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## Adolescent Alcohol Use: Social Comparison Orientation Moderates the Impact of Friend and Sibling Behavior

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### Abstract

**Objectives**—Research has indicated that both peers and siblings influence adolescents' alcohol use (e.g. Windle, 2000). The present two studies examined if social comparison orientation (SCO) moderates the effects of perceived friend and sibling alcohol use on adolescents' alcohol use cognitions and behaviors.

**Design & Methods**—Two studies examined the role of SCO as a moderator of social influence (perceived friend alcohol use in Study 1 and both perceived friend use and sibling-reported alcohol use in Study 2) on prototype perceptions and willingness to drink alcohol (Studies 1 & 2) as well as actual alcohol consumption (Study 2) among early adolescents.

**Results**—In Study 1, cross-sectional results indicated that SCO moderated the effect of perceived friend alcohol use on favorable images of drinkers and willingness to drink. Study 2 found that SCO moderated the effects of perceived friend use and sibling use on favorable images of alcohol users, willingness to use alcohol, and change in alcohol use over three years such that adolescents who reported engaging in social comparison more often reported greater willingness, more favorable images, and increases in alcohol use when perceived friend use or sibling use was high.

**Conclusions**—These studies highlight the importance of SCO as a moderator of susceptibility to the social influences of friends and siblings and may hold important implications for adolescent alcohol use prevention programs and models of health-risk behavior.

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The prevalence of adolescent alcohol use continues to be a public health concern (Johnston, O'Malley, Bachman, & Schulenberg, 2011). The 2013 Youth Risk Behavior Survey found that among high school students, during the past 30 days, 35% drank some amount of alcohol and 21% binge drank (Kann, Kinchen, & Shanklin, et al., 2014). Some potential consequences of adolescent alcohol use include: a) school problems, b) social problems, c) health problems, and d) issues in adulthood such as employment problems, other substance abuse, and criminal behavior (Hingson et al., 2009; U.S. Department of Health and Human Services, 2007; Youth Risk Behavior Surveillance System, 2007). Accordingly, identifying

factors associated with alcohol use in adolescence may help inform the development and refinement of effective prevention programs.

## **Influences on Adolescent Alcohol Use**

### **Peer influence**

Alcohol use during adolescence typically occurs in the context of peers (e.g., Barnes, Hoffman, Welte, Farrell, & Dintcheff, 2006; Ingram, Patchin, Huebner, McCluskey, & Bynum, 2007). Additionally, initiation of alcohol use commonly occurs during early adolescence (Johnston et al., 2005), a developmental period when peers become increasingly influential (Rubin, Bukowski, & Parker, 1998). A wealth of literature has determined that adolescents' beliefs about whether or not their peers use alcohol is significantly related to their own use (Borsari & Carey, 2001; Lewis & Neighbors, 2006), and as such, are important to include in models of health risk behavior (e.g., Ravis & Sheeran, 2003; Gerrard, Gibbons, Houlihan, Pomery, & Stock, 2008).

### **Sibling Influence**

In addition to peer influence, research has examined the impact of substance using siblings on adolescent use. This research indicates that young adolescents often spend more of their free time with their siblings (approximately 33%) than with their friends or their parents (McHale & Crouter, 1996). Several studies have shown that substance use by older siblings is associated with adolescent substance use (Griffin, Botvin, Scheier, & Nichols, 2002; Pomery, Gibbons, Gerrard, Cleveland, Brody, & Wills, 2005; Poelen, Engels, Van Der Vorst, Scholte, & Vermulst, 2006; Rajan et al., 2003). Many adolescents want to act “grown up” and therefore are curious about how older adolescents behave (Pickhardt, 2007) and so older siblings may be particularly influential.

The notion that adolescents' risky health behavior is influenced by their social environment and that peers and siblings may facilitate this relationship has been widely accepted in the literature (e.g., Maxwell, 2002; Santor, Messevey, & Kusumakar, 2000; Poelen et al., 2007). Furthermore, given their demonstrated importance in the prediction of alcohol use, perceptions of others' behavior has been included in many models of health risk behavior, including the prototype/willingness model (Gibbons, Gerrard, & Lane, 2003), a model designed specifically to address cognitive factors that mediate the effects of environment (social, familial, etc.) on adolescent risk behavior (Gibbons et al., 2003). As such, it provides the ideal framework for exploring the impact of peer and sibling influences on alcohol use among adolescents.

### **The Prototype/Willingness Model**

The prototype/willingness model combines elements of the Theory of Reasoned Action (Fishbein & Azjen, 1975), with a more heuristic approach to decision making (Gibbons et al., 2003). The basic assumption of this model is that there are two pathways to health risk behaviors: a reasoned path that is mediated by behavioral intention and a social reaction path that is mediated by behavioral willingness. Willingness represents an openness to engaging in a risk behavior, or what an individual would be willing to do under certain risk-conductive

circumstances (Gibbons et al., 2003). Because health risk behaviors, such as alcohol use, are social events for adolescents, they rarely engage in such behaviors alone (Gibbons et al., 1998; Nadler & Fisher, 1992) and therefore are likely to find themselves in risk conducive situations where the behavior of their peers and/or siblings is salient. Willingness is a strong predictor of substance use among adolescents and explains additional variance in behavior beyond intentions (Gerrard et al., 2008; Gibbons, Gerrard, Blanton, & Russell, 1998).

A unique construct within the prototype/willingness model is the risk prototype, defined as the image of the type of person who engages in a risk behavior (Gibbons et al., 2003). Research has shown that having relatively positive prototypes of people who engage in substance use predicts willingness to engage in the risk behavior as well as engagement in the behavior itself (Gerrard et al., 2008). Descriptive norms, or the perceived behavior of others (Borsari & Carey, 2001), are also central to the model (Gerrard et al., 2008; Litt & Stock, 2011). Research has found that perceived descriptive norms are associated with more favorable images of the typical drinker (i.e., prototypes; Blanton, Gibbons, Gerrard, Conger, & Smith, 1997) and greater willingness to use alcohol (Gibbons, Helweg-Larsen, & Gerrard, 1995; Pomery et al., 2005).

### **Social Comparison**

Social comparison is a central element in the prototype/willingness model, as it is assumed that risk images influence behavior through a comparison process (i.e. comparing the self with the risk image; Gibbons et al., 2003). One of the fundamental aspects of Festinger's original social comparison theory is that individuals are more likely to use similar rather than dissimilar others as targets of comparison (Festinger, 1954), a tenet that has been supported by research indicating that similarity to oneself is a critical parameter of social comparison (e.g. Suls & Miller, 1977; Wood, 1989). Therefore, adolescents likely look to their peers as sources of comparison because they share many characteristics (i.e. age, year in school). Additionally, because adolescents want to be seen as more mature, experienced, and often older than they really are (Kinsman et al., 1998), it is likely that older siblings also serve as common targets for social comparisons, especially given that siblings are likely to be seen as being similar (Whiteman, McHale, & Soli, 2011).

### **Individual differences in social comparison**

A number of researchers have suggested that certain individuals may be more inclined to engage in social comparison than others (e.g., Gilbert et al., 1995; Taylor, Buunk, Collins, & Reed, 1992). This propensity to engage in social comparisons is frequently referred to as Social Comparison Orientation (SCO; Gibbons & Buunk, 1999). A high SCO individual is someone who is interested in the behavior of others and has a degree of uncertainty about the self, along with a desire to reduce this self-uncertainty (Gibbons & Buunk, 1999). Consistent with this notion, research has shown that individuals high in SCO are more influenced by the behavior of others (Buunk & Gibbons, 1997). Two cross-sectional studies examined the synchronous relation between social comparison tendencies and alcohol use among college students. In the first study, college students who reported higher levels of attention to social comparison information (measured by the Attention To Social Comparison Information [ATSCI] scale; Lennox & Wolf, 1984), and who believed their

campus peers engaged in high levels of alcohol use reported the highest levels of alcohol use themselves (Novak & Crawford, 2001). Litt and colleagues (2012) found that the relation between perceived drinking norms and actual negative alcohol-related consequences was greater for students higher in SCO. Although these studies give insight into the role SCO may play, they did not address risk-related cognitions that have been shown to be influential in adolescents (Gibbons, Gerrard, & Lane, 2003), a group that is less likely to have initiated alcohol use than college students (Substance Abuse and Mental Health Services Administration, 2013).

### **The role of social comparison within the prototype/willingness model**

Despite the assertion that social comparison is an important underlying process of the prototype/willingness model, only a few studies have looked at whether SCO moderates the effects of prototypes or willingness on behavior, a claim that is central to the model. Consistent with the assumed role of social comparison in the prototype-willingness relationship, research by Gibbons and Gerrard (1995) found that favorability of risk images was related to subsequent risk behavior more strongly for those adolescents who frequently engaged in social comparison (Gibbons & Gerrard, 1995). Although more recent experimental work by Lane and colleagues (2011) indicated prototypes affect willingness through a social comparison process, it is unclear how one's SCO may interact with the perceived and/or actual behavior of their siblings and peers. The primary goal of the present two studies was to determine if SCO serves as a moderator of the effects of two important sources of influence on alcohol use and key prototype/willingness related cognitions: sibling use and perceived friend use. Results of these studies have the potential to enhance our knowledge in considering the roles of social influences and individual differences (SCO) on models of health risk behavior such as the prototype/willingness model.

### **Research Aims**

The present studies are novel in that they are the first to look at the moderating role of SCO on friend and sibling substance use within the framework of the prototype/willingness model. Specifically, Study 1 examined SCO as a moderator of the effect of perceived friend alcohol use on prototype perceptions and willingness to drink in a sample of adolescents. Study 2 examined both perceptions of friend and sibling alcohol use interacting with SCO in predicting both risk cognitions (prototype perceptions and willingness) and behaviors over time. Across studies and based upon previous research indicating that individuals who hold higher normative perceptions for alcohol use (Borsari & Carey, 2003) and who are higher in SCO (Gibbons & Gerrard 1995) engage in higher levels of substance use, we hypothesized that individuals higher in SCO, who either perceived that more friends were using alcohol or had older siblings who reported using alcohol more frequently, would report the highest levels of risk cognitions and alcohol use. Additionally, we predicted that the lowest levels of these cognitions and behaviors would be reported by individuals higher in SCO with lower using friends and/or siblings.

## Study 1

### Method

**Administration**—The data for this study was collected as part of a larger experimental study<sup>1</sup> (for a full description of recruitment, administration, and experimental results, see Litt & Stock, 2011) examining the impact of exposure to alcohol-related content on Facebook pages on risk cognitions. Local schools and community organizations (data was collected from 5 private Catholic high schools, one high school swim team and one religious youth group) in the northeastern region of the United States were contacted, and if they agreed to participate, information packets and a parental consent form were sent home to parents of any adolescent aged 13-15. On the day of data collection, any adolescent who had a signed parental consent form was allowed to participate if they also signed their own assent form. Participants completed all materials individually using pencil and paper, and depending on the preference of the organization and available space, the surveys were administered in one of two ways: 1) adolescents who had received parental consent were gathered together and taken to a separate room and given the consent information and survey packets or 2) adolescents who obtained parental consent remained in the same room as their peers who did not get parental consent. All procedures and materials were approved by the university IRB. All constructs were collected after the experimental manipulation, thus all analyses control for experimental condition<sup>1</sup>.

**Participants**—One hundred and eighty nine adolescents, ages 13-15 ( $M = 14.5$  years,  $SD = .77$ ), completed the study (49% males). Due to Institutional Review Board (IRB) restrictions, ethnicity data was not collected, however based on general demographics of the groups involved, a majority of the participants were Caucasian.

### Measures

**Prototype perceptions:** Images of alcohol users were introduced with a lead-in statement “Please think about the type of person your age and gender who drinks alcohol. How much do you think the following words describe your image of that person?”, followed by four items with the adjective descriptor stem “How [descriptor] are they?” Each item had a 7-point response scale ranging from 1 (*not at all*) to 7 (*very*). The descriptors were smart, popular, mature, and attractive. Participants also rated how similar they were to the typical alcohol user on the same scale. Descriptor items were averaged and then multiplied with the similarity score to create an index of prototype perceptions (see Gerrard et al., 2006; Litt & Stock, 2011), where higher scores reflected more favorable perceptions of alcohol users ( $\alpha = .85$ ).

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<sup>1</sup>In the larger study from which Study 1 data was drawn, individuals were randomly assigned to one of two conditions: viewing Facebook profiles that included both text and photographic references to alcohol, or a control condition in which no references to alcohol were made. Because of the experimental nature of the larger study, all analyses in Study 1 controlled for condition assignment. Although in the present study, experimental condition did not have a significant effect on Study 1 outcomes, it is important to note that in the original study from which this data was drawn (Litt & Stock, 2011), individuals who viewed Facebook profiles that portrayed drinking as normative reported higher levels of risk cognitions than individuals in the control condition. The non-significant effect of condition on willingness and prototypes in present study is likely due to the inclusion of social comparison and perceived friend alcohol use. It is important to note that the effect of condition in the original study was significant for those individuals higher in SCO, but not lower in SCO.

**Willingness:** The willingness measure began with a description of a hypothetical scenario: “Suppose you were with a group of friends at one of their houses. Your friend's parents are gone for the night, and your friend has gotten a hold of some alcohol. If your friend offered you alcohol, how willing would you be to do each of the following?” Two items followed this statement—“have 1 or two drinks,” and “drink enough to get drunk,”— from 1 (*not at all willing*) to 7 (*very willing*). The two items were averaged ( $r = .91$ ).

**SCO:** A subset (5 items) of the Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999) was used. A sample item was “If you want to find out how well you did something, how often do you compare yourself with how well other people did?” All 5 items were scored on a scale from 1 (*never*) to 5 (*all the time*) and were averaged ( $\alpha = .78$ ).

**Drinking behavior:** Previous alcohol use was assessed with a single item asking participants if they had ever drunk (even just a sip) of beer, wine, wine coolers, or other liquor. Participants responded either no or yes.

**Perceptions of friends' alcohol use:** Participants were asked to report on a scale of 0-100% how many of their friends had consumed at least one whole drink of alcohol in the past 3 months.

**Demographics:** Age, gender, and data collection location were included as key demographic variables.

**Analytical Plan**—Descriptives and correlations were calculated for all study variables. Hierarchical multiple regression analyses were conducted to evaluate willingness and prototype perceptions as a function of perceived friend alcohol use, SCO, and their interaction. Gender, age, and previous alcohol use were included in all analyses as covariates based on previous associations with alcohol consumption (O'Malley & Johnston, 2002; Wechsler et al., 2000). Given that this data was drawn from a larger study, experimental condition<sup>1</sup> and data collection location were included as covariates. All predictors were mean centered to facilitate interpretation of parameter estimates (Aiken & West, 1991; Cohen et al., 2003).

## Results

**Descriptives and Correlations**—A majority of participants (71%) reported *ever* having used alcohol (even just a sip), and on average believed that 31% of their friends had consumed at least one full alcoholic beverage in the last 3 months. Correlations indicated that perceived friend alcohol use was positively associated with willingness ( $r = .59$ ) and prototype perceptions ( $r = .52$ ). Personal alcohol use was positively and significantly related to perceived friend use ( $r = .31$ ), willingness ( $r = .30$ ), and prototype perceptions ( $r = .31$ ). See Table 1 for full correlation and descriptive information.

## Regressions

**Prototype perceptions:** Being male ( $\beta = .12, t = 2.06, p = .04$ ), ever having used alcohol ( $\beta = .13, t = 2.02, p = .04$ ), and perceiving that more friends had consumed alcohol ( $\beta = .56, t = 8.69, p < .001$ ) was associated with more favorable prototype perceptions. There were not significant effects of experimental condition, data collection location, or SCO ( $ps > .10$ ). In addition, the predicted two-way interaction (perceived friend use  $\times$  SCO) was significant ( $\beta = .12, t = 2.00, p < .05$ ; See Figure 1). Simple effects analysis (using  $\pm 1$  SD from the conditional mean of SCO) indicated that although the relationship was significant for both, perceived friend use was much more strongly associated with prototype perception for those who were higher in SCO ( $\beta = .55, t = 6.12, p < .001$ ) than adolescents lower in SCO ( $\beta = .49, t = 5.12, p < .001$ ).

**Willingness**—There were no significant main effects for past alcohol use, experimental condition<sup>1</sup>, data collection location, or SCO ( $ps > .10$ ). However, being male ( $\beta = .15, t = 2.54, p = .01$ ) and perceiving that more friends had consumed alcohol ( $\beta = .57, t = 9.51, p < .001$ ) predicted higher levels of willingness. As expected, the perceived friend use  $\times$  SCO interaction was significant ( $\beta = .12, t = 2.19, p = .03$ ). Similar to the results with prototype perception, simple effects analyses revealed that perceived friend use was associated with willingness for both those who were higher in SCO ( $\beta = .65, t = 8.07, p < .001$ ) and those who were low in SCO ( $\beta = .47, t = 4.94, p < .001$ )<sup>2</sup>, with a significantly stronger relationship being observed for those higher in SCO (see Figure 1).

## Discussion

Results indicated that SCO was a significant moderator of the effect of perceived friends' alcohol use on alcohol-risk cognitions in a sample of adolescents. In particular, both prototype perception and willingness differed as a function of the interaction between perceptions of friends' use and SCO. Although SCO was not associated with either perceived use or prototypes and willingness, it did moderate the relationship between them. The present study demonstrates the importance of looking at SCO when determining whose behavior will be most affected by adolescents' perceptions of their friends' risk behavior.

Although this is an important first step in elucidating the role that SCO may play in moderating prototype/willingness pathways, the cross-sectional nature of the design limits the conclusions we can draw about causality. Additionally, we were only able to assess perceptions of friends' alcohol use, and given the literature that highlights siblings as an important source of social influence (e.g. Pomery et al., 2005), it was important to determine whether sibling alcohol use and its effect on adolescent alcohol use is also moderated by SCO.

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<sup>2</sup>A logistic regression using past alcohol use as the dependent variable also indicated a significant interaction between perceived friend alcohol use and SCO such that individuals who were high in perceived friend use and high in SCO reported the highest rates of ever having consumed alcohol. In contrast, the lowest rates of alcohol consumption were reported by individuals with low perceived friend use and high social comparison.

## Study 2

Study 2 further examined the relationships between perceptions of friends' use, SCO, and alcohol willingness, and personal alcohol use using a longitudinal design. In addition, we were interested in determining the relationships between sibling alcohol use, SCO, willingness, and personal alcohol use. Although ethnicity is not a primary of the present paper, it should be noted that in Study 2, all the adolescents were African Americans, a group that has been shown to be less socially influenced than Caucasian samples (Gibbons, Pomery, Gerrard, et al., 2010; Robinson, Murray, Alfano, et al., 2006). Although we cannot make direct comparisons between ethnic groups, extending the results from Study 1 into another sample may help provide evidence of generalizability across racial/ethnic groups.

## Method

**Participant Recruitment**—Participants in Study 2 were part of the ongoing Family and Community Health Study (FACHS). FACHS was designed to examine the impact of environmental influences on the mental and physical health of African American families. Families were recruited from multiple sites in Iowa and Georgia that varied on demographic characteristics such as racial composition and socioeconomic level. Community coordinators compiled lists of all families that included a 5<sup>th</sup> grade child. Potential participant families, which were selected at random from these lists, were then contacted. A total of 889 families, 475 in Iowa and 422 in Georgia, were recruited. Each family had a “target” child ages 10-12 at the time of study enrollment. At the second wave of data collection, or Time 1 (T1; approximately 2 years after study enrollment,  $M = 25$  months) for the present study, 779 adolescents remained ( $M$  age = 12.29, 348 male), and at the third wave of data collection (T2 in the present study; approximately 3 years after T1,  $M = 38$  months) 678 remained (retention rate = 87%,  $M$  age = 15.5, 310 male). Of these families, 227 had an older sibling who was within 3 years of the target child's age, living at home, and participated in the study. Two families were excluded because they were outliers in the regression analyses, leaving a sample size of 225. The interview required two visits, included a computer-assisted personal interview (CAPI), and were conducted in participants' homes or nearby locations. The target adolescents received \$70 for their participation (for description of the FACHS sample and recruitment, see Brody et al., 2001; Cutrona, Russell, Hessling, & Brown, 2000).

## Measures

**Alcohol use (T1, T2):** Adolescents reported how frequently they had consumed 3 or more drinks at one time over the past year with the following scale, 1 = *never*, 2 = *1-2 times*, 3 = *about 3-11 times*, 4 = *a few times per month*, 5 = *about 1-2 times per week*, and 6 = *a few times per week*.

**Prototype perception (T1, T2):** The prototype perception measurement was the same as the one used in Study 1, except for being measured on a scale from 1 (*not at all*) to 4 (*very*; Gibbons & Gerrard, 1995) and the addition of two adjectives: *childish* and *dull* (reverse scored so that higher scores indicated more favorable prototype perceptions). Participants also reported how similar they were to the prototype (ranging from 1 = *not at all similar* to



5= *very similar*). The descriptor items were averaged and then multiplied with the corresponding similarity score ( $a = .79$ ; see Gerrard et al., 2006; Litt & Stock, 2011)

**Willingness (T1, T2):** The section began with the same hypothetical scenario as used in Study 1 and was followed up by the same two alcohol use questions which were combined to create a willingness scale ( $a = .89$ ) where higher scores indicated greater willingness to use alcohol.

**Perceptions of friends' use (T1):** Adolescents' perceptions of their friends' use was assessed using the stem “During the past 12 months, how many of your close friends have used alcohol” with responses on a 3-point scale from *none of them* to *all of them*.

**Sibling use (T1):** Siblings reported their frequency of their own drinking over the past 12 months on a 5-point scale ranging from *never* to *5 or more times*.

**SCO (T1):** Participants completed the full 10 items INCOM scale (Gibbons & Buunk, 1999) using the same 5-point scale as Study 1 that ranged from *strongly disagree* to *strongly agree* ( $a = .77$ ).

**Controls:** All analyses controlled for T1 versions of the T2 dependent variables (alcohol use, prototype perception, and willingness, respectively) in order to predict change over time. Additionally, all analyses controlled for the following measures, which have been associated with alcohol use: gender, target risk-taking (extent to which targets would enjoy series of risky activities; Wills et al., 2001), neighborhood risk as reported by the targets (frequency of various acts such as fighting, drug use in neighborhood; Rankin & Quane, 2002), parental alcohol use, and SES (parental education and income) as measured at T2.

## Results

**Descriptives and correlations—**At T1, approximately 20% of the target participants (M age = 12.3) reported having used alcohol in the past year and 36% reported that some of their friends used alcohol in the last year. Roughly 50% of older siblings reported at least minimal alcohol use in the past 12 months at T1. At T2 (M age = 15.5), 30% of target participants reported using alcohol within the last year. In addition, T1 alcohol use was positively associated with all major study variables ( $ps < .05$ ) except for SES and SCO. Perceptions of friends' use was positively associated with both T1 and T2 willingness, T1 alcohol use, risk-taking tendencies, SCO, and T1 sibling use (all  $ps < .05$ ). Sibling alcohol use was positively associated with T1 target alcohol use, risk-taking, and T2 alcohol use ( $ps < .05$ ). See Table 2 for full correlation and descriptive results.

### Perceptions of Friends' Use

**Prototype perceptions:** All predictors in the following regressions were mean centered (Aiken & West, 1991; Cohen et al., 2003). Being greater in risk-taking tendencies ( $\beta = .11$ ,  $t = 2.80$ ,  $p = .005$ ) and having more favorable prototype perceptions at T1 ( $\beta = .12$ ,  $t = 3.03$ ,  $p = .002$ ) predicted greater T2 prototype perception, whereas gender, neighborhood risk, parental alcohol use, SES, SCO, and perceptions of friends' use did not predict T2 prototype

favorability ( $ps > .05$ ). The interaction between perceived friend alcohol use and SCO was significant ( $\beta = .08, t = 1.98, p = .04$ ), with simple effects analyses (using  $\pm 1 SD$  from the conditional SCO mean) indicating that perceived friend use was a predictor of prototype perceptions for those higher in SCO ( $\beta = .18, t = 2.54, p = .01$ ), but not for those lower in SCO ( $\beta = -.05, t = -1.17, p = .28$ ; Figure 2).

**Willingness:** Being greater in risk-taking tendencies ( $\beta = .13, t = 3.07, p = .002$ ), having greater willingness at T1 ( $\beta = .20, t = 4.97, p < .001$ ), and being higher in SCO ( $\beta = .08, t = 1.97, p = .05$ ) predicted greater T2 willingness, whereas gender, neighborhood, parental alcohol use, SES, and perceptions of friends' use did not predict T2 willingness ( $ps > .05$ ). The predicted perceived friend use  $\times$  SCO interaction was significant ( $\beta = .09, t = 2.15, p = .03$ ). Simple effects analyses indicated that perceived friend use was a predictor of willingness for those higher in SCO ( $\beta = .11, t = 2.92, p = .004$ ), but not for those lower in SCO ( $\beta = -.03, t = -0.55, p = .58$ ; Figure 2).

**Alcohol use:** Results indicated that having used alcohol at T1 ( $\beta = .13, t = 4.54, p < .001$ ) and being more prone to taking risks ( $\beta = .14, t = 4.83, p < .001$ ) predicted higher levels of alcohol use at T2. There were no other main effects. However, the interaction between perceived friend use and SCO was significant ( $\beta = .13, t = 3.43, p = .001$ ) such that perceived friend use predicted T2 alcohol use for those who were higher in SCO ( $\beta = .14, t = 2.94, p = .003$ ), but not for those who were lower in SCO ( $\beta = -.05, t = -1.12, p = .23$ ; See Figure 2).

### Sibling Use

**Prototype perception:** Results indicated that prototype perceptions at T1 ( $\beta = .16, t = 2.04, p = .04$ ) predicted prototype perceptions at T2, whereas gender, neighborhood risk, parental alcohol use, SES, SCO, and sibling use did not predict T2 prototype favorability ( $ps > .05$ ). The interaction between sibling use and SCO was significant ( $\beta = .16, t = 2.12, p = .03$ ) such that sibling use predicted prototype perceptions for those higher in SCO ( $\beta = .20, t = 2.14, p = .03$ ), but was marginal for those lower in SCO ( $\beta = .14, t = 1.90, p = .06$ ; Figure 3).

**Willingness:** Having greater willingness at T1 ( $\beta = .24, t = 3.33, p = .001$ ) and being higher in SCO ( $\beta = .15, t = 2.00, p = .047$ ) predicted greater T2 willingness. However, there were not significant main effects of neighborhood risk, risk taking tendencies, parental alcohol use and sibling use ( $ps > .05$ ). Once again, the sibling use  $\times$  SCO interaction was significant ( $\beta = .18, t = 2.33, p = .02$ ). Simple effects analyses indicated that sibling use was a predictor of willingness for those higher in SCO ( $\beta = .21, t = 2.28, p = .02$ ) but not for those lower in SCO ( $\beta = -.18, t = -1.69, p = .09$ ; Figure 3).

**Alcohol use:** Being male ( $\beta = -.21, t = -2.05, p = .04$ ) and having used alcohol at T1 ( $\beta = .27, t = 3.49, p = .001$ ), predicted greater T2 alcohol use. There were no other main effects. However, the sibling use  $\times$  SCO interaction was significant ( $\beta = .15, t = 2.04, p = .04$ ). Similar to prototypes and willingness, simple effects analyses indicated that sibling use predicted alcohol use for those who were higher in SCO ( $\beta = .19, t = 2.36, p = .02$ ), but not for those who were lower in SCO ( $\beta = -.16, t = -1.64, p = .10$ ; Figure 3).

## Discussion

As predicted, SCO moderated the relation between both perceptions of friends' use (replication from Study 1) and sibling-reported alcohol use on prototype perceptions, willingness, and personal alcohol use three years later among African American adolescents. These results were significant when controlling for T1 versions of the dependent variables risk-taking tendencies, as well as parental alcohol use, SES, and neighborhood risk. Most of these latter potential confounds help account for environmental factors that are shared by the siblings, suggesting that it is the sibling's behavior that is producing the effect. Additionally, Study 2 used a longitudinal design, which allowed us to test these relationships over time.

## General Discussion

As predicted, SCO moderated the effects of perceived friend use on prototype perception of drinkers and willingness to use alcohol (Studies 1 and 2), and also change in alcohol use behaviors over time (Study 2). Specifically, adolescents higher in SCO reported greater alcohol willingness and more favorable prototype perceptions of people who drink alcohol, as well as increases in alcohol use behaviors when perceived friend use was high. In addition, Study 2 demonstrated that SCO also moderated the effect of sibling alcohol use on all major outcome variables.

Our results add to the literature on the importance of examining person-level moderators of normative influence on alcohol use cognitions and behaviors. Of note, while some past research has found that perceived friend use and sibling use predicts personal use (Borsari & Carey, 2001; Griffin et al., 2002), others have found that although there was high relative similarity in drinking within sibling pairs, there was no evidence supporting longitudinal effects of sibling's drinking (Poelen et al., 2007). The results of the present study may qualify these previous results by suggesting that the relationships between peer and sibling influence and personal alcohol use may be more complex than originally thought. In particular, it may be that SCO is the factor driving these previous peer and sibling estimates. The findings also support previous work (Litt et al., 2012) that adds SCO to the list of moderators of the relation between descriptive norms and alcohol use outcomes, including identification with other students (Lewis & Neighbors, 2007) and social anxiety (Neighbors et al., 2007). In addition, our findings indicate that SCO moderates the relation between perceived friend use *and* self-reported sibling use on alcohol use cognitions *and* behaviors and examines SCO among Black *and* primarily White (based on general school demographics) adolescents. Our results highlight the importance of examining SCO as a measure of degree of susceptibility to the social influences of friends and siblings. The findings also demonstrate the importance of SCO as a moderator of the social-reaction pathway of the prototype/willingness model and indicate SCO should be considered as a moderator in other decision-making models that include perceived norms as a predictor of behavior, particularly in younger groups that may not have yet initiated risk behavior.

**Intervention Implications**—Interventions designed from a dual-processing perspective (e.g., those incorporating the prototype/willingness model) indicate that much of adolescents' and young adults' decision-making has heuristic and/or reactive elements (e.g., Brainerd & Reyna, 1992; Gerrard et al., 2006; Gibbons, Gerrard, Lane et al., 2005;

Stanovich, 2004). These elements, including prototypes and willingness, are more malleable than the more reasoned antecedents to behavior (which imply a level of commitment, or intention) and therefore are logical targets for interventions (Blanton et al., 2001; Gerrard et al., 2006; Pomery Gibbons, Reis-Bergan, & Gerrard, 2009). The present two studies suggest that considering SCO as an individual difference variable that may influence adolescents' decisions to engage in alcohol use can potentially increase the efficacy of existing alcohol use programs. Research has found that interventions for college student alcohol drinking that utilize a normative component are particularly efficacious (Carey et al., 2007; Larimer & Cronce, 2007). Thus, future research evaluating social comparison as a moderator of norm-based interventions may reveal that the same tendency (i.e. social comparison) which increases the influence of norms on drinking cognitions and behavior may be advantageous with respect to the efficacy of norms interventions. Additional research is needed to examine ways to reduce the negative impact of peer and sibling use among those higher in SCO. One possibility is to highlight negative consequences peers and siblings may have experienced due to use (Buunk & Gibbons, 1999; Stock et al., 2013). Another possibility, in line with the work conducted by Lane and colleagues (2011), would be to develop prevention programs that encourage psychological distancing from the risk prototypes, which in turn, could lead to a decrease in risky behavior. The results of the present study suggest that individuals higher in SCO may be more influenced by this type of contrast-based intervention. Finally, Piko et al. (2007) suggested that health promotion programs should focus on fostering negative images in primary prevention more than discouraging positive ones, and this assertion could be tested in relation to adolescent alcohol use, particularly among those individuals high in SCO. In sum, our results support the use of multi-faceted interventions that acknowledge social influences on alcohol use, particularly peer and familial alcohol use (e.g., Pomery et al., 2005; Windle, 2000).

**Limitations and Future Directions**—The results of the present two studies should be considered in light of several limitations. In Study 1, the reliance on perceptions of friend use is a potential limitation as it is unclear how accurate these perceptions are. However, this concern is mitigated by the fact that the same patterns emerged in Study 2 when using self-reported sibling use. That being said, additional research should also examine *perceptions* of sibling use in order to determine whether perceptions of sibling use operate in a similar manner to sibling-reported alcohol use. Additionally, although results suggest that SCO is part of the influence process, it is unclear what specifically about comparisons with friends and siblings is important. For example, characteristics of the relationship (e.g., quality, closeness, communication) between the adolescent and their sibling might also moderate the influence of sibling use. Research is also needed to more fully understand the similarities and differences in the ways siblings versus friends influence the behaviors of adolescents. It is likely that they share some similar factors, including positive reinforcement, modeling, and feelings of acceptance, but we cannot answer this with our data. Finally, because of both institutional review board constraints and varying school policies on the nature of data collection, we were not able to classify students by unique classrooms. Although we controlled for general data collection site, it is unclear how individual classrooms/groups within these larger sites may have differed from each other, perhaps due to selection or socialization effects, and these differences could have influenced outcomes.

## Conclusions

This research identifies a strong moderator of the effects that two important sources of influence have on alcohol use: sibling use and perceived friend use. In particular, this research found that cognitions and behaviors among adolescents are associated with the degree to which they socially compare as well as the actual behavior of their siblings and perceptions of their friends' alcohol use. These findings are potentially important when developing alcohol use prevention programs in adolescent populations and in considering complex models of social influences on risk behavior, such as the prototype/willingness model.

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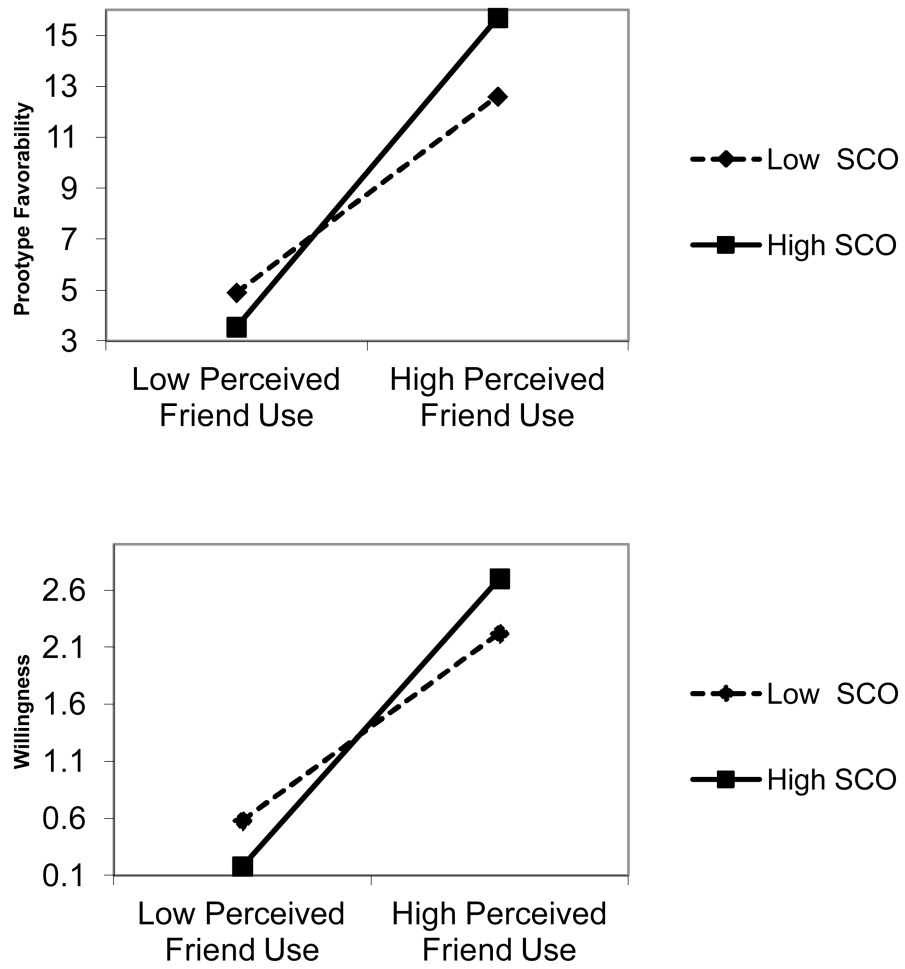
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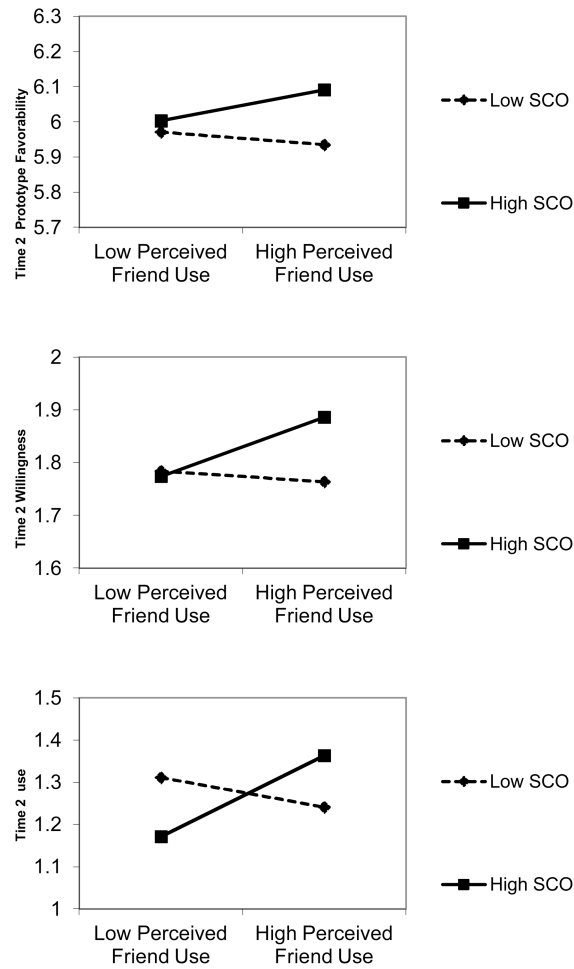
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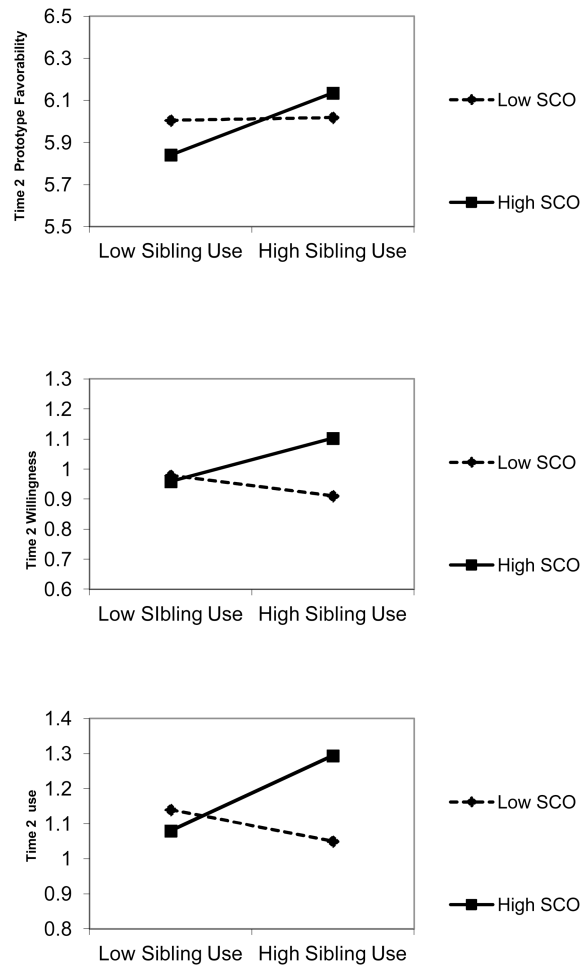




**Figure 1.** Study 1, Prototype favorability (range 1- 49) and willingness (range 1- 7) to use alcohol as predicted by perceived friend alcohol use and social comparison orientation (SCO).



**Figure 2.** Study 2, T2 Prototype favorability (range 1- 20), willingness (range 0 -3), and alcohol use (range 0 -3) as predicted by perceived friend alcohol use and social comparison orientation (SCO).



**Figure 3.** Study 2, T2 Prototype favorability (range 1- 20), willingness (range 0 -3), and alcohol use (range 0 -3) as predicted by sibling-reported use and social comparison orientation (SCO).

Table 1

## Study 1 Means, Standard Deviations, and Correlations

Variable	1	2	3	4	5	6
1. Gender	-					
2. Past Alcohol Use	-.11	-				
3. Perceived Friend Use	-.14	.31**	-			
4. Social Comparison (SCO)	.09	.14	-.03	-		
5. Willingness to drink	.03	.30**	.59**	.01	-	
6. Prototypes	.06	.31**	.52**	.03	.64**	-
<b>Mean</b>	0.51	0.73	31.57	3.47	2.11	12.78
<b>Standard Deviation</b>	0.50	0.45	31.82	0.80	1.75	8.99
<b>Range</b>	0-1	0-1	0-100	1-5	1-7	1-49

Note:

\*  $p < .05$ .\*\*  $p < .01$ .

N= 189, Gender coded male = 0, female = 1

Table 2

## Study 2 Means, Standard Deviations, and Correlations

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	-													
2. Time 1 Alcohol Use	.06	-												
3. Time 1 Willingness	.10*	.56**	-											
4. Time 1 Prototypes	.09	.17*	.10*	-										
5. Neighborhood Risk	-.05	-.12**	-.11**	-.04	-									
6. Risk-Taking	-.10	.23**	.28**	.02	-.05	-								
7. Socioeconomic Status	-.02	-.03	-.03	.01	.15**	.11**	-							
8. Social Comparison (SCO)	.04	.06	.10	.01	-.08	.17**	-.06	-						
9. Primary Caregiver Alc. Use	-.01	.04	.04	.08	-.02	.03	.02	.03	-					
10. Time 1 Perceived Friend	.01	.39**	.42**	.02	.25**	.24**	-.11*	.10*	.06	-				
11. Time 1 Sibling Use	.10	.21**	.20**	.40**	-.03	.10	-.06	.08	.25**	.10	-			
12. Time 2 Alcohol Use	-.04	.21**	.17**	.10*	-.01	.27**	-.07	.15**	.03	.18**	.26**	-		
13. Time 2 Willingness	.03	.74**	.25**	.13**	-.02	.18**	-.01	.14**	.03	.17**	.13**	.74**	-	
14. Time 2 Prototypes	.08	.15**	.10*	.49**	-.09	.01	-.01	.11*	.07	.11*	.39**	.11*	.12*	-
<b>Mean</b>	0.53	1.06	1.07	6.25	2.68	1.44	-0.01	1.88	1.46	1.34	1.74	1.34	1.19	6.86
<b>Standard Deviation</b>	0.49	0.15	0.20	1.65	0.36	0.42	0.82	0.49	0.49	0.71	0.93	0.71	0.34	1.68
<b>Range</b>	0-1	0-3	0-3	1-20	1-3	1-3	-19-9	0-4	1-2	0-3	0-3	0-3	0-3	1-20

Note:

\* p &lt; .05.

\*\* p &lt; .01.

N= 225, Gender coded female = 0, male = 1