudes, own alcohol use attitude, risk taking, and aggressive-disruptive behavior on changes in alcohol use during seventh grade. **Results:** When we controlled for demographic variables and baseline alcohol use, popularity and the other predictors of interest exhibited linear main effects on alcohol use, with popularity and the attitude variables also demonstrating curvilinear relationships. Further analysis indicated that popularity moderated the effect of aggressive-disruptive behavior, the latter being associated with greater alcohol use among more popular adolescents. Additional moderation results revealed that friends' favor-

able attitudes toward alcohol use also potentiated aggressive-disruptive behavior's relationship with alcohol use and that male youth were more likely than female youth to use alcohol, but only among low risk takers.

Conclusions: Popular youth may attempt to maintain status through early alcohol use, and their social competencies may facilitate risk processes associated with aggressive-disruptive behavior. Findings suggest the utility of providing universal prevention at developmentally crucial times to address substance use overall, and particularly to decrease early use among popular youth, which may serve to slow the growth of substance use in the larger cohort. Although aggressive-disruptive youth who are popular seem to be at particular risk, they may resist traditional interventions, indicating the potential value of less obvious intervention strategies. (*J. Stud. Alcohol Drugs*, 75, 919–928, 2014)

ONE FACTOR THAT HAS BEEN CONSIDERED for its potential relevance to engaging in risk behaviors is adolescent popularity. *Popularity* is specifically defined as a unique form of social status that corresponds to possessing visibility, prestige, and power in one's peer group (Cillessen et al., 2011). Defined as such, popularity is distinct from other constructs that pertain to social acceptance, such as being well liked or preferred as a social companion. Whereas acceptance tends to be associated with positive outcomes (Schwartz and Gorman, 2011), popularity is linked to risk behaviors, including early sexual activity and substance use (Killeya-Jones et al., 2007; Mayeux et al., 2008; Prinstein et al., 2003; Sandstrom and Cillessen, 2010). Despite the conceptual and empirical distinctions between popularity and acceptance-related variables, the terminology has become muddled because acceptance-related variables have also been referred to as *sociometric popularity*, or even simply as *popularity*. To promote clarity, we follow recent recommendations and use the term *popularity* to refer to possessing visibility, prestige, and power in the peer group, and the term *acceptance* to refer to being well liked or preferred as a companion by others (Cillessen and Marks, 2011).

Popularity, social competence, and substance use

The attainment and maintenance of popularity among one's peers connote the possession of social competence. Whereas social competence can entail prosocial skills such as being cooperative, empathic, and supportive, popularity is proposed to include competencies that can also be applied for more self-interested purposes, such as the maintenance of social rank (Cillessen, 2011). Popular adolescents may seek to retain their status by being in the developmental vanguard with respect to demonstrating what are considered to be mature or adult behaviors. Sensing that alcohol use will soon become more prevalent in their cohort, popular adolescents may seek to be among the first to use alcohol in order to be perceived as bold or "grown up," a goal that they should be able to achieve given their social competencies. Thus, popularity should be associated with early alcohol use.

Popularity as a moderator

In addition to its predicted effect on alcohol use, there is also reason to expect that popularity might moderate the operation of other risk processes. The social competencies possessed by popular youth provide them with greater opportunity and ability to engage in a range of activities, including early substance use (Schwartz and Gorman, 2011). Therefore, to the degree that youth experience a particular risk process, popularity may potentiate its effect. We explored this possibility with regard to four risk processes involving

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socialization, autonomy, risk taking, and aggressive-disruptive behavior.

The socialization process involves adolescents shaping their substance use behaviors to be consistent with their friends' attitudes (Burk et al., 2012). Because popular individuals are theorized to possess greater social skills that enable them to ascertain others' attitudes and ably enact behaviors that serve to maintain their popular status (Andreou, 2006), it is conceivable that the relationship between friends' attitudes and one's own alcohol use is stronger for popular adolescents. To date, there exists only one study that has tested the socialization hypothesis with regard to popularity (Mathys et al., 2013). Although the results did not support the proposed risk mechanism, this may have occurred because youth were in the 10th and 11th grades, a developmental period when conformity effects are waning (Windle et al., 2008). In addition, socialization effects have been reported for acceptance (Allen et al., 2005; Fallu et al., 2011), suggesting the potential importance of considering friends' attitudes for youth who enjoy high status among peers. The scarcity of relevant research and mixed findings across peer status variables highlight the need to further evaluate the socialization hypothesis with regard to popularity, especially during early adolescence when conformity effects are stronger and substance use is less established.

Another potential risk process is that the alcohol use behaviors of popular youth are more strongly influenced by their own attitudes, a possibility we term the *autonomy hypothesis*. The idea that one's own attitudes influence behavior is well supported (e.g., Ajzen, 2001; Bandura, 1986; Champion and Skinner, 2008). This effect may be particularly strong for popular adolescents who—by virtue of their power and prestige—may feel especially free to act in accord with their own attitudes, as observed among those who are high in self-esteem and low in self-monitoring (Ajzen and Fishbein, 2005; Deci and Ryan, 1985). In addition, popular adolescents wield their social influence strategically to acquire resources and achieve their goals, and therefore may be more able to access and use alcohol, should they choose to do so (Hawley, 1999; Prinstein and Cillessen, 2003). For these reasons, the relationship between one's own alcohol use attitude and actual alcohol use behavior may be stronger among popular youth.

Popularity could also increase the effects of individual difference factors that are linked to early alcohol use, including risk taking and aggressive-disruptive behavior (e.g., Hawkins et al., 1992; Mrug et al., 2004; Zuckerman and Kuhlman, 2000). Risk-taking youth are attracted to new and exciting activities and may engage in early alcohol use because of its novelty or because alcohol use occurs at the kind of events they seek out, such as parties or activities unsupervised by adults. Accordingly, risk-taking youth who also enjoy the influence and social cachet that come with

popularity may be able to convince others to engage in activities associated with alcohol use or may be more frequently invited to social events at which alcohol is available.

With respect to aggressive-disruptive youth, popularity could strengthen the processes that encourage their rule-breaking behaviors, including underage alcohol use. Specifically, delinquent behaviors are promoted through the process of deviancy training, wherein adolescents' "rule-breaking talk"—such as talking about substance use—is met with laughter and approval from peers (Dishion et al., 1996). Because other adolescents tend to admire and emulate popular youth (Cohen and Prinstein, 2006), the rule-breaking talk of aggressive-disruptive adolescents who are also popular is more likely to be reinforced, which could strengthen the relationship between aggressive-disruptive behavior and alcohol use. Furthermore, popular youth who engage in aggressive-disruptive behavior possess popularity while exhibiting such behavior. They may, therefore, view delinquent acts as elemental to their identity and popular status and engage in early alcohol use to demonstrate their rebelliousness in order to maintain popularity, similar to processes hypothesized regarding school disengagement (Schwartz et al., 2006).

Overview of the current study

The current study tested the predictive relationship of popularity to early alcohol use and explored the potential for popularity to moderate the effects of other risk processes. We examined these issues among 1,196 seventh-grade adolescents and took care to address several methodological issues that might otherwise have complicated the interpretation of results. First, to prevent adolescents' own attitudes from biasing the friends' attitudes measure, the latter was based on data acquired directly from adolescents' friends. Second, each adolescent's own attitude was included in the predictive model as part of testing the autonomy hypothesis, thereby controlling for the similarity between adolescents' own attitudes and those of their friends. Third, the longitudinal design enabled the assessment of predictor variables that temporally preceded changes in adolescents' alcohol use, thus precluding the possibility that results could reflect reverse causal effects. Last, analyses addressed the possibility of predictors having nonlinear relationships with alcohol use in order to avoid spurious interaction effects (Royston and Sauerbrei, 2008).

Method

Participants

Data were obtained from the Capable Families and Youth Project (Spath et al., 2005), a longitudinal study focused on the prevention of adolescent substance use and other

problem behaviors. All research connected with the current investigation was reviewed and approved by the Institutional Review Board Committee in the Office for Responsible Research at Iowa State University. Both parental and youth consent were obtained before youth participation. A letter informed parents that their tacit consent was presumed unless they actively refused consent, and youths' active consent was requested at survey administration. Youth were excluded from analyses if they refused consent, had severe mental disability, were absent from school at either assessment, failed to provide full data on all measures, reported no friends, or had no friends who provided alcohol attitude data. Of approximately 1,800 total students, participants in the current analysis included 1,196 seventh graders (590 girls) enrolled in 36 schools located in 22 contiguous Iowa counties. Schools were selected on the basis of several criteria, including approximately 20% or more of households eligible for the free and reduced-cost school lunch program, school district enrollment less than 1,200, and sixth through eighth grades taught at a single location.

Participants in the current analysis averaged 12.8 years of age at the start of the study, and included 3 Latinos, 9 Asian Americans, 11 Native Americans, 1,147 European Americans, 12 individuals who indicated other ethnicity, and 14 individuals who provided no ethnicity information. The large proportion of European American participants in this study is representative of the associated school and community populations. A randomized block design was used to assign schools to one of two intervention conditions or a control condition. The interventions included the Life Skills Training program and the Strengthening Families Program: For Parents and Youth 10–14. The interventions were neither designed nor expected to affect the outcome variable within the timeframe considered in the present study. Therefore, they are not the focus of this investigation and are little discussed, although analyses nonetheless controlled for their potential effects. Readers interested in the Capable Families and Youth Project intervention conditions and their effects are referred to the detailed descriptions provided by Spoth et al. (2005) and online (<http://www.ppsi.iastate.edu>) for relevant citations.

Procedure

Participants completed surveys twice, first at the start of seventh grade and then again approximately 7 months later at the end of seventh grade. Youth were typically 12 or 13 years of age during the timeframe of this study, corresponding to a developmental stage when adolescents are particularly prone to peer influence (Costanzo and Shaw, 1966). Surveys required approximately 50 minutes to complete and were administered to students during the school day. Students were assured of confidentiality regarding their questionnaire responses.

Measures

Controls. Several demographic variables were included to statistically control for their relationships with alcohol use. These included participants' biological sex (female = 0, male = 1; 50.7% male), living with both biological parents (no = 0, yes = 1; 74.2% yes), and receipt of free or reduced-cost lunch (no = 0, yes = 1; 19.7% yes). The intervention condition was accounted for by a categorical variable with three values.

Popularity. In accordance with recommendations for the assessment of popularity, participants were provided with a numbered list of all fellow students in the seventh grade and were instructed to record the numbers of all those whom they perceived to be "popular," a term readily understood by adolescents (Cillessen and Marks, 2011). Participants were not limited with regard to how many peers from the list they could nominate, although no more than one nomination per peer was counted from each youth, and self-nominations were not counted. The number of nominations each participant received from their seventh-grade peers ($M = 1.62$, $SD = 3.14$) was standardized within each school to yield the measure of popularity (e.g., LaFontana and Cillessen, 2002).

Own alcohol use attitude. Each participant's own attitude toward alcohol use was assessed by an eight-item scale pertaining to the perceived rewards for alcohol use (Madon et al., 2003). Sample items included, "Drinking alcohol lets you have more fun" and "Kids who drink alcohol have fewer friends." Response options ranged from 1 (*strongly disagree*) to 6 (*strongly agree*), with items reverse-scored as necessary such that greater values corresponded to more favorable attitudes toward alcohol use. Participants' own alcohol use attitude was quantified as their average response ($M = 2.76$, $SD = 0.64$; Cronbach's $\alpha = .71$).

Friends' alcohol use attitudes. As was done for the measure of popularity, participants indicated their friends through the use of numbered lists that included all seventh graders, responding to the question, "With whom do you most often 'hang out' during the school day?" Each friend's alcohol use attitude was based on that friend's average response to the eight-item alcohol use attitude scale described above. The friends' alcohol use attitudes score for each participant was determined by averaging the individual attitude scores of all friends identified by each participant ($M = 2.78$, $SD = 0.36$). Thus, participants identified their friends, but these friends reported their own alcohol use attitudes. On average, youth listed 7.66 friends ($SD = 5.08$) and were listed as friends by 6.40 other youth ($SD = 3.86$).

Risk taking. To indicate their preference for risky and exciting activities, youth completed seven items adapted from the Eysenck risk-taking scale (Eysenck and Eysenck, 1975) (e.g., "I would enjoy fast driving"; "I think life with no danger in it would be dull for me"; 1 = *strongly disagree*, 5 = *strongly agree*). Risk taking was quantified as the par-

participant's average response, and greater values corresponded to more risk taking. The scale exhibited good internal consistency ($M = 2.77$, $SD = 0.87$; Cronbach's $\alpha = .85$).

Aggressive-disruptive behavior. Aggressive-disruptive behavior was assessed through peer nominations to three items: "Who is disruptive?", "Who gets mad easily?", and "Who starts fights?" (Coie and Dodge, 1988). Youth averaged 2.22 ($SD = 5.08$) nominations across the three items. The nominating procedure for these items was the same as for popularity. For each item, the number of nominations was standardized within school, and aggressive-disruptive behavior was quantified as the average of the three standard scores, which demonstrated good internal consistency (Cronbach's $\alpha = .77$).

Alcohol use. Alcohol use was assessed using two items: "About how often (if ever) do you: (1) drink beer, wine, wine coolers or liquor (more than just a few sips)" and (2) "drink until you get drunk?" Each item presented nine response options that ranged from *never* to *more than once a day*. Scores for each item were dichotomized such that the two response options of *never* and *a few times but NOT in the past year* were scored as 0, and the remaining seven options that ranged from *a few times a year* to *more than once a day* were scored as 1. Scores for the two items were summed to yield an alcohol use score that could range from 0 to 2.

This particular coding scheme was chosen for two reasons. First, any changes in value would correspond to meaningful changes in alcohol use within the timeframe of the study. Specifically, a score that remained 0 would indicate maintaining alcohol abstinence across the timeframe of the study. A change from 0 to 1 would reflect a change from abstinence to currently drinking at least a few times in the past year (without becoming drunk), and a change from 1 to 2 would indicate a change from at least occasional recent drinking (without becoming drunk) to heavier use reflected by now also becoming drunk on at least a few recent occasions. Second, because very few seventh graders engaged in frequent or heavy alcohol use, this coding system reduced the influence of extreme scores. Alcohol use scores of 0, 1, and 2 characterized 1,079, 93, and 24 youth at the start of seventh grade, and 956, 187, and 53 youth at the end of seventh grade, respectively.

Analytic plan

Two factors precluded the use of typical regression techniques in analyzing these data. First, youth were clustered within schools, causing non-independence among observations, a situation that can bias statistical results (Kreft and de Leeuw, 1998). Second, data were not normally distributed, because the dependent variable of alcohol use could take on only three discrete values. Therefore, SAS PROC GLIMMIX (SAS Institute Inc., Cary, NC) was used to perform multilevel ordinal logistic regression analysis, with school controlled

to address the multilevel data structure. Although PROC GLIMMIX does not provide formal tests of the proportional odds assumption, an analysis using PROC LOGISTIC did not support rejecting this assumption ($p = .160$). The predictor variables of friends' attitudes, own attitude, and risk taking were standardized to facilitate interpretation of results. As described above, aggressive-disruptive behavior and popularity were standardized within school. Alcohol use at the end of seventh grade constituted the dependent variable.

Hierarchical analyses were conducted, with the first step statistically controlling for alcohol use at the start of seventh grade, sex, living with both biological parents, receipt of free or reduced-cost lunch, and the intervention condition. The second step entailed main effects testing of the five predictors of primary interest, including friends' attitudes, own attitude, risk taking, aggressive-disruptive behavior, and popularity. Because spurious interactions among the predictor variables can occur if nonlinear main effects are present but not included in the model, main effects testing considered both linear and quadratic terms for these variables (Royston and Sauerbrei, 2008). The third step assessed the hypothesized interactions of popularity with the other four primary predictor variables: friends' attitudes, own attitudes, risk taking, and aggressive-disruptive behavior. Subsequent analysis evaluated the robustness of significant results from the previous steps by conducting exploratory tests of all other two-way interactions among the primary predictor variables, as well as their interactions with sex and the intervention condition.

Results

Correlations

Only four correlations among predictor variables were greater than .20 in magnitude. Specifically, aggressive-disruptive behavior was associated with being male ($r = .21$), and drinking at the start of seventh grade correlated with both own alcohol use attitudes ($r = .28$) and risk taking ($r = .25$), with the latter two variables also correlating with each other ($r = .23$). Thus, no two predictor variables exceeded 8% shared variance, indicating no concern regarding multicollinearity.

Ordinal logistic regression analysis

Results of the regression analysis are presented in Table 1. In Step 1, among the variables included as controls, alcohol use at the start of seventh grade was strongly related to alcohol use at the end of seventh grade ($b = 2.65$, $SE = 0.19$, $p < .001$; OR = 14.17, 95% CI [9.71, 20.66]), whereas living with both biological parents predicted less alcohol use ($b = -0.64$, $SE = 0.18$, $p < .001$; OR = 0.53, 95% CI [0.37, 0.74]). However, neither sex, receipt of free or reduced-cost lunch,

TABLE 1. Ordinal logistic regression model predicting alcohol use ($N = 1,196$)

Variable	Step 1 <i>b</i> (<i>SE</i>)	Step 2 <i>b</i> (<i>SE</i>)	Step 3 ^a <i>b</i> (<i>SE</i>)
Step 1: Thresholds and demographic and statistical controls			
Threshold for alcohol use = 1	-1.78 (0.27)	-1.49 (0.29)	1.51 (0.29)
Threshold for alcohol use = 2	-4.18 (0.32)	-4.06 (0.34)	-4.14 (0.35)
Alcohol use at start of seventh grade	2.65 (0.19)***	2.11 (0.21)***	2.15 (0.21)***
Sex	0.27 (0.16)	0.03 (0.18)	0.19 (0.19)
Lives with both parents	-0.64 (0.18)***	-0.46 (0.19)*	-0.53 (0.19)**
Receipt of free/reduced-cost lunch	-0.15 (0.21)	-0.10 (0.22)	-0.09 (0.22)
Step 2: Main effects			
Friends' alcohol use attitudes		0.48 (0.12)***	0.49 (0.12)***
Friends' alcohol use attitudes ² (quadratic term)		-0.15 (0.06)*	-0.18 (0.07)**
Own alcohol use attitude		0.59 (0.12)***	0.50 (0.13)***
Own alcohol use attitude ² (quadratic term)		-0.15 (0.08) [†]	-0.14 (0.08) [†]
Risk taking		0.41 (0.09)***	0.67 (0.15)***
Aggressive-disruptive behavior		0.26 (0.10)**	0.10 (0.12)
Popularity		0.33 (0.16)*	0.32 (0.16)*
Popularity ² (quadratic term)		-0.10 (0.06) [†]	-0.13 (0.06)*
Step 3: Interactions			
Popularity × Aggressive-Disruptive Behavior			0.31 (0.09)**
Friends' Attitudes × Aggressive-Disruptive Behavior			0.20 (0.10)*
Sex × Risk Taking			-0.43 (0.19)*

Notes: Effects involving the variables of primary interest were retained through backward selection. Exponentiation of regression coefficients yields odds ratios, or e^b = odds ratio (OR). All model steps control for intervention condition, which in no case attained significance ($ps > .38$). ^aStep 3 results correspond to the final regression model.

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

nor intervention condition predicted alcohol use ($ps \geq .10$). The nonsignificant result for intervention condition was not unexpected because the interventions were not designed to produce immediate effects on substance use behavior, as previously indicated.

Main effects of the primary predictor variables were tested in Step 2 by inclusion of both their linear and quadratic terms. Using backward selection, all five of the predictor variables of primary interest evidenced main effect relationships with alcohol use. Both risk taking and aggressive-disruptive behavior were positively and linearly related to alcohol use ($b = 0.41$, $SE = 0.09$, $p < .001$, and $b = 0.26$, $SE = 0.10$, $p = .007$, respectively), whereas their quadratic terms were not supported ($ps > .33$). Linear and quadratic terms were significantly predictive of alcohol use for friends' alcohol use attitudes ($b_{\text{linear}} = 0.48$, $SE = 0.12$, $p < .001$; $b_{\text{quadratic}} = -0.15$, $SE = 0.06$, $p = .017$), own alcohol use attitude ($b_{\text{linear}} = 0.59$, $SE = 0.12$, $p < .001$; $b_{\text{quadratic}} = -0.15$, $SE = 0.08$, $p = .053$), and popularity ($b_{\text{linear}} = 0.33$, $SE = 0.16$, $p = .035$; $b_{\text{quadratic}} = -0.10$, $SE = 0.06$, $p = .064$).

Although the quadratic terms of own attitudes and popularity were of marginal significance, when either term was removed from the model the other became significant, thereby justifying their retention in the model to reduce the likelihood of subsequently obtaining spurious interaction effects for their associated linear terms. All predictors evidenced positive relationships with alcohol use, as indicated by the positive linear coefficients. The negative quadratic coefficients for friends' alcohol use attitudes, own alcohol use attitudes, and popularity indicate that their positive rela-

tionships to alcohol use became somewhat weaker at higher values for these variables.

Step 3 of the model focused on testing the two-way linear interactions of popularity with each of the other four predictor variables using backward selection, a process that ultimately supported the interaction of popularity with aggressive-disruptive behavior ($b = 0.30$, $SE = 0.09$, $p = .001$), with the other three interaction terms failing to attain significance ($ps > .116$). This interaction remained virtually unchanged (i.e., $b = 0.31$ as reported in Table 1) in subsequent analyses that considered all other two-way interactions among the predictor variables, as well as their interactions with sex and the intervention condition. These additional analyses did yield significant interactions of friends' attitudes with aggressive-disruptive behavior ($b = 0.20$, $SE = 0.10$, $p = .036$) and sex with risk taking ($b = -0.43$, $SE = 0.19$, $p = .021$). Results for the final model are presented in Step 3 of Table 1, and the significant interactions are depicted in Figures 1, 2, and 3. The interactions of popularity with aggressive-disruptive behavior and of friends' attitudes with aggressive-disruptive behavior are shown in Figures 1 and 2, respectively. Whereas aggressive-disruptive behavior had little effect when popularity was low or when friends' attitudes toward alcohol use were unfavorable, the likelihood of alcohol use for aggressive-disruptive youth increased for those who were more popular or whose friends' attitudes toward alcohol use were more favorable. Figure 3 depicts the interaction of sex with risk taking and shows that alcohol use was greater for males than females among low risk takers but not high risk takers. To provide concrete representations

FIGURE 1. Interaction of popularity with aggressive-disruptive behavior ($p = .001$) as depicted by the predicted probability that a youth who abstains from alcohol use at the start of seventh grade will initiate alcohol use by the end of seventh grade. Graph generated from results of the final regression model.

of the model's effects, Table 2 presents predicted probabilities that an initially abstinent youth would transition to alcohol use by the end of seventh grade for each significant effect in the final model.

Discussion

This research investigated how popularity relates to early adolescent alcohol use as well as its potential to moderate the effect of other risk processes. Results revealed popularity to be associated with increased alcohol use over time, a finding consistent with other work supporting a link between popularity and risk behaviors. Furthermore, this relationship existed even after controlling for a range of demographic, attitudinal, and individual difference variables. This unique, predictive relationship suggests that the association with alcohol use is attributable to risk processes specific to popularity and not the result of popularity being correlated with other variables. These results may reflect popular youth engaging in alcohol use as a means of displaying or retaining their popular status. The social competencies associated with popularity could facilitate such behavior by increasing a youth's ability to access and consume alcohol. However, the current study did not examine mediational processes, thus requiring additional research

to better understand the link between popularity and early alcohol use.

Popularity was also found to moderate the relationship between aggressive-disruptive behavior and alcohol use, with aggressive-disruptive behavior predicting greater alcohol use among popular youth but not among less popular youth. It is possible that this finding resulted from popularity enhancing the effects of deviancy training. That is, aggressive-disruptive youth who are also popular may receive greater reinforcement from peers for rule-breaking talk, thereby encouraging them to engage in delinquent behavior such as substance use (Dishion et al., 1996). In addition, aggressive-disruptive youth who are popular might use alcohol because it bolsters an identity characterized by defiance, which they may view as an attribute that is essential for retaining their popular status (Schwartz et al., 2006). Although suggested by previous work, these possibilities remain speculative and highlight the need for additional study to determine the specific processes that underlie this finding.

Results provided no support for popularity moderating the influence of risk processes associated with socialization, autonomy, or risk taking. Because all of these variables predicted alcohol use in their own right, the nonsignificant interactions were not attributable to the lack of main effects. Furthermore, the lack of support for the socializa-

FIGURE 2. Interaction of friends' alcohol use attitudes with aggressive-disruptive behavior ($p = .036$) as depicted by the predicted probability that a youth who abstains from alcohol use at the start of seventh grade will initiate alcohol use by the end of seventh grade. Graph generated from results of the final regression model. Greater values for friends' alcohol use attitudes correspond to more favorable attitudes toward alcohol use.

FIGURE 3. Interaction of sex with risk taking ($p = .021$) as depicted by the predicted probability that a youth who abstains from alcohol use at the start of seventh grade will initiate alcohol use by the end of seventh grade. Graph generated from results of the final regression model.

TABLE 2. Probability and risk of alcohol use initiation as a function of predictive variable levels

Effects and variable levels ^a	Probability of alcohol initiation ^b	OR ^c
Living with both parents		
(a) Not living with both parents	19.3%	OR _{b vs. a} = 0.59
(b) Living with both parents	12.4%	
Friends' attitudes		
(a) Friends' unfavorable attitudes	10.8%	OR _{b vs. a} = 1.63
(b) Friends' favorable attitudes	16.5%	
Own attitudes		
(a) Own unfavorable attitude	10.5%	OR _{b vs. a} = 1.78
(b) Own favorable attitude	17.2%	
Risk taking		
(a) Low risk taking	11.4%	OR _{b vs. a} = 1.57
(b) High risk taking	16.8%	
Aggressive-disruptive behavior		
(a) Low aggressive-disruptive	13.3%	OR _{b vs. a} = 1.11
(b) High aggressive-disruptive	14.5%	
Popularity		
(a) Low popularity	11.8%	OR _{b vs. a} = 1.38
(b) High popularity	15.5%	
Popularity × Aggressive-Disruptive Behavior		
Low popularity		
(a) Low aggressive-disruptive	12.0%	OR _{b vs. a} = 0.95
(b) High aggressive-disruptive	11.5%	OR _{d vs. c} = 1.29
High popularity		
(a) Low aggressive-disruptive	13.9%	OR _{c vs. a} = 1.18
(b) High aggressive-disruptive	17.3%	OR _{d vs. b} = 1.60
Friends' Attitudes × Aggressive-Disruptive Behavior		
Unfavorable friends' attitudes		
(a) Low aggressive-disruptive	10.8%	OR _{b vs. a} = 1.00
(b) High aggressive-disruptive	10.8%	OR _{d vs. c} = 1.23
Favorable friends' attitudes		
(c) Low aggressive-disruptive	15.2%	OR _{c vs. a} = 1.47
(d) High aggressive-disruptive	17.9%	OR _{d vs. b} = 1.81
Sex × Risk Taking		
Female youth		
(a) Low risk taking	9.5%	OR _{b vs. a} = 1.95
(b) High risk taking	17.0%	OR _{d vs. c} = 1.27
Male youth		
(c) Low risk taking	13.7%	OR _{c vs. a} = 1.51
(d) High risk taking	16.7%	OR _{d vs. b} = 0.98

Notes: OR = odds ratio. ^aLow and high values of each continuous variable set at 0.5 *SD* below and above its mean, respectively; ^bprobabilities represent predicted likelihoods that a youth abstinent at the start of seventh grade would initiate alcohol use by the end of seventh grade. Probabilities predicted on the basis of final regression model setting predictive variables to the levels specified, drinking at start of seventh grade to 0 (i.e., abstinent), and all other variables to their respective means; ^cORs compare risk for alcohol use initiation, with subscripts indicating the variable levels whose probabilities are being compared. These ORs compare the probabilities predicted by the regression model—not distinct groups of youth—and thus are associated with neither significance levels nor confidence intervals.

tion hypothesis is consistent with nonsignificant findings previously reported among older adolescents (Mathys et al., 2013). Nonetheless, it should be noted that support for the socialization hypothesis has been received with regard to the peer status variable of acceptance (Allen et al., 2005; Fallu et al., 2011), a difference that could stem from the distinctiveness of acceptance from popularity. However, the findings reported as supportive of the socialization hypothesis among accepted youth might also have been attributable to methodological choices, such as not controlling for youths' own attitudes, not assessing friends' attitudes directly, or not considering nonlinear main effects. In this context, it is

relevant to note that analyses of the current data also seemed to support the socialization hypothesis for popularity if other predictor variables were omitted and if only linear main effects were modeled, indicating the importance of addressing these issues.

Strengths and limitations

The current study possessed a number of strengths that promote confidence in the validity of the findings. First, results were based on a large number of adolescents from a sizeable number of middle schools and who constituted a

sample that was representative of the corresponding population. Second, the analysis statistically controlled for a number of demographic variables and tested for both linear and nonlinear effects of all predictor variables, thereby reducing the chance of obtaining spurious interaction effects. Last, the short-term longitudinal design ruled out the possibility that youth alcohol use at the end of seventh grade could have influenced the predictor variables, thus precluding reverse causal effects.

It is important, however, to also be cognizant of several limitations of this research. Although representative of the population from which it was drawn, the sample was comparatively homogenous, indicating the need for investigating these questions in other settings and with a more diverse sample of youth. In addition, results could be unique to the developmental stage of early adolescence, a time when rates of experimentation and initiation of substance use are just beginning to increase. Popularity's ability to moderate other risk processes may influence alcohol use outcomes related to frequency or amount of use, outcomes that were not feasible to investigate among seventh graders because of the small amount of use overall. Another matter is that youth did not identify other peers as being friends per se. Instead, a youth's friends were identified as those with whom the youth most often affiliated. However, it is a reasonable inference that one will tend to spend time with friends, and the friends' attitude variable did predict alcohol use as expected. Nonetheless, to the degree that youth in the current study tended to associate with peers with whom they were not friends, the current results could underestimate the strength of friends' socializing effects.

Implications

Results suggest that efforts to reduce alcohol use among popular youth during early adolescence might be most successful to the degree that they are effective for those who also exhibit aggressive-disruptive behaviors. Because these youth may be less likely to earnestly participate in traditional interventions promoted by adults, it might be appropriate to also target these youth for less formal kinds of intervention. For example, these youth could be encouraged to participate in regular activities that they intrinsically enjoy, such as sports or music, but that are also supervised by responsible adults. Close parental monitoring and enduring control of youths' social contexts can limit substance use opportunities and delay initiation until after developmentally crucial stages, thereby reducing the risk of more severe substance use in the long term (Spoth et al., 2009).

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