Revisiting "What They Think": Adolescent Drinking and the Importance of Peer Beliefs

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Abstract

The association between delinquent peers and delinquent behavior is among the most consistent findings in the criminological literature, and a number of recent studies have raised the standards for determining the nature and extent of peer influence. Despite these advances, however, key questions about *how* deviant behavior is socially transmitted remain unresolved. In particular, much of the research examining peer influence is limited to peer behavior, despite a rich literature supporting the salience of beliefs, such as expectations and moral approval, in shaping behaviors. The current study takes advantage of advances in the modeling of peer influence and selection processes to re-examine the contributions of peer beliefs and behaviors to adolescent drinking. I employ longitudinal social network analysis to examine how peers contribute to the complex interplay between deviant beliefs and behaviors. I find evidence that beliefs related to peer drinking have both a direct and indirect impact on behavior and also play an important role in the friendship selection process. These results highlight the importance of understanding how peers influence deviant behavior and suggest that peer beliefs are an important part of this relationship.

Keywords

peer influence; delinquent peers; social networks; alcohol use

The extant criminological literature examining peer influence is largely limited to the delinquent behavior of the peers despite a rich body of research supporting the salience of beliefs in shaping behaviors. The present paper thus focuses on an aspect of the social transmission of deviance that has received little attention, especially in research that capitalizes on recent major advances in the study of peer influence. I revisit the role that peer beliefs play in the development of alcohol use and employ longitudinal social network analysis to address whether the importance of peers is linked to "what they think or what they do" (Warr and Stafford, 1991). Furthermore, this study builds on past research by including expectations as a type of peer beliefs and by considering how beliefs about alcohol affect friendship choices. This study examines alcohol use because available data allow me to assess multiple types of adolescent beliefs about drinking, and alcohol use by adolescents is among the most common forms of deviance and has been linked to a number of undesirable outcomes (Duncan et al., 1997; Kandel et al., 1986). I distinguish several

important pathways through which peer beliefs could be associated with behavior, and results reveal that peer beliefs have both a direct and indirect impact on alcohol use and also play an important role in the friendship selection process. These findings highlight a complicated interplay between beliefs and behaviors and suggest that the salience of delinquent peers extends beyond their behavior.

RECONSIDERING THE IMPORTANCE OF BELIEFS

In a seminal piece that explored how delinquent adolescents influence their peers, Warr and Stafford (1991) estimated models that contained measures of both peer behaviors and peer beliefs. Although the authors found an association between respondents' delinquent behavior and both peer behaviors and peer beliefs, the magnitude of the peer behavior effect was larger than the peer belief effect. Furthermore, the behavior of peers was more influential than peer beliefs in cases where the two were incongruent. In light of these findings, Warr and Stafford concluded that peer delinquent behavior, in contrast to peer beliefs about delinquency, was the more important mechanism behind the relationship between delinquency and delinquent peers.

The work of Warr and Stafford (1991) represents a notable attempt to understand whether peer beliefs about deviance are a cause of adolescent delinquency. Indeed, the association between delinquent peers and delinquent behavior is among the most consistent findings in the criminological literature (Warr, 2002), yet the question of exactly *how* peers influence their friends remains unanswered. A rich history in the social-psychological literature focuses on the formation of beliefs[1] and how they are shaped by the beliefs of others (Fishbein and Ajzen, 1975), and criminological theories that stress peer influence place emphasis on the salience of both beliefs and behaviors in the social transmission process. Differential association theory (Sutherland, 1947), for example, contends that deviant behavior is learned, and social learning theory (Akers, 1985; Burgess and Akers, 1966) builds on this premise by specifying the mechanisms through which the learning process takes place. The importance of beliefs and behaviors can be seen in these mechanisms, which include differential association (exposure to beliefs favorable to deviance), definitions (one's own attitudes toward a given behavior), differential reinforcement (the balance of rewards and punishments associated with delinquent behaviors), and imitation (copying the behavior of others). Empirical studies, however, have traditionally concluded that the association between an individual's delinquency and peer delinquency generally persists even when controlling for individual beliefs (Jaquith, 1981; Jensen, 1972; Matsueda, 1982; Warr and Stafford, 1991). This finding has been interpreted as supporting the mechanisms of imitation and reinforcement (as measured by peer delinquency) over differential association (represented by individual beliefs).

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[1]Past research has employed a number of labels to describe what individuals and their peers think about behavior. In this paper, I use the term "beliefs" to refer to this general domain. This use is conventional in social psychology and consistent with the work of Fishbein and Ajzen (1975: 131), who define beliefs as,

"the subjective probability of a relation between the object of the belief and some other object, value, concept, or attribute. Thus a person may believe that he possesses certain attributes (e.g., that he is intelligent, honest, punctual, etc.), that a given behavior will lead to certain consequences, that certain events occur contiguously, etc."

In a recent study, Megens and Weerman (2012) used direct measures of peer characteristics to revisit whether peer beliefs contribute to delinquency in adolescence. Most of the past research on peer beliefs, on the other hand, relied on perceptual measures of peer beliefs and peer behavior in which respondents indicated whether their friends approved of or engaged in specific delinquent acts (e.g., Agnew, 1991; Hindelang, 1974; Warr and Stafford, 1991). Research into the use of these perceptual measures, however, has made clear that adolescents consistently overestimate behavioral similarity to peers, and estimates of peer influence derived from these perceptual measures are likely biased (Aseltine, 1995; Haynie and Osgood, 2005; Jussim and Osgood, 1989; Kandel, 1996). Megens and Weerman (2012) addressed this measurement issue through the use of social network data. These authors discovered that peer beliefs, rather than peer behavior, were the more salient predictor of respondents' delinquent behavior, a result that runs counter to those of Warr and Stafford (1991).

The results of Megens and Weerman (2012) illustrate not only the importance of considering peer beliefs when attempting to explain deviance, but also point to an avenue through which peer beliefs may affect individual delinquency: their study revealed that the measure of the respondents' *own* beliefs not only mediated the effect of peer beliefs but was also the strongest predictor of delinquency within the models. In other words, the authors found that peer beliefs about deviance were associated with individuals' delinquency because peer beliefs influenced individual beliefs. This particular finding is in line with past research establishing that respondents' own moral beliefs play a crucial role in explaining their delinquent behavior, including alcohol use (Akers et al., 1979; Johnson, Marcos, and Bahr, 1987; Matsueda, 1982; Matsueda and Heimer, 1987; Strickland, 1982). Several studies have also investigated the effect of peers on these beliefs (Mears, Ploeger, and Warr, 1998; Thornberry et al., 1994). In one study, Mears and colleagues (1998) concluded that exposure to delinquent peers affected males more strongly than females, and that moral evaluations of delinquent behavior played a moderating role in this relationship. Similarly, a study by Thornberry et al. (1994) found evidence that not only was respondents' behavior influenced by peer and individual beliefs about delinquency, but that peer delinquency also influenced individual beliefs. The studies by Mears, Ploeger, and Warr (1998) and Thornberry et al. (1994), however, both relied on perceptual measures of peer beliefs and behavior, and neither tested whether peer beliefs about delinquency shape individual beliefs. Thus, individuals' delinquency may be driven in part by how they think about this behavior, and it is still unresolved whether these beliefs are altered through exposure to peer beliefs.

WHICH BELIEFS?

The current study adds to the existing literature on peer beliefs by taking a broader view of the type of beliefs that may contribute to adolescent drinking. Differential association theory and social learning theory both suggest that peer beliefs have clear potential for contributing to the learning of deviant behavior. Indeed, the central proposition of differential association theory emphasizes associate's views by stating that exposure to "definitions" favorable to deviance increases the likelihood of engaging in criminal behavior. But while definitions are incorporated into social learning theory, Akers (1985) classifies them as a type of signal, called "discriminative stimuli," associated with the reinforcement of behavior. These signals

indicate the expected responses to a given behavior, and the likelihood that an individual will engage in deviance depends on differential reinforcement, the balance of these expected rewards and punishments. Social learning theory thus acknowledges the importance of definitions while simultaneously recognizing the role that other factors, including other types of beliefs, play in shaping behavior. Conceptualizing beliefs only in regard to their moral values may therefore understate the role that beliefs play in shaping deviant behavior such as alcohol use. Furthermore, while criminological theories identify peer beliefs as mechanisms that contribute to deviance, the importance of these beliefs can be found in more general theoretical perspectives of human behavior as well. For instance, according to Blumer (1969), an underlying premise of symbolic interactionism is that the meanings assigned to behaviors determine actions, and social interactions shape these meanings. As part of this process, individuals evaluate the beliefs and behaviors of others and modify their own beliefs accordingly. This perspective not only asserts that factors such as peer beliefs contribute to deviance, but also contends that these beliefs should not be limited to any particular type, such as moral approval. Instead, any other beliefs about the behavior that pertain its meaning are also relevant.

A review of the criminological research that has sought to disentangle the effects of peer beliefs and behavior, however, reveals that peer beliefs have primarily been conceptualized as level of *approval* of delinquent acts (Megens and Weerman, 2012; Thornberry et al., 1994; Warr and Stafford, 1991; Weerman, 2011). Warr and Stafford (1991), for example, measured respondents' beliefs with responses to items that asked how wrong it was for someone to engage in a series of delinquent behaviors, and the measure of friends' beliefs came from the respondents being asked whether their friends would approve or disapprove of the respondent committing a series of delinquent acts. Similarly, the study by Megens and Weerman (2012) relied on items that asked respondents how much they agreed with a set of five statements related to delinquency (e.g., "You're allowed to steal if you need money," "You are never allowed to hit someone"). A scale created from these items then formed the measure of approval of delinquent behavior. This literature thus relies exclusively on moral beliefs, despite social learning theory's clear position that other types of beliefs should also influence behavior.

One type of belief that has received considerable attention through a rich tradition of research into alcohol use is expectations about rewards and punishments, and much of this work has focused on identifying the beliefs most relevant to predicting subsequent behavior (Jones, Corbin, and Fromme, 2001; Sher et al., 1996; Wood et al., 2001). In a review of the literature on outcome expectancy theory and alcohol use, Jones and colleagues (2001: 60) declared "Self-reported drinking behaviour is significantly and positively associated with positive expectancies and inversely associated with negative expectancies." Sher et al. (1996) likewise found evidence of a reciprocal relationship between actual alcohol use and expectancies such as "drinking makes me feel less tense or nervous," "drinking makes me feel less shy," and "drinking makes many activities more enjoyable." In another study, Wood et al. (2001) reported that a measure of positive expectations of alcohol use partially mediated the effect of social modeling, measured as a combination of friends' drinking behavior, friends' attitudes, and perceived pressure to drink. Furthermore, Mooney and

Corcoran's (1991: 90) study of the effects of personal and perceived expectations about drinking on alcohol use led them to conclude that "In general, an individual's perceptions of a best friend's behavior and expectancies do seem to add to the prediction of self-reported drinking beyond that which is predicted by personal expectancies." Although suggestive, these results are the product of perceptual, rather than direct, measures of peers' expectations of alcohol use. Further research is needed to determine whether these effects continue to be observed in research that employs direct measures of peer expectations.

Criminologists have thus far largely assessed peer beliefs through items expressing approval or disapproval of delinquent acts, resulting in measures that reflect moral judgments of such behavior. Expectations, on the other hand, focus on beliefs that reflect the perceived consequences of the behavior, such as whether the respondent believes that alcohol use will be pleasurable or improve social situations. Measures of expectations have subsequently garnered a fair amount of empirical support while appearing to be theoretically distinct from measures that signal the moral approval of deviant behavior. Moreover, expected social consequences may be especially germane to the study of alcohol use in adolescence. Underage drinking occurs more frequently than other types of deviance, including other types of drug use (Johnston et al., 2012), and past studies suggest that alcohol use contributes to popularity among adolescents (Dijkstra et al., 2010; Osgood et al., 2013). The ubiquity of alcohol use, combined with its position as a high-status activity, may lead to beliefs about drinking that are particularly transparent among adolescents. Additionally, expectations may be responsive to different sources of influence than moral beliefs. Moral beliefs, for example, may be the consequence of family and community values, which are likely to be more stable over time, while beliefs related to expectations may be more adaptable to experiences and reinforcement. This makes these expectations particularly important during adolescence, a time during which children face increased exposure to peers (Felson and Gottfredson, 1984; Larson and Richards, 1991; Larson et al., 1996; Warr, 1993). It is fair to ask, then, whether the criminological research would find additional evidence that peer beliefs influence delinquency if peer expectations were incorporated into these measures.

WHICH PATHS?

The current study also goes beyond past research by adopting a social network approach to examine how peer beliefs contribute to alcohol use in adolescence. Social network perspectives emphasize the complex connections that link individuals (Wasserman and Faust, 1994). These perspectives, in addition to their implications for statistical analyses, also focus on the substantive consequences of interpersonal relationships (e.g., Coleman, 1988; Granovetter, 1973; Kandel, 1978). Peer beliefs could be associated with individual deviance for a number of reasons, and longitudinal social network models allow these paths to be tested simultaneously. This approach allows me to distinguish between several potential routes of influence or selection that might connect adolescents' alcohol use to the beliefs of their friends.

First, an association between individual deviance and peer beliefs may be the result of a direct effect of peer beliefs on deviance. Social learning theory (Akers, 1985; Burgess and

Akers, 1966), for example, allows for behavior to be reinforced by social processes even if one's own beliefs about the behavior remain unchanged. Alcohol use among adolescents may thus be influenced by whether they expect reinforcement for choosing behavior that is consistent with their friends' beliefs, regardless of whether they share those beliefs. In this situation, peer beliefs influence individual delinquency even when other mechanisms, such as individual beliefs, are controlled. To test this path, I examine whether the associations between peer beliefs about drinking and individual alcohol use remain statistically significant in models that control for competing explanations.

A second path that may exist could result from peer beliefs influencing deviance indirectly. According to differential association theory (Sutherland, 1947), adolescents whose friends approve of delinquency face increased exposure to such beliefs. These adolescents are at risk for having their own beliefs shaped by their friends' beliefs, which in turn would produce delinquent behaviors. In this scenario, individuals' own beliefs would mediate the effect of peer beliefs on deviance. Matsueda (1982), for example, provided evidence that measures of definitions favorable to the law not only predicted delinquent behavior but also mediated the effects of other variables, such as perceptions of neighborhood trouble; the recent findings of Megens and Weerman (2012) also support the role of individual beliefs in mediating the effects of peer beliefs. I investigate this path by first testing whether individual beliefs about drinking predict alcohol use. Next, I estimate models that predict changes in beliefs about alcohol use to determine if peer beliefs influence individual beliefs. If individual beliefs about drinking predict individual alcohol use, and if these individual beliefs change in response to peer beliefs, then this provides evidence of an indirect effect of peer beliefs on drinking.

A third way that peer beliefs may be connected to individual delinquency is through selection on these characteristics. That is, individuals may base their friendship choices at least in part on a preference for peers whose beliefs are consistent with their own. If so, then peers' beliefs play a role in regards to whom adolescents are exposed. This is the view promoted by control theories (Gottfredson and Hirschi, 1990; Hirschi, 1969), which argue that delinquent adolescents have delinquent peers not due to social influence, but instead because these adolescents prefer friends similar to themselves. Adolescents who view drinking favorably, for example, may seek out friends who hold similar views, and friends who view alcohol use favorably may also be more likely to drink. The implications of this association are particularly salient if either type of influence discussed is also present. In that case, selection on beliefs favorable to deviant behavior will increase exposure to these beliefs among these adolescents, which in turn will in turn shape their own beliefs and behaviors.

Recent work indicates that both selection and influence contribute to the link between delinquency and delinquent peers (Brechwald and Prinstein, 2011). Traditional regression models, however, do not distinguish whether the association between an individual's characteristics and the characteristics of friends exists due to peer influence or selection. Past research interpreting the similarity between peers as entirely due to social influence may therefore have overestimated this effect. The recent study by Megens and Weerman (2012), for instance, used social network data to study the link between peer and respondent

beliefs, but the authors interpreted this association as evidence of peer influence without taking the selection of friends into account. Moreover, most research that has considered both processes has focused primarily on *behavioral* selection and influence and has not yet been extended to the study of peer beliefs. In another study, for example, Weerman (2011) used social network data to model both the friendship selection and influence processes. Although this study did test for the possibility of selection of friends similar to oneself on approval of deviance, the primary focus of the study was peer behavior. The study found no evidence of selection on beliefs, but it considered only moral beliefs, and it did not consider peer beliefs as a potential source of influence on either individual beliefs or behavior. In my study, I use longitudinal social network analysis to estimate the influence and selection processes associated with both beliefs and behaviors. This feature not only promotes less-biased estimates of influence, but it simultaneously provides information about how both alcohol use and beliefs about drinking contribute to the friendship selection process.

The final path connecting adolescent deviance and peer beliefs that I consider in my study emerges due to the correlation between beliefs and behaviors. If adolescents are primarily influenced by the *behavior* of their peers, then peer beliefs may only be related to individual behavior to the extent that they covary with peer behavior. Recall that while Warr and Stafford (1991) did find evidence that peer moral beliefs were associated with respondent beliefs and behavior, they concluded that the link between delinquency and delinquent peers was primarily due to peer behavior. These results suggest that social learning mechanisms other than beliefs, such as imitation, are responsible for the social transmission of deviance. If this is the case, peer beliefs would not directly influence individual beliefs and behaviors, and any initial association between individual deviance and peer beliefs would be eliminated once measures of peer behavior are introduced into the model. Peer beliefs about drinking, for example, may predict adolescent alcohol use if adolescents are influenced by their peers' alcohol use and if peers who drink are also more likely to hold favorable beliefs about alcohol use. In order to test whether the effects of peer beliefs about drinking influence adolescent alcohol use beyond their association with peer alcohol use, I include measures of friends' alcohol use in my models.

THE CURRENT STUDY

Understanding how peer beliefs influence deviant behavior has meaningful implications for both theoretical research and policy. If peer beliefs do play a central role in the etiology of adolescent deviance, then failing to account for beliefs may underestimate the importance of peers and subsequently inflate the importance of other correlates. A finding that peer beliefs are important in the development of deviance also would support the use of programs that focus on encouraging prosocial beliefs as a means to reduce problem behaviors in adolescence. Further, these possibilities highlight the need to understand which beliefs are involved in the social transmission process in order to target interventions optimally and to refine theory.

This study will add to our understanding of the social transmission of deviance in several ways. First, I explore how different *types* of beliefs affect delinquent behavior. Since past research has suggested that expectations and moral approval are both important determinants

of behavior, studying both advances our knowledge of how friends' beliefs influence delinquency. The current study will expand knowledge about the effects of peer beliefs on deviance by considering measures of both approval of alcohol use and positive outcome expectations of alcohol use. Second, the models in this study account for both the friendship selection and influence processes for beliefs and behaviors. Considering the selection and influence processes for beliefs and behaviors simultaneously reduces the potential bias associated with these estimates and will increase knowledge about how peer beliefs contribute to deviant behavior in adolescence. Finally, this study, in line with recent work on peer beliefs (e.g., Megens and Weerman, 2012), employs direct measures of peer attributes and maintains the current standards of research on peer influence.

METHODS

DATA

The current paper uses data collected from the evaluation of the PROSPER partnership model, a system that delivers community-supported intervention programs designed to reduce risky adolescent behaviors and promote healthy lifestyle choices (Spoth et al. 2007; Spoth et al. 2011). Data collection began during 2002 at schools in twenty-seven school districts located in rural and semi-rural Iowa and Pennsylvania communities.[2] Students from two successive cohorts answered questionnaires in the Fall of 6th grade and every Spring thereafter through the 9th grade, resulting in five waves of data. This study analyzes data from an average of 7,800 students at each wave and more than 11,000 students overall. Moreover, survey items asked the students to name their best and closest friends in their grade, producing "directed" friendship ties (i.e., friendship nominations may be asymmetric). These social network data identify which students are friends and provide direct measures of friends' beliefs and behaviors. Research assistants matched friendship nominations to the names on the student rosters with the aid of a computer program. Coders succeeded in matching 83.0% of the provided names; 1.9% of names could not be matched due to multiple plausible matches, 0.4% were inappropriate choices (e.g., celebrities), and the remaining 14.7% did not appear to be students in that grade and school. The SIENA analyses (described below) include all respondents who completed questionnaires at least once, and respondents appear in the networks for all waves they were enrolled in the district. SIENA models treat item-level missing data as non-informative, and rates of missing data are below 3% for all variables for respondents included in the analyses.

MEASURES

The primary outcome variable used within this study is a measure of each respondent's past-month alcohol use. At each wave, students answered the question, "During the past month, how many times have you had beer, wine, wine coolers, or other liquor?" The original five response categories are recoded to "0" (none), "1" (once), and "2" (a few times or more) because initial rates of use are too low to support finer distinctions.

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[2]An additional community was included in the PROSPER trial, but friendship data from this community were not collected, precluding social network analysis.

I study the role of two types of peer beliefs in the development of deviance: alcohol expectations and moral approval of alcohol use.[3] The measure of *alcohol expectations* (α = 0.91) is taken from five statements about whether respondents associate drinking alcohol with positive outcomes, such as "Kids who drink alcohol have more friends," "Drinking alcohol makes you look cool," and "Drinking alcohol lets you have more fun." The full set of questions included in the alcohol expectations measure appears in the Appendix. Students reported how much they agreed with each statement on a scale of "1" (strongly disagree) to "5" (strongly agree). The sum of these responses is recoded as "0" (5), "1" (6–10), "2" (11–15), and "3" (16–25) in order to fit the SIENA modeling framework. This choice of ranges is a compromise between categories that represent similar proportions of the sample and categories that preserve the original distribution of the items. Across all waves, more than half of all respondents are coded as "0" (55%) while a much smaller proportion are coded as "3" (4%), although the proportion in this highest category increases from approximately 1% at Wave 1 to over 10% in Wave 5. The second type of belief, *moral approval*, derives from an item that asked how wrong it was for someone the respondent's age to drink beer, wine, or liquor. Respondents provided answers to this question on a four-point scale with answers ranging from "Not at all wrong" to "Very wrong." This measure is coded so that higher values correspond to more tolerant moral beliefs toward alcohol use. The distribution of the moral approval measure is similar to the alcohol expectations measure, with 56% of respondents across all waves coded as "0" and 7% coded as "3," and the proportion in highest category increases from about 3% at Wave 1 to over 13% in Wave 5.

Models include demographic attributes and other potential sources of influence as covariates. Dummy variables are used for *sex* ("1" = male), *race* ("1" = White) and for whether the respondent reported living with *both biological parents* ("1" = both parents). The measure of *school adjustment and bonding* (α = 0.81) is the mean of eight items that asked students about their attitudes toward school and their teachers; higher scores reflect more positive attitudes. *Family relations* (α = 0.81) is a composite measure, operationalized as the mean of standardized subscales that corresponded to parental affective quality, joint activities between parents and children, parenting practices, and general family cohesion. Analyses also include a measure of *risk and sensation seeking* (α = 0.75) that is the mean of responses to three questions (e.g., how often the respondent does something that feels good regardless of the consequences). All variables, with the exception of sex and race, are time-varying, and Table 1 lists the means, standard deviations, and ranges of these measures.

MODELING STRATEGY

I examine the role of beliefs in the social transmission of deviance through stochastic actor-oriented models (SAOM) that are estimated with the Simulation Investigation for Empirical Network Analysis (SIENA) software developed by Snijders and colleagues (Snijders, 2001, 2005; Snijders, Steglich, and Schweinberger, 2007). This approach estimates a wide variety of network processes for selection and influence through simulations of change in the network and behavior based on an actor-oriented model of longitudinal network data. The

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[3] The correlation between the two measures of beliefs ranges from .31 at the first wave of data collection to .54 at the final wave. A correlation matrix for the variables across all waves is found in the Appendix.

stochastic simulations consist of a series of model-based network micro steps (i.e., a change in whether two students are connected by a friendship nomination) and behavioral micro steps (e.g., a change in the respondent's self-reported alcohol use); both types of micro steps are modeled as a multinomial logit distribution. Parameter estimates maximize the correspondence between summary statistics for the observed data and the results of the simulations. For more information and a nontechnical introduction into the method, see Steglich, Snijders, and West (2006).

Stochastic actor-oriented models present an improvement over traditional regression modeling techniques because they both account for patterns of dependency found in network data and provide a framework through which selection processes can be modeled in considerable detail. Thus, not only do I examine whether friends' beliefs about alcohol use influence drinking, but I also explore the role that these views play in the friendship formation process. This combination permits me to examine a more extensive set of questions than addressed in previous research.

The parameters included in these models can be loosely grouped into three categories: structural terms, selection terms, and behavior terms. Structural terms control for patterns that emerge in the network without regard to the characteristics of the individuals, and empirical research has identified these processes as ubiquitous and highly influential within friendship networks drawn from a range of diverse populations (e.g., Schaefer, Haas, and Bishop, 2012; Steglich, Snijders, and West, 2006). All models include structural parameters for the overall rate of friendship choice (*outdegree, density*), tendencies to reciprocate friendships from others (*reciprocity*), choosing the friends of other people the actor named as friends (*transitive triplets*), becoming friends with people who choose the same people the actor did (*balance*[4]), maintaining hierarchical friendship triads (*3-cycles*), and continuity in popularity (*indegree – popularity sqrt*). Parameters accounting for changes in overall rates of friendship selection that occur due to multiple elementary schools feeding into the same high school (*merge*) and students transitioning into higher level schools (e.g., middle school to high school; *transition*) are included in the models as well. Although structural parameters are not the focus of the present study, their inclusion ensures that their effects are not mistakenly attributed to the processes of substantive interest.

Selection terms correspond to respondent preferences in the friendship selection process based on attributes of the actors. First*, alter* terms represent characteristics associated with receiving friendship nominations more or less frequently. *Ego* terms, on the other hand, indicate whether the characteristic is associated with nominating more or fewer friends. Finally, *same/similarity* terms reveal a preference for selecting friends similar to oneself on the characteristic. In the current study, these parameters will not only control for the role that demographic characteristics (i.e., sex, race) play in the friendship selection process but will also be used to explore how alcohol use and beliefs about drinking contribute to friendship choices.

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[4]Although preliminary analyses indicated a definite tendency toward balance, including this term interfered with model convergence in several networks. Because estimates for balance varied little across networks, I fixed the estimate to its mean from preliminary results.

Behavior parameters correspond to effects on outcome measures (e.g., alcohol use or beliefs about drinking) from respondents' and friends' attributes. Terms for *average similarity* represent influence from friends and indicate the extent to which respondents change their beliefs or behaviors in order to become more similar to those of their friends. Additional behavior parameters for the *friendship group mean* indicate how the respondent's behavior changes in response to other attributes of their friends. Individual-level behavioral parameters represent the effect of the respondents' own characteristics on each outcome variable, thereby controlling for other sources of influence.

I estimated separate SIENA models for each of the 42 district-cohort combinations within the study.[5] The coefficients obtained from these models indicate the strength of the process associated with each parameter, controlling for the other model parameters, in that district-cohort combination across all waves of data. Three-level hierarchical linear models (HLM) then produced an aggregate estimate for each parameter. Grade cohorts within school districts were the level-two unit of analysis, districts were the level-three units, and at level one the precision of the SIENA estimates (i.e., their squared standard errors) served as a known variance. This approach, which is commonly associated with meta-analyses (Raudenbush and Bryk, 2002), essentially weighted each set of parameter estimates inversely to their corresponding standard errors. This process also yielded information about the variability associated with each estimate, which is the basis for the between-network standard deviations presented in the tables.[6]

PLAN OF ANALYSIS

The analyses progress in the following manner. First, I test whether friends' moral approval and positive expectations for drinking influence individual alcohol use, and I control for friends' drinking in this analysis to determine whether any effects of peer beliefs are independent of peers' alcohol use. This model also explores the roles that alcohol use and beliefs about drinking play in the friendship selection process. I then turn my attention to predicting beliefs about alcohol use. To this end, I estimate models for two outcomes—moral approval and positive expectations for drinking—and examine whether peer beliefs influence individual beliefs. Finally, I present results from supplementary analyses that isolate the role that individual beliefs play in the relationship between peer beliefs and adolescent drinking.

RESULTS

CHANGES IN BEHAVIOR

Table 2 presents results from a model that explores changes in both friendship selection and past-month alcohol use. Because not accounting for factors associated with changes in

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[5]One district-cohort network is omitted due to a missing wave of data and two because a school closing after a fire created a chaotic pattern of school transitions that precluded SAOM analysis. Nine additional networks are omitted due to unsatisfactory convergence. Convergence difficulties are common for SAOM analyses, typically resulting from insufficient variation over time to identify all parameters empirically (Knecht et al., 2010). All reported models were estimated with five phase-2 sub-phases and 4,000 iterations during phase 3, and all freely estimated parameters across all networks have convergence *t* values of less than +/− .10.
[6]I obtained the between-network standard deviations by taking the square root of the sum of district-cohort (level 2) and district (level 3) variance estimates from the HLM models

friendship selection may result in biased estimates of social influence, I begin by focusing on these processes. The selection estimates provide clear evidence that both alcohol use and beliefs about drinking play a significant role in shaping adolescent friendship networks. Adolescents name others who report more past-month drinking as friends at a higher rate relative to those who report less drinking ($b = 0.069$, $SE = 0.012$, $p < 0.001$). The alter effects for moral approval of alcohol and positive expectations for alcohol use, however, are not statistically significant. This suggests that the overall preference for friends who drink is based on friends' behavior rather than their beliefs. Those with more positive expectations for alcohol use also tend to nominate fewer friends relative to their peers ($b = -0.023$, $SE = 0.007$, $p < 0.01$). Additionally, adolescents show a preference for not only nominating friends whose alcohol use is similar to their own ($b = 0.272$, $SE = 0.023$, $p < 0.001$), but also for selecting friends with similar levels of moral approval ($b = 0.076$, $SE = 0.015$, $p < 0.001$) and expectations ($b = 0.073$, $SE = 0.020$, $p < 0.01$) for alcohol use. Thus, the role of peer beliefs in the friendship selection process is not simply a consequence of these beliefs being correlated with peer alcohol use.

Estimates of peer influence and friendship selection may be biased if they fail to account for network structure, and estimates for these structural parameters are also included in Table 2. Each parameter estimate (e.g., outdegree, reciprocity) is statistically significant, supplying evidence that endogenous network processes play an important role in shaping friendships in adolescence. The estimates for the structural effects are stable across the different model specifications, and tables for subsequent models omit these terms.[7] Furthermore, the results from this model confirm the importance of demographic characteristics to the friendship selection process. For example, females and non-White adolescents are more likely to add new friendships and retain old friendships than males and Whites. Further, males tend to receive friendship nominations at a higher rate than females, and non-White adolescents receive more friendship nominations relative to White adolescents. Respondents also show preferences for nominating friends of the same sex and race.

The behavioral parameters for friends' attributes test whether either type of friends' beliefs about drinking, or friends' drinking itself, influences respondents' past-month alcohol use. As expected, the parameter estimate for friends' drinking is positive and statistically significant ($b = 0.871$, $SE = 0.129$, $p < 0.001$), indicating that adolescents tend to change their own alcohol use so that it becomes more similar to that of their friends. The effect of friends' moral approval of alcohol use, however, is also a significant predictor of drinking in this model ($b = 0.212$, $SE = 0.066$, $p < 0.01$). The estimate of friends' positive expectations for drinking ($b = 0.010$, $SE = 0.068$, $p > 0.10$), on the other hand, is not statistically significant. Thus, while friends' moral approval of drinking exhibits a direct effect on respondents' drinking, friends' positive expectations for drinking does not appear to influence alcohol directly.

The individual-level control variables, included to allow for other processes associated with changes in past-month alcohol use, suggest that females report more increases in past-month

[7]All models also include behavioral and friendship rate parameters that control for the number of changes in individual behavior and network ties, respectively. These estimates are available from the author on request.

alcohol use than males. Decreases in both family relations and school adjustment and bonding, and increases in risk and sensation seeking, all coincide with increases in alcohol use. In line with previous research, the effects of respondents' own moral approval ($b = 0.169$, $SE = 0.011$, $p < 0.001$) and expectations ($b = 0.085$, $SE = 0.009$, $p < 0.001$) are significant predictors of past-month drinking. That is, increases in adolescents' approval of drinking and expectations about the positive consequences of drinking are both associated with increases in alcohol use. With these results in mind, I turn my attention to whether respondents' own moral approval and expectations related to alcohol use are influenced by their friends.

CHANGES IN BELIEFS

Table 3 presents results from a model that explores changes in respondents' moral approval of alcohol use. Because the roles of beliefs and alcohol use in the friendship selection process have been explored in the previous model, I focus my discussion on the behavioral parameter estimates. The estimate for friends' moral approval provides evidence in support of the hypothesis that peer beliefs toward alcohol use influence individual beliefs ($b = 2.407$, $SE = 0.148$, $p < 0.001$). The effect of friends' alcohol use on individuals' moral approval of drinking, on the other hand, is not significant ($b = 0.028$, $SE = 0.059$, $p > 0.10$). This pattern suggests that while adolescents may change their beliefs to become more similar to those of their friends, alcohol use by friends does not change this type of belief. The other individual-level control variables included in this model suggest that the same factors that influenced alcohol use in the previous model also influence moral beliefs about drinking. That is, females report more increases in moral approval than males, and increases in moral approval coincide with decreases in both the quality of family relations and the level of school adjustment and bonding and with increases in risk and sensation seeking.

Next, I examine the effects of peer beliefs and behaviors on adolescents' positive expectations for drinking. The behavioral influence parameters in Table 4 reveal that friends' expectations for drinking are strongly associated with respondents' own expectations ($b = 1.415$, $SE = 0.250$, $p < 0.001$). This result again suggests that what peers believe about alcohol influences what adolescents think, as respondents' expectations for drinking tend to change to become more similar to their friends' expectations. The estimate for friends' drinking also reveals a positive and statistically significant effect on the respondents' expectations ($b = 0.294$, $SE = 0.060$, $p < 0.001$). This indicates that respondents whose friends reported more past-month alcohol use are more likely to have positive expectations for alcohol use. Finally, results for the control variables reveal that the same individual-level factors associated with changes in the moral approval of alcohol use also influence expectations for drinking: females report more increases in positive expectations for drinking, while decreases in both family relations and school adjustment, and increases in risk and sensation seeking, all accompany increased expectations.

THE ROLE OF INDIVIDUAL BELIEFS

Results in Table 3 and Table 4, discussed above, reveal that friends' beliefs about drinking influence individual beliefs about drinking. Respondents' own beliefs about drinking, in turn, predict past-month alcohol use. I further explore the role that individual beliefs play in

the relationship between peer beliefs and adolescent drinking by considering whether the effects of peer beliefs on adolescent drinking are entirely due to their relationship with individual beliefs. In order to isolate the role of each type of belief, I estimated additional models predicting alcohol use separately for positive expectations and moral approval so that both types of beliefs were not in the same model. The first of these models contain measures of peer beliefs but do not contain measures of individual beliefs. I then reinserted the individual belief parameters and re-estimated the models, observing how the estimate of peer beliefs changes. The results from these analyses are available in the Appendix.

Results from both sets of models are similar. In the models that do not contain the measures of individual beliefs, the estimates for friends' moral approval ($b = 0.291$, $SE = 0.043$, $p < 0.001$) and positive expectations ($b = 0.236$, $SE = 0.051$, $p < 0.001$) for drinking are significant predictors of individual alcohol use. After controlling for individual beliefs, the estimates for friends' moral approval ($b = 0.223$, $SE = 0.051$, $p < 0.01$) and positive expectations ($b = 0.188$, $SE = 0.055$, $p < 0.01$) for drinking are both reduced but remain statistically significant predictors of alcohol use. This suggests that while some of the effect of peer beliefs on alcohol use is an indirect effect (via respondents' own beliefs), the effect of peer beliefs is not solely attributable to changes in individual beliefs about drinking.

DISCUSSION

Most criminologists readily acknowledge that exposure to delinquent peers is a robust correlate of deviant behavior (Warr, 2002). It is of no surprise then that both theory (e.g., Akers, 1985; Burgess and Akers, 1966; Sutherland, 1947) and prevention strategies (e.g., Spoth et al. 2007; Spoth et al. 2011) identify these peers as crucial to the processes through which deviance develops. Despite the clear interest in determining how peers contribute to this process, however, the extant literature has been unduly narrow in focusing almost exclusively on the behavior of these peers. This approach risks underestimating the importance of peers by failing to consider the impact of what friends *think* about delinquency. The current study advances what is known about the role of peer beliefs in the development of deviance by examining different paths through which these beliefs could be connected to alcohol use. Taken together, the results reveal a complex set of relationships between adolescents' own beliefs and behaviors and those of their peers. These findings highlight four main themes.

The first theme evident from this study is the influence of peer beliefs on adolescent beliefs and behaviors. These results provide support for differential association theory's (Sutherland, 1947) thesis that adolescents whose friends approve of delinquent acts are at risk of acquiring these beliefs and engaging in deviance themselves. Analyses reveal that when friends are more approving of alcohol use and expect more positive consequences from alcohol use, respondents' own beliefs tend to change in the same direction. Individuals' own beliefs, in turn, predict alcohol use. Supplementary analyses reveal that initial effects of friends' beliefs on respondent alcohol use are partially, but not completely, attenuated when measures of respondents' beliefs are included in the models. A positive effect of friends' moral approval of alcohol use on respondent drinking is also observed, and this association remains statistically significant even in models accounting for individual

moral beliefs and both individual and friends' expectations for alcohol use. Thus, the initial effect of friends' expectations for alcohol use is due to both its effect through respondents' own attitudes and its association with moral beliefs, while friends' moral approval influences alcohol use beyond its effects on respondent beliefs. These findings build upon those of Megens and Weerman (2012), who reported that the effect of peers' moral beliefs was mediated by individual beliefs, and provide further evidence that the results of Warr and Stafford (1991) may have been a consequence of measurement error.

If the effect of friends' moral approval of drinking on alcohol use is not entirely mediated through one's own beliefs, how then should this association be interpreted? One explanation is that this estimate reflects a direct effect; that is, adolescents might be more likely to engage in underage drinking in response to their friends support (or at least absence of condemnation) of the behavior, even if respondents themselves consider it wrong. Another possibility, however, is that friends' moral approval of drinking influences alcohol use through a mechanism not included in the above models. Friends who are more approving of underage drinking, for example, may provide more opportunities to drink, or they may affect how likely an individual is to perceive the effects of alcohol as pleasurable, which in turn would encourage additional drinking (Kreager and Matsueda, 2006). Measures related to the availability of alcohol or perceived effects of its use, however, are not available in the PROSPER data, and future research should clarify the mechanisms that underlie the association between friends' moral approval of drinking and adolescent alcohol use.

Second, results from this study support the conclusion that beliefs about alcohol use play an important role in the friendship selection process during adolescence. I found evidence of a strong preference for selecting friends who report similar beliefs about drinking; this effect remains statistically significant even when models also account for the tendency to select friends whose alcohol use is similar. This result, in addition to explaining friendship selection tendencies, also has important implications for how adolescents influence their peers. Because individuals who hold beliefs more favorable to alcohol use are more likely to drink, selecting these peers as friends increases one's exposure to behavioral influence. Selection on beliefs thus determines, at least in part, which peers have the opportunity to influence adolescents.

The role of peer beliefs in the friendship selection process may be especially important in early adolescence, when base rates of alcohol use are especially low but variation in beliefs about drinking have begun to emerge. Consider, for example, recent data from a nationally-representative sample that addressed both approval and use of alcohol. According to Johnston et al. (2012), 50% of 10th graders and 64% of 12th graders reported past-year alcohol use, and a similar proportion of students did not disapprove of people who try one or two drinks of an alcoholic beverage (59% and 71% at each respective grade). Among 8th grade students, however, only 27% reported past-year use, despite 46% of the students in this grade expressing that they did not disapprove of people who tried alcohol. This finding indicates that adolescents come to hold beliefs receptive to alcohol use in advance of starting to drink. Moreover, these data suggest that younger adolescent peer groups will be comprised primarily of individuals who do *not* drink. Other peer characteristics, however,

have the opportunity to be important determinants of later alcohol use, and peer beliefs appear to be one such factor.

A third theme arising from this study is the confirmation of the salience of peers' alcohol use as a risk factor for adolescent drinking. Social learning theory (Akers, 1985; Burgess and Akers, 1966) contends that the learning process includes peer behavior as well as beliefs, and the present study provides additional support for this view. My results reveal that changes in adolescent drinking correspond to changes in friends' alcohol use. This effect remained significant even when controlling for peer and individual beliefs, suggesting that other mechanisms, such as imitation, are important for understanding how peers influence deviance. Respondents also displayed a preference for naming friends whose alcohol use is similar to their own and for choosing friends who report more frequent alcohol use. Thus, alcohol use is important to both peer selection and influence processes, and these conclusions match those of a study by Osgood et al. (2013) that employed this data to explore how peers shape patterns of alcohol use in adolescence without taking peer beliefs into account. Therefore, although the results presented in the current study support the importance of peer beliefs in the development of adolescent drinking, they do not contradict previous research that has portrayed peer behavior as one of the keys to understanding deviance.

A final theme emerging from this study is the importance of considering how different types of beliefs contribute to adolescent drinking. Respondents tend to nominate friends whose beliefs about alcohol use, both in terms of moral approval and positive expectations, are similar to their own. Accounting for selection on only one type of belief may thus underestimate the importance of beliefs in the friendship selection process. Furthermore, while friends' drinking does not change moral beliefs about alcohol use, a positive relationship between friends' drinking and individual expectations for alcohol use is present. Thus, adolescents who have friends who drink are more likely to associate alcohol use with positive outcomes such as having more friends and having more fun. This association is particularly important given the finding that these positive expectations are themselves linked to increased alcohol use, and it provides support for the hypothesis that beliefs related to expected utilities are especially likely to change in response to adolescents' own experiences and their exposure to peers. As predicted by social learning theory, then, it appears that one of the ways that peers' drinking may matter in the development of alcohol use among adolescents is by increasing positive expectations of that use.

LIMITATIONS

The current study builds on previous research on the role of peer beliefs in the social transmission of deviance in several important ways. In addition to using social network measures of peer beliefs, the models presented in this paper explicitly consider the role of beliefs both in the friendship selection process and as a mechanism through which peer influence is transmitted. Furthermore, while previous research has considered peers' moral approval of alcohol use, this study considers peers' expectations for that use as well. With these methodological strengths in mind, I turn to a discussion of several of the limitations found within this study.

One limitation of the current study is that while past research exploring the effects of peer beliefs has focused on general delinquent behaviors, this study is limited to the nexus of alcohol-related beliefs and drinking. Although alcohol use is an important topic in its own right, as well as a form of illegal behavior for U.S. adolescents, the results presented here may or may not generalize to other forms of delinquency. Unfortunately, measures of beliefs related to delinquent behaviors other than drug use are not available in the PROSPER data. Furthermore, while using a measure of past-month alcohol use is preferable to past-year reports, which may be systematically underestimated (Bachman and O'Malley, 1981), past-month measures may also be influenced to a greater degree by fluctuations in respondents' opportunities to drink.

A second limitation worth noting is that the PROSPER sample consists of students from small towns with populations that are predominantly White and that contain a substantial proportion of low-income families. Although homogeneity among respondents removes potential causes of spuriousness and allows for the estimation of more consistent results, the processes investigated in this study may operate differently in other settings. Additionally, the survey questionnaire limited student friendship choices to other students in the same school and grade, a restriction that may affect the observed peer influence and selection processes.

Finally, this study largely positions drinking as a consequence of beliefs favorable to alcohol use. There is a high probability, however, that there is in fact a reciprocal relationship, and respondents' drinking also modifies their beliefs. Adolescents who use alcohol, for example, may adjust their expectations for drinking to more closely match their own experiences, or they may soften their moral judgments about underage drinking after their own alcohol use. The current study does not provide direct estimates of how perceptions of alcohol use change due to actual drinking, and future research is needed to more fully understand this process.

CONCLUSION

A long tradition in criminology has interpreted the link between delinquency and delinquent peers as evidence that these peers play an instrumental role in the development of deviant behavior. More recently, research employing social network data has sought to clarify the mechanisms that underlie this connection. Accordingly, studies have explored the selection and influence processes associated with delinquency (Weerman, 2011) and the effects of peer beliefs (Megens and Weerman, 2012), a central concept in prominent criminological theories. The current study takes a further step in this direction by examining the ways through which alcohol use in adolescence is linked to how peers think about this behavior. The conclusions drawn from this work indicate that peer beliefs influence alcohol use both directly and through their effects on how individuals think about drinking. Beliefs about drinking also play a role in the friendship selection process. These results suggest that peer beliefs, in addition to peer behaviors, play an important role in the etiology of deviance, and future studies will need to continue to consider these mechanisms.

Acknowledgments

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APPENDIX. ITEMS USED IN VARIABLE CONSTRUCTION

Alcohol expectations

1. Kids who drink alcohol have more friends
2. Drinking alcohol is a good way of dealing with your problems
3. Drinking alcohol makes you look cool
4. Drinking alcohol lets you have more fun
5. Drinking helps you get along with other people

Moral approval

1. How wrong do you think it is for someone your age to drink beer, wine or liquor?

School adjustment and bonding

1. I like school a lot.

2. I try hard at school.

3. Grades are very important to me.

4. School bores me.

5. I don't feel like I really belong at school.

6. I feel very close to at least one of my teachers.

7. I get along well with my teachers.

8. I feel that teachers are picking on me.

Family Relations

(Parental affective quality)

1 Work on homework or a school project together.

2 Do something active together, like playing sports, bike riding, exercising, or going for a walk.

3 Talking about what's going on at school.

4 Work on something together around the house.

5 Discuss what you want to do in the future.

6 Do some other fun activity that you both enjoy.

(Joint activities)

7 During the day, my parents know where I am.

8 My parents know who I am with when I am away from home.

9 My parents know when I do something really well at school or some place else away from home.

10 My parents know when I get into trouble at school or some place else away from home.

11 My parents know when I do not do things they have asked me to do.

(Parenting practices)

12 My parents give me reasons for their decision.

13 My parents ask me what I think before making a decision that affects me.

14 When I don't understand why my parents make a rule for me, they explain the reason.

(General family cohesion)

15 Family members really help and support each other.

16 We fight a lot in our family.

17   Activities in our family are pretty carefully planned.

18   Family members rarely become openly angry.

19   We are generally very near & orderly.

20   It's often hard to find things when you need them in our household.

21   Family members hardly ever lose their tempers.

Risk and sensation seeking

1.   Do what feels good, regardless of the consequences.

2.   Do something dangerous because someone dared you to do it.

3.   Do crazy things just to see the effect on other

Table A1

Correlation matrix

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Drinking (past–month)	1.00								
2. Moral approval of alcohol use	.53	1.00							
3. Expectations for alcohol use	.46	.53	1.00						
4. Sex	.00[a]	.04	.03	1.00					
5. Race	−.03	−.04	−.05	−.03	1.00				
6. Both Biological Parents	−.07	−.09	−.10	.05	.08	1.00			
7. School Adjustment & Bonding	−.31	−.42	−.40	−.19	.06	.14	1.00		
8. Family Relations	−.29	−.39	−.40	−.01[b]	.05	.18	.54	1.00	
9. Risk & Sensation Seeking	.31	.36	.35	.14	−.04	−.10	−.39	−.34	1.00

All correlations p < .001 unless otherwise noted

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]p > .10

[b]p < .05

Table A2

Selected SIENA Parameter Estimates[a]: The Effects of Moral Approval of Alcohol Use on Drinking

	Model 1				Model 2			
	b	SE	t	SD	b	SE	t	SD
Selection parameters								
Alter effects: Who is more often named as a friend?								
Drinking	.069	.011	6.55 ***	.004	.074	.012	6.12 ***	.006
Moral approval of alcohol use	.012	.003	4.47 ***	.001	.009	.003	3.11 **	.001
Sex	.015	.008	2.03 †	.020	.016	.008	2.08 *	.019
Race	−.072	.009	−7.85 ***	.036	−.073	.009	−7.81 ***	.035
Ego effects: Who names more friends?								
Drinking	.004	.020	.19	.088	−.006	.019	−.31	.082

	Model 1				Model 2			
	b	**SE**	**t**	**SD**	**b**	**SE**	**t**	**SD**
Moral approval of alcohol use	−.026	.008	−3.40 **	.041	−.025	.008	−3.06 **	.044
Sex	−.137	.018	−7.48 ***	.085	−.138	.018	−7.62 ***	.083
Race	−.052	.016	−3.36 **	.050	−.056	.016	−3.61 **	.049
Similarity effects: Choosing friends similar to oneself								
Drinking	.261	.021	12.40 ***	.006	.276	.021	13.41 ***	.006
Moral approval of alcohol use	.100	.016	6.18 ***	.055	.088	.016	5.50 ***	.050
Sex	.713	.023	30.54 ***	.122	.713	.023	30.50 ***	.122
Race	.175	.023	7.54 ***	.109	.177	.023	7.62 ***	.109
Behavioral parameters: Influence on Drinking								
Friends' attributes								
Drinking mean similarity	.872	.109	8.02 ***	.022	.866	.123	7.02 ***	.025
Mean moral approval of alcohol use	.291	.043	6.78 ***	.008	.223	.051	4.36 **	.009
Control variables (individual level)								
Moral approval of alcohol use	—	—	—	—	.188	.011	17.58 ***	.002
Sex	−.158	.017	−9.51 ***	.003	−.147	.017	−8.72 ***	.003
Race	−.008	.028	−.28	.057	.005	.028	.18	.050
Both Biological Parents	−.024	.020	−1.20	.017	−.031	.019	−1.60	.022
School Adjustment & Bonding	−.173	.014	−12.12 ***	.033	−.131	.015	−8.80 ***	.032
Family Relations	−.143	.023	−6.24 ***	.027	−.093	.025	−3.78 **	.034
Risk & Sensation Seeking	.140	.010	14.57 ***	.004	.117	.011	11.03 ***	.014

***
p < .001.
**
p < .01.
*
p < .05.
†
p < .10.

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]Models also include rate, shape, and structural parameters

Table A3

Selected SIENA Parameter Estimates[a]: The Effects of Expectations for Alcohol Use on Drinking

	Model 1				Model 2			
	b	**SE**	**t**	**SD**	**b**	**SE**	**t**	**SD**
Selection parameters								
Alter effects: Who is more often named as a friend?								
Drinking	.079	.011	7.50 ***	.031	.084	.011	7.47 ***	.030
Expectations for alcohol use	.011	.005	2.46 *	.007	.010	.005	2.01 †	.008
Sex	.015	.007	1.98 †	.018	.016	.007	2.18 *	.017
Race	−.071	.009	−7.79 ***	.035	−.069	.010	−7.12 ***	.034
Ego effects: Who names more friends?								
Drinking	−.003	.020	−.13	.076	−.002	.021	−.10	.080

	Model 1				Model 2			
	b	**SE**	**t**	**SD**	**b**	**SE**	**t**	**SD**
Expectations for alcohol use	−.030	.006	−4.89 ***	.021	−.027	.006	−4.37 ***	.021
Sex	−.137	.019	−7.16 ***	.090	−.138	.019	−7.19 ***	.089
Race	−.054	.015	−3.52 **	.049	−.053	.016	−3.33 **	.051
Similarity effects: Choosing friends similar to oneself								
Drinking	.284	.023	12.28 ***	.008	.298	.024	12.35 ***	.007
Expectations for alcohol use	.091	.020	4.49 ***	.068	.085	.020	4.18 ***	.067
Sex	.713	.023	30.66 ***	.121	.714	.024	30.30 ***	.123
Race	.174	.023	7.45 ***	.110	.174	.024	7.29 ***	.112
Behavioral parameters: Influence on Drinking								
Friends' attributes								
Drinking mean similarity	1.081	.093	11.59 ***	.021	1.042	.108	9.68 ***	.022
Mean expectations for alcohol use	.236	.051	4.60 ***	.009	.188	.055	3.40 **	.010
Control variables (individual level)								
Expectations for alcohol use	—	—	—	—	.143	.008	18.59 ***	.002
Sex	−.153	.018	−8.41 ***	.003	−.147	.018	−8.26 ***	.003
Race	−.012	.028	−.43	.053	−.008	.028	−.29	.051
Both Biological Parents	−.027	.020	−1.37	.014	−.019	.017	−1.15	.004
School Adjustment & Bonding	−.172	.014	−12.38 ***	.026	−.143	.014	−10.25 ***	.034
Family Relations	−.151	.023	−6.43 ***	.023	−.112	.024	−4.62 ***	.032
Risk & Sensation Seeking	.140	.010	14.57 ***	.006	.124	.010	13.07 ***	.002

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p < .001.

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p < .01.

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p < .05.

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p < .10.

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]Models also include rate, shape, and structural parameters

Table 1

Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Drinking (past–month)	.307	.644	0	2
Moral approval of alcohol use	.728	.949	0	3
Expectations for alcohol use	.666	.856	0	3
Sex	.489	—	0	1
Race	.816	—	0	1
Both Biological Parents	.605	—	0	1
School Adjustment & Bonding	3.779	.768	1	5
Family Relations	−.011	.502	−2.997	1.188
Risk & Sensation Seeking	.139	1.004	1	5

All values are means across 42 networks, with a total N of 39,353 person/waves

Table 2

Selected SIENA Parameter Estimates[a]: Moral Approval, Expectations, and Drinking

	b	SE	t	SD
Structural parameters				
Outdegree (density)	−3.176	.056	−56.28 ***	.274
Reciprocity	1.954	.043	45.01 ***	.216
Transitive triplets	.334	.014	23.13 ***	.072
3–cycles	−.409	.016	−25.03***	.074
Balance	.100	—	—	—
Indegree – popularity (square root)	.181	.010	18.32 ***	.045
Merger ego	−.789	.113	−6.96 ***	.302
Transition ego	−.232	.046	−5.09 ***	.206
Selection parameters				
Alter effects: Who is more often named as a friend?				
Drinking	.069	.012	5.58 ***	.006
Moral approval of alcohol use	.007	.004	1.84 †	.001
Expectations for alcohol use	.009	.005	1.66	.012
Sex	.015	.007	2.02 †	.018
Race	−.071	.010	−7.19 ***	.036
Ego effects: Who names more friends?				
Drinking	.012	.022	.56	.088
Moral approval of alcohol use	−.017	.009	−1.97 †	.044
Expectations for alcohol use	−.023	.007	−3.21 **	.024
Sex	−.135	.018	−7.61 ***	.078
Race	−.058	.016	−3.55 **	.049
Similarity effects: Choosing friends similar to oneself				
Drinking	.272	.023	11.86 ***	.007
Moral approval of alcohol use	.076	.015	5.12 ***	.038
Expectations for alcohol use	.073	.020	3.66 **	.063
Sex	.714	.024	30.22 ***	.122
Race	.174	.024	7.42 ***	.107
Behavioral parameters: Influence on Drinking				
Friends' attributes				
Drinking mean similarity	.871	.129	6.73 ***	.026
Mean moral approval of alcohol use	.212	.066	3.22 **	.013
Mean expectations for alcohol use	.010	.068	.14	.012
Control variables (individual level)				
Moral approval of alcohol use	.169	.011	15.77 ***	.002

	b	SE	t	SD
Expectations for alcohol use	.085	.009	9.45 ***	.002
Sex	−.152	.018	−8.24 ***	.003
Race	.002	.029	.05	.057
Both Biological Parents	−.032	.021	−1.53	.051
School Adjustment & Bonding	−.119	.015	−7.77 ***	.031
Family Relations	−.068	.024	−2.79 **	.009
Risk & Sensation Seeking	.110	.010	10.45 ***	.003

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  p < .001.

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  p < .01.

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 p < .05.

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 p < .10.

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]Models also include rate and shape parameters

Table 3

Selected SIENA Parameter Estimates[a]: The Effects of Drinking on Moral Approval of Alcohol Use

	b	SE	t	SD
Selection parameters				
Alter effects: Who is more often named as a friend?				
Moral approval of alcohol use	.035	.004	7.98 ***	.002
Drinking	.028	.005	5.31 ***	.001
Sex	.015	.007	2.04 †	.020
Race	−.074	.009	−7.76 ***	.039
Ego effects: Who names more friends?				
Moral approval of alcohol use	−.034	.012	−2.80 *	.062
Drinking	−.006	.010	−.56	.047
Sex	−.135	.019	−7.17 ***	.088
Race	−.051	.016	−3.25 **	.054
Similarity effects: Choosing friends similar to oneself				
Moral approval of alcohol use	.252	.033	7.65 ***	.114
Drinking	.098	.012	8.07 ***	.035
Sex	.712	.023	30.53 ***	.122
Race	.174	.024	7.34 ***	.112
Behavioral parameters: Influence on Moral Approval				
Friends' attributes				
Moral approval mean similarity	2.407	.148	16.25 ***	.031
Mean drinking	.028	.059	.48	.011
Control variables (individual level)				
Sex	−.095	.014	−6.75 ***	.003
Race	.012	.024	.50	.077
Both Biological Parents	−.034	.020	−1.70	.051
School Adjustment & Bonding	−.171	.015	−11.50 ***	.030
Family Relations	−.228	.020	−11.30 ***	.066
Risk & Sensation Seeking	.117	.011	10.72 ***	.026

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p < .001.

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p < .01.

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p < .05.

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p < .10.

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]Models also include rate, shape, and structural parameters

Table 4

Selected SIENA Parameter Estimates[a]: The Effects of Drinking on Expectations for Alcohol Use

	b	SE	t	SD
Selection parameters				
Alter effects: Who is more often named as a friend?				
Expectations for alcohol use	.037	.008	4.78 ***	.017
Drinking	.034	.007	5.19 ***	.019
Sex	.015	.007	2.09 *	.018
Race	−.073	.010	−7.28 ***	.041
Ego effects: Who names more friends?				
Expectations for alcohol use	−.037	.011	−3.38 **	.039
Drinking	−.004	.012	−.37	.045
Sex	−.134	.020	−6.75 ***	.093
Race	−.056	.015	−3.62 **	.047
Similarity effects: Choosing friends similar to oneself				
Expectations for alcohol use	.233	.043	5.41 ***	.143
Drinking	.114	.013	8.57 ***	.041
Sex	.713	.023	30.49 ***	.122
Race	.173	.024	7.32 ***	.112
Behavioral parameters: Influence on Expectations				
Friends' attributes				
Expectations mean similarity	1.415	.250	5.67 ***	.561
Mean drinking	.294	.060	4.89 ***	.013
Control variables (individual level)				
Sex	−.061	.015	−4.06 **	.003
Race	−.048	.026	−1.82 †	.074
Both Biological Parents	−.013	.020	−.66	.035
School Adjustment & Bonding	−.190	.013	−14.51 ***	.010
Family Relations	−.335	.024	−14.00 ***	.039
Risk & Sensation Seeking	.121	.010	12.05 ***	.007

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p < .001.

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p < .01.

*
p < .05.

†
p < .10.

All values are means across 42 networks, with a total N of 39,353 person/waves

[a]Models also include rate, shape, and structural parameters