False Consensus and Adolescent Peer Contagion: Examining Discrepancies between Perceptions and Actual Reported Levels of Friends' Deviant and Health Risk Behaviors

Mitchell J. Prinstein[1,3] **and Shirley S. Wang**[2]

Adolescents' perceptions of their friends' behavior strongly predict adolescents' own behavior, however, these perceptions often are erroneous. This study examined correlates of discrepancies between adolescents' perceptions and friends' reports of behavior. A total of 120 11th-grade adolescents provided data regarding their engagement in deviant and health risk behaviors, as well as their perceptions of the behavior of their best friend, as identified through sociometric assessment. Data from friends' own report were used to calculate discrepancy measures of adolescents' overestimations and estimation errors (absolute value of discrepancies) of friends' behavior. Adolescents also completed a measure of friendship quality, and a sociometric assessment yielding measures of peer acceptance/rejection and aggression. Findings revealed that adolescents' peer rejection and aggression were associated with greater overestimations of friends' behavior. This effect was partially mediated by adolescents' own behavior, consistent with a false consensus effect. Low levels of positive friendship quality were significantly associated with estimation errors, but not overestimations specifically.

KEY WORDS: peer relations; false consensus; friendship; health risk behaviors.

Perhaps the most consistent and potent peer predictor of adolescents' engagement in deviant and health risk behavior is the frequency of these behaviors among adolescents' close friends. Results from literally dozens of investigations have provided evidence of this contagion effect for a variety of behaviors and domains of social–psychological functioning, including aggression (e.g., Vitaro, Tremblay, Kerr, Pagani, & Bukowski, 1997), illegal behavior (e.g., Paetsch & Bertrand, 1997), use of alcohol (see Bosari & Carey, 2001; Hawkins, Catalano, & Miller, 1992, for reviews), nicotine (Alexander, Piazza, Mekos, & Valente, 2001; Conrad, Flay, & Hill, 1992; Kobus, 2003; Urberg, Degirmencioglu, & Pilgrim, 1997), marijuana (e.g., Andrews, Tildesley, Hops, & Li, 2002; Wills & Cleary, 1999), sexual risk behavior (Billy & Udry, 1985; Prinstein, Meade, & Cohen, 2003),

weight-related behaviors (e.g., dieting, binge eating; Paxton, Schutz, Wertheim, & Muir, 1999), symptoms of depression (Hogue & Steinberg, 1995; Stevens & Prinstein, 2005), and even suicidality (Brent et al., 1993; Prinstein, Boergers, & Spirito 2001). Evidence has supported both a selection effect (i.e., that adolescents select friends who engage in similar behaviors; Aseltine, 1995; Cohen, 1977; Ennett & Bauman, 1994; Fischer & Bauman, 1988; Wang, Eddy, & Fitzhugh, 2000), as well as a socialization effect, suggesting that affiliation with peers who engage in deviant or health risk behaviors is prospectively associated with increases in adolescents' own behavior (e.g., Kandel 1978; Keenan, Loeber, Zhang, Stouthamer-Loeber, & Van Kammen, 1995).

Although rarely studied, numerous mechanisms may help to explain the remarkably powerful effects of peer contagion across a wide range of behaviors and domains of functioning. For instance, Dishion and colleagues have offered compelling evidence for a behavioral model of "deviancy training" in which adolescents' utterances regarding maladaptive attitudes or aggressive behaviors are particularly likely to elicit positive reinforcement (i.e.,

[1] University of North Carolina at Chapel Hill.
[2] Yale University.
[3] Address all correspondence to Mitch Prinstein, PhD, Department of Psychology, University of North Carolina at Chapel Hill, Davie Hall, CB#3270, Chapel Hill, North Carolina 27599-3270; e-mail: mitch.prinstein@unc.edu.

laughing, smiling) from a friend in a deviant dyad, and this reinforcement is associated with increased deviancy over time (e.g., Dishion & Owen, 2002; Dishion, Spracklen, Andrews, & Patterson, 1996). Other research in this area has suggested that peer contagion may be affected by implicit peer modeling, explicit peer demands (i.e., peer pressure), or adolescents' beliefs that their emulation of peers' attitudes and behavior may earn them specific social rewards within the social hierarchy (e.g., greater levels of status or acceptance by peers; Prinstein et al., 2003; Simons-Morton, Haynie, Crump, Eitel, & Saylor, 2001; Urberg, Cheng, & Shyu, 1991; Urberg, Shyu, & Liang, 1990).

In addition to these models, data from the large body of literature on associations between adolescents' and their friends' behaviors has provided important evidence regarding the role of adolescents' perceptions. Results from studies using different methodologies to assess contagion effects have yielded a notable pattern of results. When adolescents' friends' behaviors are assessed using adolescents' own report (i.e., thus, a measure of adolescents' *perceptions* of their friends' behavior), correlations with adolescents' own behavior are generally two to three times stronger than when adolescents' friends' behaviors are measured by friend-report (i.e., indicating friends' *actual* reported behavior; Iannotti & Bush, 1992; see Kandel, 1996, for a review). Studies utilizing both methodological approaches have supported a mediator model, indicating that adolescents' perceptions are ultimately more proximal predictors of adolescents' own behavior that partially explain the association between adolescents' and their friends' actual behaviors (e.g., Fromme & Ruela, 1994). Interestingly, few investigations in this area have examined potential discrepancies between these perceptions and friends' actual behavior, or individual differences that may be associated with an increased tendency towards misperceptions of friends' behavior (Urberg et al., 1990). This idea has clear implications for prevention; adolescents' misperceptions could be targeted by psychoeducational-based strategies designed to help reduce adolescents' engagement in maladaptive behavior.

Indeed, numerous theories largely discussed within the social psychology literature offer good reason to predict that adolescents' perceptions of their friends' behavior may be erroneous, and largely based on "social projection" (Graham, Marks, & Hansen, 1991; Kandel, 1996; Marks, Graham, & Hansen, 1992; Orive, 1988; Sherman, Presson, Chassin, Corty, & Olshavsky, 1983; Urberg et al., 1990; Wilcox & Udry, 1986). For example, the false consensus effect refers to a tendency for individuals to misperceive others' attitudes or behavior as more similar to their own (Ross, Greene, & House, 1977). Findings regarding false consensus effects reveal that individuals who engage in a specific behavior (or endorse a particular attitude) are likely to overestimate the frequency of similar behaviors among others, while those who do not engage in the behavior are likely to underestimate the frequency of others' behavior (see Marks & Miller, 1987; Mullen et al., 1985, for reviews).

The examination of adolescents' perceptions, and the false consensus effect in particular, may have important implications for understanding peer contagion. It has been hypothesized that false consensus may produce a rigid and self-reinforcing cycle between behaviors and beliefs (Fiske & Taylor, 1991). Specifically, adolescents who engage in deviant or health risk behaviors will be more likely to overestimate the frequency of their peers' behavior. This may apply to adolescents' estimates of the behavior among peers in a community setting or within an intervention group. Individuals use these (often erroneous) estimations of the frequency of others' behavior as a benchmark to strive towards in order to achieve or maintain social rewards (Bandura, 1973). For instance, adolescents may believe that engagement in deviant or health risk behavior at a frequency that matches their perceptions of others' behavior may earn them status among respected peers (Bandura, 1973). The interaction between adolescents' behaviors and their perceptions of peers' behavior is cyclically reinforcing, raising the threshold of behavior that adolescents believe is normative or associated with social rewards in the peer group, and perhaps above the level of behavior that adolescents would otherwise engage in.

Empirical evidence has demonstrated that the false consensus effect applies to health risk behaviors specifically. Findings indicate that young adults are prone to overestimate their peers' favorable attitudes towards and engagement in health risk behavior, including use of nicotine, alcohol, "hard" drugs, and sexual risk behaviors (e.g., Botvin, Botvin, Dusenbury, & Goldberg, 1992; Sherman et al., 1983). Findings also have indicated that adolescents associate aggressive and health risk behaviors with high levels of reputation-based peer status (Prinstein et al., 2003; Prinstein & Cillessen, 2003).

Interestingly, despite the preponderance of evidence suggesting that individuals erroneously estimate the behavior of others in their general peer group, relatively little evidence has suggested that a false consensus effect may be applicable to perceptions of the behavior of *close friends* (Urberg et al., 1990). Developmental theory and research offer some reason to suspect that adolescents might be more adept at estimating the frequency of their friends' engagement in deviant and health risk behavior

as compared to estimations of behavior within the overall peer group. As compared to estimates of anonymous peers, estimations of friends' behavior rely on concrete data regarding a specific peer with whom the individual has a close relationship. Adolescents' spend the majority of their time within the peer context, and a substantial proportion of these interactions are among close friends (Brown, 1990). Moreover, these adolescent friendships are characterized by high levels of intimacy and personal disclosure (Buhrmester & Furman, 1987), increasing the likelihood that information regarding deviant or health risk behaviors will be explicitly discussed. As compared to the estimation of private attitudes or covert behaviors, adolescents often also have opportunities to directly observe their friends' deviant and health risk behaviors; many occur in the peer context and in partnership with close friends (Brown, Dolcini, & Leventhal, 1997; Moffitt, 1993).

This study therefore examined adolescents' perceptions of their peers' deviant and health risk behavior to investigate three sets of hypotheses. First, to replicate past research, the relative contributions of adolescents' perceptions and their friend's actual reported behaviors as correlates of adolescents' own deviant and health risk behavior were examined. As in past work, it was anticipated that the significant concurrent association between adolescents' friends' actual reported behavior and their own behavior would ultimately be accounted for by the mediating effects of adolescents' perceptions of friends' behavior.

A second goal of this study pertained to a closer examination of potential discrepancies between adolescents' perceptions and their friends' actual reported deviant and health risk behavior. Specifically, two indices were computed to examine the magnitude of discrepancies between adolescents' perceptions and their friends' actual reported deviant and health risk behaviors. One of these discrepancy measures reflected adolescents' tendency to over- or underestimate the frequency of their friends' behaviors. The absolute value of this measure was used as a second index reflecting adolescents' general misperceptions, regardless of the direction of the bias. Utilizing these measures, it was possible to explore whether adolescents display a general tendency to provide erroneous estimates of their friends' behaviors, whether misperceptions were most likely to be over- or underestimates, and also whether this effect varied across different types of behavior (i.e., deviant vs. health risk). Given that each occurrence of health risk behavior (e.g., smoking) is generally less salient among peers than an occurrence of deviant behavior (e.g., vandalism), it was anticipated that adolescents would evidence greater misperceptions of friends' health risk behavior than friends' deviant behavior.

In addition to an exploration of general reporting tendencies among adolescents, a third and main goal of this study was to understand individual factors that might be associated with an increased tendency towards misperception. Although individual differences in these phenomena are rarely discussed within the social psychology literature, the identification of factors that may be associated with biases may prove especially informative for elucidating mechanisms of peer contagion. In particular, a focus of these hypotheses pertained to adolescents with high levels of rejection and aggression among peers, as these youths are most likely to affiliate with deviant peers, and consequently, are at greatest risk for engaging in deviant and health risk behavior (Dishion, Capaldi, Spracklen, & Li, 1995; Dishion, Capaldi, & Yoerger, 1999; Dishion, Patterson, Stoolmiller, & Skinner, 1991).

Findings from multiple domains of social development research have revealed that rejected and aggressive children are generally poor at evaluating and interpreting information within the social context. Research on hostile attribution biases has demonstrated that rejected and aggressive youth are especially prone to misattribute benign social cues as due to hostile intent (e.g., Dodge, Bates, & Pettit, 1990). Zakriski and Coie (1996) revealed that rejected and aggressive youth demonstrate considerable difficulty discerning which of their peers may like or dislike them (see also MacDonald & Cohen, 1995). Research also has consistently demonstrated that these youths are prone to overestimate their own social competence and status among peers (Hughes, Cavell & Grossman, 1997; Rudolph & Clark, 2001). Given this general difficulty in the management of social information, it was hypothesized that adolescents' rejection and aggression among peers would be significantly associated with a tendency to erroneously estimate their friends' deviant and health risk behavior. Consistent with the notion that rejected and aggressive youth are particularly prone towards deviant interpretations of social cues, it was specifically anticipated that rejection and aggression would be associated with *overestimations* of friends' behavior.

Of course to fully understand the potential associations between adolescents' aggression, peer rejection, and their estimations of friends' deviant and health risk behaviors, it was important to consider past research demonstrating that rejected and aggressive youth typically have friendships that are lower in quality than their peers (e.g., Parker & Asher, 1993). Friendships that lack positive qualities (e.g., less emotional disclosure, lower levels of companionship) may provide fewer opportunities for adolescents to gather accurate data regarding their friends' behavior, and therefore yield greater discrepancies between adolescents' perceptions and friends' reports

of behavior. High levels of negative friendship qualities (e.g., conflict) may similarly be indicative of restricted communication regarding behavior engagement. Thus, in analyses examining potential associations between rejection, aggression, and adolescents' estimations of friends' behavior, both positive and negative friendship qualities were initially controlled. It was anticipated that friendship quality would be significantly associated with discrepancies between adolescents' perceptions and their friends' actual reported levels of behavior (i.e., either over- or underestimations). However, adolescents' aggression and peer rejection should remain significant correlates of these discrepancies (overestimations in particular) after controlling for the effects of friendship quality.

A fourth and final goal of this study was to examine adolescents' own deviant or health risk behavior as potential mediators of the association between aggression, rejection, and overestimations of friends' behavior. Specifically, if adolescents' peer rejection and aggression are indeed associated with greater tendencies towards *overestimation* of friends' behaviors, and not estimation errors in general, this may be due to a false consensus effect. In other words, it may be that adolescents who themselves engage in higher frequencies of deviant and health risk behavior (i.e., rejected and aggressive adolescents) may have an increased tendency to overestimate the frequency that others, even their friends, adopt similar attitudes and behaviors (Urberg et al., 1990). This result would suggest that the effects of rejection and aggression on adolescents' overestimations of friends' behavior are at least partially explained by their own reported deviant and health risk behavior. Thus, adolescents' own level of behavior was examined as a potential mediator.

In sum, by examining adolescents' perceptions of their friends' deviant and health risk behavior, as well as friends' actual level of reported behavior, this study offered an opportunity to explore several hypotheses regarding adolescents' misperceptions that may have implications for understanding peer contagion effects. It was anticipated that adolescents perceptions of friends' behavior would be most strongly associated with their own deviant and health risk behavior, partially mediating the association between friends' and adolescents' actual reported behavior. It was also expected that significant discrepancies would be revealed between adolescents' perceptions and their friends' actual reported behavior, suggesting that adolescents' perceptions of friends' behavior may be inaccurate. It was further anticipated that after accounting for the potential contributions of friendship quality as correlates of these discrepancies, adolescents' own levels of peer-reported aggression and rejection would be associated with the magnitude of discrepancies. Lastly,

associations between adolescents' aggression and rejection and their estimations would be mediated by adolescents' own deviant and health risk behavior, consistent with a false consensus effect.

METHODS

Participants

A total of 120 adolescents (67 girls and 53 boys) in the 11th grade at a suburban high school participated in the study. The ethnic distribution of the sample was 79.2% White/Caucasian; 14.2% African American; 3.3% Latino American, and 3.4% other/mixed ethnicity within a city of fairly homogeneous, middle-class socioeconomic status (per capita income = $25,175. According to school records, approximately 23.4% of students were eligible for free or reduced-price lunch.

Procedures

All students in the 11th grade were recruited for participation, with the exception of students in self-contained special education classes ($n = 372$). Consent forms were returned by 85% of families ($n = 318$); of these 93% of parents gave consent for their child's participation ($n = 297$). Data were unavailable for 30 participants due to student absenteeism on the days of testing and missing data, yielding a sample of 267 adolescents (72% of all eligible participants).

Hypotheses examined in this study primarily pertained to discrepancies between adolescents' perceptions of their best friends' behavior and their friends' actual reported behavior. Thus, analyses were limited to only those participants who met several criteria. First, participants were included only if they had selected a best friend who also was a participant in the study (i.e., only those participants for whom best friends' actual reported behavior could be determined). Of the 267 adolescents who completed measures for this study, 124 adolescents either failed to select a single best friend or selected a best friend who was not participating in this study. Second, to eliminate concerns regarding duplication of data and resulting inflated associations, each adolescent was included as a best friend only once within the data set. Of the 143 adolescents who met the first criteria, 56 adolescents selected a best friend who had been selected by at least one other participant. In each instance, one adolescent was selected at random for inclusion in the data set, and the other(s) who selected the same best friend were omitted

from analyses. A total of 120 participants met both of these criteria.[4] Although this is a somewhat small subset of the initial sample of participants, the data generally suggested that the subset was fairly representative of the overall sample. Multiple comparisons were conducted to compare the final sample of adolescents with those who had been eliminated because of missing data or inadequate best friend data. No significant differences emerged on any study variable, with one exception. African American adolescents were overrepresented in the group of participants who selected a nonparticipant best friend as compared to adolescents of other ethnic backgrounds, $\chi^2 = 11.91$, $p < .05$. However, it should be noted that the final sample of participants who selected a participant best friend did not differ in ethnic composition from the demographics of the entire 11th grade according to school records, suggesting adequate representation of the original pool of potential participants.

Measures

Adolescents' Deviant and Health Risk Behaviors

Adolescents' deviant and health risk behavior was assessed using items from existing instruments (e.g., Youth Risk Behavioral Surveillance; Center for Disease Control [CDC], 1998; Dishion et al., 1991; La Greca, Prinstein, & Fetter, 2001). Specifically, adolescents responded to 10 items assessing the frequency of engagement in deviant behavior and health risk behaviors. Adolescents responded to each item using a 5-point likert-scale (1–5) response set corresponding to the expected range of behavior frequency commonly reported within this age group. A log transformation was conducted for all items that yielded significantly skewed distributions, and factor analyses of these transformed items using an oblique rotation identified two factors with eigenvalues greater than 1. Five items loaded onto a factor of *deviant behavior* (i.e., ruined or damaged other people's property or possessions on purpose; stolen something, or tried to steal something, worth less than $5; stolen something, or tried to steal something, worth more than $50; broken into a car or building to steal something; been in a physical fight; $\alpha = .76$; untransformed score $M = 1.24$; $SD = .50$). Four items loaded onto a factor of health risk

---

[4]To further reduce potential data redundancy, a separate set of analyses was conducted using a reduced data set in which each adolescent was included as either a target participant or a best friend, but never both. This reduced data set included data from 154 adolescents (i.e., a total of 77 target adolescents and each of their best friends). Analysis of this reduced data set yielded an identical pattern of findings to the reported results, with one exception noted below.

behaviors (i.e., number of cigarettes smoked per day; frequency of drinking five or more drinks on a single occasion; frequency of marijuana use; frequency of doing something that could have gotten the participant in trouble with the police; $\alpha = .73$; untransformed score $M = 1.63$; $SD = .77$). All factor loadings exceeded .40 and there were no significant cross-loadings, with one exception. One item assessing how frequently adolescents cheated on tests loaded comparably on both factors and was excluded from remaining analyses. A mean score was computed across the remaining items for each of the two factors to obtain measures of adolescents' actual reported engagement in deviant and health risk behaviors.

Perceptions of Best Friends' Behavior

Using a peer nomination procedure, adolescents were asked to identify an unlimited number of their closest friends from a roster of all grademates as well as a single peer who was their "very best friend." Next, adolescents were asked to report the perceived frequency of their very best friend's engagement in deviant and health risk behavior using items identical to those described above. Scores were transformed in the exact same manner as for adolescents' reports of their own behavior.

Computation of Discrepancies Between Actual and Perceived Friends' Behavior

Because each adolescent and his/her best friend had completed the measure of self-reported deviant and health risk behavior, it was possible to compute discrepancies between adolescents' best friends' actual reported behavior and adolescents' perceptions of their best friends' behavior. Past research has offered at least two options for the computation of discrepancies. Studies on informant discrepancies (e.g., the depression-distortion hypotheses) and cognitive distortions, for instance, have used a residual score approach to compute discrepancy scores (Brendgen, Vitaro, Turgeon, & Poulin, 2002; Chi & Hinshaw, 2002; De Los Reyes & Prinstein, 2004; McGrath & Repetti, 2002). This approach involves the initial regression of one informant's scores onto the other's (i.e., *x* onto *y*), yielding a residual score as a measure of error (i.e., discrepant) variance. A second regression reversing predictor and criterion variables (i.e., *y* onto *x*) is then conducted. Residual scores from this second regression analysis are multiplied by –1 to ensure that discrepancies may be interpreted in the same direction, and the two residual scores are averaged to produce a measure of discrepancy that is not weighted toward either initial measure. A second approach to the computation of discrepancy scores involves

the calculation of a simple difference score between informants' reports for each item (see literature on change scores; Edwards, 1994; Rogosa, Brandt, & Zimowski, 1982). Difference scores are then averaged across similar items to compute a summary measure of discrepancies for classes of behaviors (i.e., deviant behavior; health risk behavior). Both computational procedures were used in the current study, yielding discrepancy scores that were nearly identical (i.e., r's > .95) to one another and producing an identical pattern of results for all study analyses. For ease of interpretation, results using discrepancy scores yielded from the difference score approach are presented below.

The two discrepancy scores resulting from this computational procedure were each coded in two ways. By subtracting adolescents' best friends' actual reported behavior scores from scores indicating adolescents' perceptions of their best friends' behavior, results produced scores including both negative and positive values, with higher values indicating that adolescents had overestimated the frequency of their friends' actual reported behavior. These two indices were coded as "overestimations of best friends' deviant behavior" and "overestimations of best friends' health risk behavior." By calculating the absolute value of these indices, it was possible to obtain scores that captured the magnitude of adolescents' estimation errors regardless of the direction of these errors. These absolute value scores were coded as "estimation errors of best friends' deviant behavior" and "estimation errors of best friends' health risk behavior" with greater scores indicating a greater magnitude of estimation error.

Friendship Quality

All adolescents were asked to complete the *Network of Relationships Inventory* (NRI; Furman 1998) to describe the quality of their relationship with the adolescent they selected as a best friend. The NRI includes 30 items designed to assess positive (i.e., companionship, instrumental aid, intimacy, nurturance, affection, admiration, reliable alliance) and negative aspects (i.e., conflict, antagonism, relative power) of friendship quality. Adolescents respond to each item using a 5-point Likert scale. Two mean scores were computed for a measure of positive (21 items; $\alpha = .96$) and negative friendship quality (9 items; $\alpha = .87$). Extensive psychometric support for the NRI has been provided by Furman (1998) as a reliable and valid measure of friendship quality.

Peer Nominations

A peer nomination procedure was used to assess adolescents' peer acceptance/rejection and peer aggression.

Using alphabetized rosters of all grademates, adolescents were asked to nominate an unlimited number of peers that they "liked to spend time with the most," and "liked to spend time with the least." The order of alphabetized names on this roster was counterbalanced (e.g., Z through A) to control for possible effects of alphabetization on nominee selection. A sum of the number of nominations each child received was computed and standardized. A difference score between standardized "like most" and "like least" nominations was then computed and restandardized for a measure of *social preference*, with higher scores indicating greater peer acceptance and lower scores indicating greater peer rejection (Coie & Dodge, 1983). Using this procedure it was possible to obtain an ecologically valid measure of peer acceptance/rejection that was not influenced by adolescents' self-report. Data from sociometric nominations are widely considered the most reliable and valid indices of acceptance and rejection among peers (Coie & Dodge, 1983).

Adolescents' also nominated peers who were overtly aggressive ("Who says mean things, threatens, or physically hurts others—for instance, hitting, kicking or pushing others, teasing or calling names?" De Los Reyes & Prinstein, 2004; Prinstein, in press; Prinstein & Cillessen, 2003). A sum of the number of nominations each child received on this item was computed and standardized as a measure of *aggression*.

RESULTS

Preliminary Analyses

Before examining discrepancies between adolescents' perceptions and their friend's actual reported levels of behavior, preliminary analyses were conducted to examine bivariate associations and relative contributions of these two measures as concurrent predictors of adolescents' own deviant and health risk behavior. The results from correlation and Fisher z analyses suggested that the association between adolescents' perceptions of their best friend's behavior and their friend's actual reported behavior was stronger for health risk, $r = .50$, $p < 001$, than for deviant behavior, $r = .24$, $p < .01$, Fisher $z = 2.33$, $p < .01$.

An initial goal of this study was to examine the relative contributions of friend's actual reported behavior and adolescents' perceptions of their friend's behavior as concurrent predictors of adolescents' deviant and health risk behavior. It was anticipated that adolescents' perceptions would partially mediate the association between friends' and adolescents' actual reported behavior. Two

Table I. Hierarchical Multiple Regression Analyses Examining Adolescents' Perceptions and Their Friends' Actual Reported Behaviors as Concurrent Predictors of Adolescents' Own Deviant and Health Risk Behavior

	Deviant			Health risk		
	ΔR^2	β at step	Final β	ΔR^2	β at step	Final β
Step 1						
Friend's actual reported behavior	.01	.11	−.09	.10*	.32*	−.08
Step 2						
Perceptions of friend's behavior	.61*		.81*	.51*		.82*
Total R^2	.62*			.62*		

*$p < .0001$.

hierarchical multiple regression analyses were conducted. For each analysis, adolescents' own reports of behavior were entered as a dependent variable, friend's actual reported level of corresponding behaviors (i.e., deviant or health risk) was entered on an initial step, and adolescents' perceptions of their friend's behavior was entered on a second step (see Table I). Results suggested that only adolescents' perceptions of friend's deviant behavior were significantly correlated with adolescents' own deviant behavior. For adolescents' health risk behavior, results suggested that the significant contribution of friend's actual reported health risk behavior was ultimately accounted for by adolescents' perceptions of their friend's health risk behavior. Because initial criteria for mediation were already met (i.e., both predictors were significantly correlated with the criterion variable; r's > .33, $p < .001$), computations of direct and indirect effects were next conducted to examine whether the association between friend's actual reported health risk behavior and adolescents' own behavior was significantly weaker once adolescents' perceptions were considered in the model (see recent guidelines by Holmbeck, 2002). A significant effect suggested that the association between friend's actual health risk reported behavior and adolescents' own behavior was mediated by adolescents' perceptions, $z = 5.55$, $p < .01$.

Overestimations and Estimation Errors of Friend's Deviant and Health Risk Behavior

A second goal of this study was to examine the frequency of adolescents' overestimations and estimation errors of best friends' deviant and health risk behavior. Regarding the measures of overestimations, results revealed that neither sample mean was significantly different than zero, $t(119) < −1.18$, *NS*, suggesting that although there was substantial variability in adolescents' discrepancies, there was no significant tendency for adolescents (as a group) to systematically over- or underestimate the frequency of their friends' deviant, $M = .01$; $SD = .13$,

or health risk behavior, $M = −.02$; $SD = .16$. Moreover, there was no significant difference between adolescents' overestimation scores for deviant as compared to health risk behavior, $t(119) = .55$, *NS*. There was evidence to suggest that adolescents did make significant estimation errors (i.e., the absolute value of over- and underestimations), however. Estimation errors for friends' deviant behavior, $M = .07$; $SD = .11$, and health risk behavior, $M = .10$; $SD = .12$, were each significantly different from zero, $t(119) = 7.30$ and 8.79, $p < .001$, respectively. Moreover, results indicated that adolescents were somewhat more likely to make estimation errors regarding their friends' health risk behavior than their friends' deviant behavior, $t(119) = 2.38$, $p < .05$.

Correlates of Discrepancies Between Adolescents' Perceptions and Friends' Actual Reported Behavior

A third and primary goal of this study was to examine correlates of adolescents' overestimations and estimation errors of friends' behavior. Table II provides correlations between each of these variables, adolescents' friendship quality, peer nominated social preference and aggression, and adolescents' own reported frequency of deviant and health risk behavior. As would be expected mathematically, overestimations and estimation errors were not significantly correlated.

It was hypothesized that adolescents' peer rejection and aggression would be associated with a greater tendency to overestimate friends' engagement in deviant and health risk behavior. Two hierarchical multiple regression analyses were conducted with adolescents' overestimations of friends' deviant and health risk behavior entered as dependent variables, respectively. For each analysis, adolescents' positive and negative friendship quality were controlled on an initial step, followed by peer nominated social preference and aggression entered on a second step. Lastly, to examine the false consensus effect, adolescents' own level of deviant (or health risk) behavior was entered

Table II. Bivariate Associations Among Primary Study Variables ($n = 120$)

	2	3	4	5	6	7	8	9	10
1. Overestimations of friends' deviant behavior	.39***	−.01	.03	−.20**	.14	−.20**	.20**	.56**	.17*
2. Overestimations of friends' health risk behavior		.13	−.14	−.07	.04	−.28***	.36***	.37***	.48***
3. Estimation errors of friends' deviant behavior			.32***	−.24**	.09	.03	.19**	.49***	.31***
4. Estimation errors of friends' health risk behavior				−.24**	.01	.00	.29***	.27***	.16
5. Positive friendship quality					−.02	.16*	−.08	−.20**	−.07
6. Negative friendship quality						.06	.16*	.15*	.10
7. Peer nominated social preference							−.31***	−.10	.05
8. Peer nominated aggression								.25**	.28***
9. Adolescents' deviant behavior									.46***
10. Adolescents' health risk behavior									

*$p < .05$ (one tailed). **$p < .05$ (two-tailed). ***$p < .001$ (two tailed).

on a final step to examine a mediator model. All results are presented in Table III.

Analyses revealed that positive and negative friendship qualities were not significantly associated with adolescents' overestimations of friends' deviant or health risk behaviors. After controlling for friendship quality, adolescents' peer nominated aggression and social preference explained a significant proportion of variance in overestimations. Adolescents' aggression was uniquely associated with overestimations of friends' deviant and health risk behavior. Low levels of social preference (i.e., peer rejection) also were associated with overestimations of friends' health risk behavior (see β at step).[5]

The final step of the regression analysis examined the potential mediating role of adolescents' own deviant or health risk behavior. Consistent with a false consensus effect, it was hypothesized that adolescents with higher levels of deviant and health risk behavior would have a greater tendency to overestimate their friends' deviant and health risk behavior; this effect might explain the association between adolescents' aggression and overestimations. Results indicated that adolescents' own behavior indeed was a significant predictor of overestimations in both domains of friends' behavior (i.e., deviant and health risk behavior). This finding, and the results from correlations presented in Table II, confirmed that adolescents' own behavior was associated with both overestimations and with peer nominated aggression, thus satisfying the initial criteria for mediation.

As final test of mediation, computations of direct and indirect effects were conducted to examine whether the association between aggression and overestimations was significantly weaker once adolescents' own behavior was considered in the model (Holmbeck, 2002). Results from these computations indicated that adolescents' own deviant behavior was a statistically significant mediator of the association between adolescents' aggression and their overestimation of friends' deviant behavior, $z = 2.92$, $p < .05$. By examining the magnitude of the indirect effect as compared to the total effect, it was possible to determine that adolescents' own deviant behavior accounted for 74% of the effect between adolescents' aggression and their overestimations of friends' deviant behavior (Holmbeck, 2002). Results from post hoc mediator computations also revealed a statistically significant effect of adolescents' own health risk behavior as a mediator of the association between adolescents' aggression and their overestimation of friends' health risk behaviors, $z = 2.79$, $p < .05$. Specifically, the mediator accounted for 35% of the effect between adolescents' aggression and their overestimations of friends' health risk behavior.

A parallel set of analyses was conducted to examine associations between friendship quality, social preference, aggression, and adolescents' own behavior as concurrent predictors of adolescents' estimation errors. These analyses helped to determine whether previously revealed predictors were associated with erroneous perceptions of friends' behavior regardless of the direction of the misperception (i.e., either over- and underestimation). Regression predictors were entered in the same manner as described in the analyses above (see Table III).

Findings revealed that friendship quality was significantly associated with estimation errors for both deviant and health risk behaviors. Unique effects revealed that lower levels of positive friendship quality were associated with higher levels of errors in estimating friends' deviant

[5]In analysis of the reduced dataset, social preference was significantly associated with adolescents' overestimations of friends' deviant behavior, $\beta = -.36$, $p < .001$, suggesting that higher levels of peer rejection were associated with a greater tendency towards overestimation of friends' deviant behavior. Moreover, social preference remained a significant (i.e., unmediated) correlate of adolescents' overestimations of friends' deviant behavior, $\beta = -.29$, $p < .001$, after adolescents' own deviant behavior was entered into the model.

Table III. Hierarchical Multiple Regression Analyses Examining Friendship Quality, Peer Rejection, Aggression, and Adolescents' Own Behavior as Concurrent Predictors of Adolescents' Overestimations and Estimation Errors of Friends' Behavior

	Overestimations of friends' behavior						Estimation errors of friends' behavior					
	Deviant			Health risk			Deviant			Health risk		
	ΔR^2	β at step	Final β	ΔR^2	β at step	Final β	ΔR^2	β at step	Final β	ΔR^2	β at step	Final β
Step 1												
Positive friendship quality	.05	−.19	−.07	.01	−.06	.01	.06*	−.23*	−.16	.06*	−.24*	−.24*
Negative friendship quality		.13	.04		.03	.00		.07	−.05		.00	−.05
Step 2												
Social preference	.09*	−.16	−.10	.12*	−.23*	−.27*	.10*	.09	.13	.03	.10	.09
Aggression		.24*	−.04		.23*	−.03		.33**	.10		.18	.13
Step 3												
Adolescents' own behavior (deviant or health risk)	.22**		.56**	.18**		.49**	.14*		.46**	.01		.09
Total R^2	.36**			.30**			.30**			.10		

*$p < .05$. **$p < .001$.

and health risk behavior. In other words, results indicated that lower levels of positive friendship quality were associated with a greater tendency to erroneously estimate the frequency of friends' behavior, however, friendship quality was not significantly associated with a tendency to *over*-estimate friends' behavior specifically. After controlling for friendship quality, results revealed only one significant effect for adolescents' aggression, suggesting that higher levels of aggression were associated with greater levels of estimation errors for friends' deviant behavior. This effect was mediated by adolescents' own deviant behavior, however, $z = 2.79$, $p < .05$. Specifically, adolescents' own deviant behavior accounted for 69% of the effect between adolescents' aggression and their estimation errors for friends' deviant behavior.

DISCUSSION

Prior developmental psychopathology research has consistently demonstrated that adolescents' perceptions of their best friends' behavior are prospectively associated with their own behavior. On the basis of the assumption that these perceptions are reasonable estimates of friends' actual behavior, recent efforts have emphasized the disaggregation of deviant peer groups whose members engage in similar levels of behavior. This remains an important, albeit challenging intervention strategy. Yet, theory and research from social psychology literature offer some reason to question prior assumptions regarding adolescents' perceptions of their friends' behavior; these estimates may be erroneous. In fact, discrepancies may be most likely among adolescents at greatest risk for the development or maintenance of maladaptive behavior. Findings from

this study offered an extension of both literatures by more closely scrutinizing adolescents' perceptions of their best friends' behaviors, and offering some evidence for specific factors that are associated with misperceptions of others' behavior. The results have implications for the prevention of maladaptive behavior within community-based samples as well as mechanisms that might lead to peer contagion among clinically referred youth in intervention contexts.

Findings from this study highlighted both the importance of and possible inaccuracies in adolescents' perceptions of their friends' behavior. Initial results indicated that adolescents' perceptions are ultimately stronger and more proximal correlates of adolescents' own deviant and health risk behavior; these findings also have been demonstrated in prior longitudinal work (Kandel, 1996). However, despite the high levels of intimacy, disclosure, and companionship that characterize many adolescent friendships, results suggested that adolescents' perceptions of their friend's behavior nevertheless were discrepant from their friend's actual reported behavior (Sherman et al., 1983; Urberg et al., 1990).

Discrepancies between adolescents' estimations and their friends' reported deviant and health risk behavior were examined in two ways. As a general measure of erroneous estimation, adolescents' estimation errors (i.e., either over- or underestimation) were examined. Findings indicated that the overall sample did not evidence a significant level of estimation errors, suggesting that there was variability in both the magnitude and direction of discrepancies between adolescents' perceptions and their friends' reported behavior. Some of this variability in estimation errors was significantly associated with friendship quality. Lower levels of adolescents' reported positive friendship

quality were associated with a higher magnitude of discrepancies, perhaps suggesting that adolescents in lower quality relationships have fewer opportunities to observe or discuss their friend's engagement in deviant or health risk behavior. Overall, these results offer some evidence to underscore the importance of friendship quality as an important factor to understand in addition to the identity of adolescents' friends. Misperceptions of others' behavior may be most likely when adolescents are less familiar with the peers they wish to emulate.

Most interesting, examinations of a second index of estimation discrepancies indicated that some adolescents may be particularly likely to *overestimate* the frequency of their friends' deviant and health risk behavior. This was somewhat more evident for adolescents' estimations of their friends' health risk behaviors as compared to their friends' deviant behavior, possibly reflecting the greater frequency of adolescents' engagement in health risk behaviors as compared to deviance, and thus greater room for erroneous estimation. Adolescents also may be somewhat less likely to discuss each instance of common health risk behaviors with close friends, but more likely to discuss deviant acts.

Further examination of these overestimations suggested that adolescents' perceptions may be partially attributed to a false consensus effect. Typically this effect is demonstrated by revealing greater estimates of behavior within a general peer group among those who themselves engage in the behavior, as compared to those who do not (e.g., Whitley, 1998). Attempts to determine whether these estimates are discrepant from actual reported behaviors are rare. These findings therefore offer at least two particularly noteworthy contributions. First, from a theoretical standpoint, results provide evidence to suggest that a false consensus effect applies to adolescents' estimates of a specific peer's (i.e., a friend's) behavior. Second, and perhaps most importantly from a clinical perspective, findings revealed that adolescents who engage in deviant and health risk behavior are not only assuming that their friend also engages in high levels of these behaviors, but rather they are *overestimating* the actual reported frequency of their friend's behaviors. Within a community sample, opportunities to dispel misperceptions and erroneous estimations of norms may be a fruitful avenue for the prevention of deviant and health risk behavior (Schroeder & Prentice, 1998); these approaches may have particular utility among adolescents. Within the context of an intervention involving groups of clinically referred adolescents, the false consensus effect may offer some partial explanation for contagion effects that occur among aggregates of deviant peers. For example, it may be that affiliation with other deviant peers leads to the development of inflated social norms regarding deviant or health risk behaviors, thus raising the threshold of what adolescents consider acceptable or normative deviance.

Several potential explanations for the false consensus effect have been noted within the social psychology literature. For example, one theory suggests that false consensus estimates may be due to individual's selective exposure to data that are consistent with their own behavior (i.e., through exclusive interactions with peers who exhibit similar attitudes and behaviors; Marks & Miller, 1987). From a developmental perspective, this explanation is consistent with the "selection" tenet of homophily theory (Kandel, 1978). However, because this study specifically focused on estimates of close friends' behavior, rather than estimates of a broader peer group, the selective exposure hypothesis cannot wholly account for the observed results. Adolescents in this study constructed erroneous estimations of their best friend's behavior; selective exposure to this best friend should have yielded lower discrepancies according to this hypothesis.

A second hypothesis raised within the social psychology literature suggests that individuals may be biased towards interpretation of social data that verifies their own behavioral decisions (Fiske & Taylor, 1991; Gilovich, 1991). This idea is consistent with a social information processing perspective, as described in clinical and developmental literatures (e.g., Crick & Dodge, 1994). Individuals who engage in a particular behavior may be more likely to encode cues in their environment or interpret ambiguous information that is consistent with their own behavior. For example, an adolescent who has decided to use substances at a party may selectively attend to others who also are using substances during the party or later interpret ambiguities in a friend's report of activities at the party as a confirmation that the friend had also elected to engage in substance use. A similar mechanism may exist for adolescents' interpretations of peers' statements and behaviors in the context of a group intervention. Consistent with past research regarding rejected and aggressive youths' poor social cognitive skills, results from this study suggest that these adolescents are especially prone to overestimate others' behaviors, including the behavior of their friends. The effects of adolescents' aggression on misperceptions may be at least partially explained by a false consensus mechanism.

A third potential explanation for false consensus effects pertains to individuals' tendency to misconstrue the attitudes that underlie others' behavior. The fundamental attribution error suggests that individuals interpret others' behavior as reflective of dispositional factors (but attribute their own behavior to specific factors), and thus assume that others' behavior occurs across multiple situations and

contexts (while their own actions may not be representative of typical behavior; Ross, Amabile, & Steinmetz, 1977). As consequence of this attributional error, individuals are likely to overestimate the frequency that others engage in behavior (Ross, Greene, et al., 1977). Pluralistic ignorance theories similarly suggest that even when behaviors are identical, individuals perceive differences between their and others' private attitudes regarding these behaviors (Miller & McFarland, 1991; Miller & Prentice, 1994). Specifically, individuals are likely to believe that others possess more favorable attitudes regarding (e.g., deviant/health risk) behaviors; this belief naturally leads to an assumption that others may engage in these behaviors more frequently (Miller & Prentice, 1994; Prentice & Miller, 1993; Suls & Green, 2003).

More troubling, and perhaps particularly relevant for understanding peer contagion in adolescence, attributional errors and pluralistic ignorance can also deleteriously affect individuals' subsequent behavioral decisions. Individuals who believe that respected members of their peer group engage in and value a specific behavior will feel pressured towards behavioral conformity. As compared to children, adolescents are especially susceptible to this pressure (Steinberg & Silverberg, 1986). Adolescents emulate friends' behavior both to avoid social sanctions as well as to maintain high self-esteem through reflected appraisal among peers (Felson, 1985; Harter, Stocker, & Robinson, 1996). Adolescents may initially respond to this pressure by conforming to the perceived behavior of others. However, adolescents who yield to conformity pressures yet retain negative attitudes regarding these behaviors will experience cognitive dissonance (Festinger, 1957). Individuals may resolve the dissonance between their behavior and their actual values either by terminating their behavior or by altering their values. Interventions designed towards altering adolescents' estimations of the frequency of their friend's behavior, or the assumed attitudes that underlie their friends' behavior may be welcome to help reduce dissonance, and subsequently to reduce adolescents' engagement in deviant and health risk behavior. Without intervention, adolescents might alternatively reduce dissonance by adopting more favorable attitudes towards deviant and health risk behavior (i.e., private acceptance of attitudes to match public conformity of behaviors; Prentice & Miller, 1993). This private acceptance of deviant and risk attitudes clearly presents a serious and more stable risk factor for ongoing deviance and risk behavior.

Still, a fourth possibility may be that false consensus or pluralistic ignorance effects are associated with findings regarding deviance training (Dishion et al., 1996; Dishion & Owen, 2002). A behavioral model might suggest that

attitudes regarding deviant and health risk behavior are communicated implicitly through positively reinforcing verbal and nonverbal behaviors (e.g., laughing, nodding). Either through accurate or distorted interpretation, these social cues may further contribute to adolescents' beliefs regarding normative and acceptable attitudes and behavior.

Both the study of adolescents' attitudes regarding deviant and health risk behavior, and the integration of cognitive and interpersonal models of peer contagion offer high priorities for future work. Another important direction for future research will be the continued examination of peer rejection and aggression as factors significantly associated with adolescents' tendency to overestimate friends' behavior. Although significant support for a false consensus effect was revealed in this study, adolescents' own behavior only partially mediated the association between adolescents' aggression and overestimations. Moreover, an unmediated association between peer rejection and adolescents' overestimation of friends' health risk behaviors was revealed. Consistent with the social information processing perspective, these results suggested that adolescents who are aggressive or rejected by peers may be most likely to exhibit biases when encoding or interpreting social stimuli regarding friends' maladaptive behavior. These misperceptions may compound a host of related risk factors (e.g., low parental monitoring, poor emotional regulation skills, affiliation with deviant peers) that place rejected and aggressive adolescents at increased risk for engagement in deviant and health risk behavior (Prinstein & La Greca, 2004).

Future research also should address some of the limitations of this preliminary investigation. One important issue pertains to the imperfect validity of adolescents' own reports of their deviant and health risk behavior engagement. Although it is recognized that the validity of adolescents' perceptions as a measure of friends' behavior is inferior to friends' actual report, it is important to acknowledge that even friends' actual reported behavior may be affected by reporting biases or social desirability. Thus, it is important to note that this study cannot determine the *accuracy* of their perceptions of friends' behaviors, but rather *discrepancies* between these perceptions and friends' own report. Few preferable alternatives currently exist for measuring adolescents' engagement in deviant and health risk behavior.

Future research also might benefit by recruiting clinically referred youth who might engage in more severe deviant and health risk behaviors, or at greater frequencies. It is currently unclear if the results from this study would apply to estimations of more severe deviant or health risk behavior. It also should be noted that the use of

a school-based sociometric procedure in this study may have reduced the number of deviant adolescents who are more likely than other adolescents to report close friendships with peers outside of the school setting (Kiesner, Poulin, & Nictora, 2003). The use of larger samples also might be beneficial for identifying potential subgroups of adolescents who may be at greater risk for misperceptions, and to determine the possible differences in the magnitude of discrepancies within reciprocated and unreciprocated friendships. Longitudinal data also are needed to reach conclusions regarding the possible effects of misperceptions on future behavior.

Overall, results from this study offer important directions for the integration of theories from both social psychology and developmental psychopathology to help elucidate processes of peer contagion. Results regarding discrepancies between adolescents' perceptions and their friends' actual reported behaviors have implications for future research regarding peer contagion effects and offer practical suggestions for interventions designed to mitigate the effects of deviant peer aggregation.

ACKNOWLEDGMENTS

REFERENCES

Alexander, C., Piazza, M., Mekos, D., & Valente, T. (2001). Peers, schools, and adolescent cigarette smoking. *Journal of Adolescent Health*, *29*, 22–30.

Andrews, J. A., Tildesley, E., Hops, H., & Li, F. (2002). The influence of peers on young adult substance use. *Health Psychology*, *21*, 349–357.

Aseltine, R. H. (1995). A reconsideration of parental and peer influences on adolescent deviance. *Journal of Health and Social Behavior*, *36*, 103–121.

Bandura, A. (1973). *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice-Hall.

Billy, J. O. G., & Udry, J. R. (1985). The influence of male and female best friends on adolescent sexual behavior. *Adolescence*, *20*, 21–32.

Bosari, B., & Carey, K. B. (2001). Peer influences on college drinking: A review of the research. *Journal of Substance Abuse*, *13*, 391–424.

Botvin, G. J., Botvin, E. M., Baker, E., Dusenbury, L., & Goldberg, C. J. (1992). The false consensus effect: Predicting adolescents' tobacco use from normative expectations. *Psychological Reports*, *70*, 171–178.

Brendgen, M., Vitaro, F., Turgeon, L., & Poulin, F. (2002). Assessing aggressive and depressed children's social relations with classmates and friends: A matter of perspective. *Journal of Abnormal Child Psychology*, *30*, 609–624.

Brent, D. A., Pepper, J. A., Moritz, G., Allman, C., Schweers, J., Roth, C., et al. (1993). Psychiatric sequelae to the loss of an adolescent peer to suicide. *Journal of the American Academy of Child and Adolescent Psychiatry*, *32*, 509–517.

Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman & G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 171–196). Cambridge: Harvard University Press.

Brown, B. B., Dolcini, M. M., & Leventhal, A. (1997). Transformations in peer relationships at adolescence implications for health related behavior. In J. Schulenberg, J. L. Maggs, & K. Hurrelmann (Eds.), *Health risks and developmental transitions during adolescence* (pp. 161–189). Cambridge: Cambridge University Press.

Buhrmester, D., & Furman, W. (1987). The development of companionship and intimacy. *Child Development*, *58*, 1101–1113.

Center for Disease Control. (1998). Youth-risk behavior surveillance—United States, 1997. *Morbidity and Mortality Weekly Report*, *47*, SS-3.

Chi, T. C., & Hinshaw, S. P. (2002). Mother–child relationships of children with ADHD: The role of maternal depressive symptoms and depression-related distortions. *Journal of Abnormal Child Psychology*, *30*, 387–400.

Cohen, J. M. (1977). Sources of peer group homogeneity. *Sociology of Education*, *30*, 241–277.

Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. *Merrill-Palmer Quarterly*, *29*, 261–282.

Conrad, K. M., Flay, B. R., & Hill, D. (1992). Why children start smoking cigarettes: Predictors of onset. *British Journal of Addiction*, *87*, 1711–1724.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74–101.

De Los Reyes, A., & Prinstein, M. J. (2004). Applying depression-distortion hypotheses to the assessment of peer victimization in adolescents. *Journal of Clinical Child and Adolescent Psychology*, *33*, 325–335.

Dishion, T. J., Capaldi, D., Spracklen, K. M., & Li, F. (1995). Peer ecology of male adolescent drug use. *Development and Psychopathology*, *7*, 803–824.

Dishion, T. J., Capaldi, D. M., & Yoerger, K. (1999). Middle childhood antecedents to progressions in male adolescent substance use: An ecological analysis of risk and protection. *Journal of Adolescent Research*, *14*, 175–205.

Dishion, T. J., & Owen, L. D. (2002). A longitudinal analysis of friendships and substance use: Bidirectional influence from adolescence to adulthood. *Developmental Psychology*, *38*, 480–491.

Dishion, T. J., Patterson, G. R., Stoolmiller, M., & Skinner, M. L. (1991). Family, school, and behavioral antecedents to early adolescent involvement with antisocial peers. *Developmental Psychology*, *27*, 172–180.

Dishion, T. J., Spracklen, K. M., Andrews, D. W., & Patterson, G. R. (1996). Deviancy training in male adolescents friendships. *Behavior Therapy*, *27*, 373–390.

Dodge, K. A., Bates, J. E., & Petit, G. S. (1990). Mechanisms in the cycle of violence. *Science*, *250*, 1678–1683.

Edwards, J. R. (1994). The sudy of congruence in organizational behavior research: Critique and a proposed alternative. *Organizational Behavior and Human Decision Processes*, *58*, 51–100.

Ennett, S. T., & Bauman, K. E. (1994). The contribution of influence and selection to adolescent peer group homogeneity: The case of adolescent cigarette smoking. *Journal of Personality and Social Psychology*, *67*, 653–663.

Felson, R. B. (1985). Reflected appraisal and the development of self. *Social Psychology Quarterly*, *48*(1), 71–78.

Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson.

Fischer, L. A., & Bauman, K. E. (1988). Influence and selection in the friend-adolescent relationship: Findings from studies of adolescent smoking and drinking. *Journal of Applied Social Psychology*, *18*, 289–314.

Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). New York: McGraw-Hill.

Fromme, K., & Ruela, A. (1994). Mediators and moderators of young adults' drinking. *Addiction*, *89,* 63–71.

Furman, W. (1998). The measurement of friendship perceptions: Conceptual and methodological issues. In W. M. Bukowski, A. F. Newcomb, & W. W. Hartup (Eds.), *The company they keep: Friendship in childhood and adolescence* (pp. 41–65). New York: Cambridge University Press.

Gilovich, T. (1991). *How we know what isn't so: The fallibility of human reason in everyday life*. New York: Free Press.

Graham, J. W., Marks, G., & Hansen, W. B. (1991). Social influence processes affecting adolescent substance use. *Journal of Applied Psychology*, *76,* 291–298.

Harter, S., Stocker, C., & Robinson, N. S. (1996). The perceived directionality of the link between approval and self-worth: The liabilities of a looking glass self-orientation among young adolescents. *Journal of Research on Adolescence*, *6,* 285–308.

Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112,* 64–105.

Hogue, A., & Steinberg, L. (1995). Homophily of internalized distress in adolescent peer groups. *Developmental Psychology*, *31*(6), 897–906.

Holmbeck, G. N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology*, *27,* 87–96.

Hughes, J. N., Cavell, T. A., & Grossman, P. A. (1997). A positive view of self: Risk of protection for aggressive children? *Development & Psychopathology, 9,* 75–94.

Iannotti, R. J., & Bush, P. J. (1992). Perceived vs. actual friends' use of alcohol, cigarettes marijuana, and cocaine: Which has the most influence? *Journal of Youth and Adolescence*, *21,* 375–389.

Kandel, D. B. (1978). Homophily, selection, and socialization in adolescent friendships. *American Journal of Sociology*, *84,* 427–436.

Kandel, D. B. (1996). The parental and peer contexts of adolescent deviance: An algebra of interpersonal influences. *Journal of Drug Issues*, *26,* 289–316.

Keenan, K., Loeber, R., Zhang, Q., Stouthamer-Loeber, M., & Van Kammen, W. B. (1995). The influence of deviant peers on the development of boys' disruptive and delinquent behavior: A temporal analysis. *Development and Psychopathology, 7,* 715–726.

Kiesner, J., Poulin, F., & Nicotra, E. (2003). Peer relations across contexts: Individual-network homophily and network inclusion in and after school. *Child Development*, *74,* 1328–1343.

Kobus, K. (2003). Peers and adolescent smoking. *Addiction*, *98S,* 37–55.

La Greca, A. M., Prinstein, M. J., & Fetter, M. D. (2001). Adolescent peer crowd affiliation: Linkages with health-risk behaviors and close friendships. *Journal of Pediatric Psychology*, *26,* 131–143.

MacDonald, C. D., & Cohen, R. (1995). Children's awareness of which peers like them and which peers dislike them. *Social Development*, *4,* 182–193.

Marks, G., Graham, J. W., & Hansen, W. B. (1992). Social projection and social conformity in adolescent alcohol use: A longitudinal analysis. *Personality and Social Psychology Bulletin, 18,* 96–101.

Marks, G., & Miller, N. (1987). Ten years of research on the false-consensus effect: An empirical and theoretical review. *Psychological Bulletin, 102,* 72–90.

McGrath, E. P., & Repetti, R. L. (2002). A longitudinal study of children's depressive symptoms, self-perceptions, and cognitive distortions about the self. *Journal of Abnormal Psychology*, *111,* 77–87.

Miller, D. T., & McFarland, C. (1991). Plurastic ignorance: When similarity is interpreted as dissimilarity. *Journal of Personality and Social Psychology, 53,* 298–305.

Miller, D. T., & Prentice, D. A. (1994). Collective errors and errors about the collective. *Personality and Social Psychology Bulletin, 20,* 541–550.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. *Psychological Review, 100,* 674–701.

Mullen, B., Atkins, J. L., Champion, D. S., Edwards, C., Hardy, D., Story, J. E., et al. (1985). The false consensus effect: A meta-analysis of 115 hypothesis tests. *Journal of Experimental Social Psychology*, *21,* 262–283.

Orive, R. (1988). Social projection and social comparison of opinions. *Journal of Personality and Social Psychology*, *54,* 953–964.

Paetsch, J. J., & Bertrand, L. D. (1997). The relationship between peer, social, and school factors, and delinquency among youth. *Journal of School Health, 67,* 27–32.

Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology*, *29,* 611–621.

Paxton, S. J., Schutz, H. K., Wertheim, E. H., & Muir, S. L. (1999). Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. *Journal of Abnormal Psychology*, *108,* 255–266.

Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology*, *64,* 243–256.

Prinstein, M. J. (in press). Assessment of adolescents' preference- and reputation-based popularity using sociometric experts. *Social Development*.

Prinstein, M. J., Boergers, J., & Spirito, A. (2001). Adolescents' and their friends' health-risk behavior: Factors that alter or add to peer influence. *Journal of Pediatric Psychology*, *26,* 287–298.

Prinstein, M. J., & Cillessen, A. H. N. (2003). Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merrill-Palmer Quarterly, 49,* 310–342.

Prinstein, M. J., & La Greca, A. M. (2004). Childhood peer rejection and aggression as predictors of adolescent girls' externalizing and health risk behaviors: A six year longitudinal study. *Journal of Consulting and Clinical Psychology, 72,* 103–112.

Prinstein, M. J., Meade, C. S., & Cohen, G. L. (2003). Adolescent oral sex, peer popularity, and perceptions of best friends's sexual behavior. *Journal of Pediatric Psychology, 28,* 243–249.

Rogosa, D., Brandt, D., & Zimowski, M. (1982). A growth curve approach to the measurement of change. *Psychological Bulletin*, *92,* 726–748.

Ross, L. D., Amabile, T. M., & Steinmetz, J. L. (1977). Social roles, social control, and biases in social-perception processes. *Journal of Personality and Social Psychology*, *35,* 485–494.

Ross, L., Greene, D., & House, P. (1977). The false consensus effect: An egocentric bias in social perception and attribution processes. *Journal of Experimental Social Psychology, 13,* 279–301.

Rudolph, K. D., & Clark, A. G. (2001). Conceptions of relationships in children with depressive and aggressive symptoms: Social-cognitive distortion or reality? *Journal of Abnormal Child Psychology*, *29,* 41–56.

Schroeder, C. M., & Prentice, D. A. (1998). Exposing pluralistic ignorance to reduce alcohol use among college students. *Journal of Applied Social Psychology, 28,* 2150–2180.

Sherman, S. J., Presson, C. C., Chassin, L., Corty, E., & Olshavsky, R. (1983). The false consensus effect in estimates of smoking prevalence: Underlying mechanisms. *Personality and Social Psychology Bulletin, 9,* 445–459.

Simons-Morton, B., Haynie, D. L., Crump, A. D., Eitel, P., & Saylor, K. E. (2001). Peer and parent influences on smoking and drinking among early adolescents. *Health Education & Behavior*, *28,* 95–107.

Steinberg, L. D., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. *Child Development*, *57,* 841–851.

Stevens, E. A., & Prinstein, M. J. (2005). Peer contagion of depressogenic attributional styles among adolescents: A longitudinal study. *Journal of Abnormal Child Psychology, 33,* 25–38.

Suls, J., & Green, P. (2003). Pluralistic ignorance and college student perceptions of gender-specific alcohol norms. *Health Psychology*, *22,* 479–486.

Urberg, K. A., Cheng, C., & Shyu, S. (1991). Grade changes in peer influence on adolescent cigarette smoking: A comparison on two measures. *Addictive Behaviors*, *16,* 21–28.

Urberg, K. A., Degirmencioglu, S. M., & Pilgrim, C. (1997). Close friend and group influence on adolescent cigarette smoking and alcohol use. *Developmental Psychology*, *33,* 834–844.

Urberg, K. A., Shyu, S., & Liang, J. (1990). Peer influence in adolescent cigarette smoking. *Addictive Behaviors*, *15,* 247–255.

Vitaro, F., Tremblay, R. E., Kerr, M., Pagani, L., & Bukowski, W. M. (1997). Disruptiveness, friends' characteristics, and delinquency in early adolescence: A test of two competing models of development. *Child Development*, *68,* 676–689.

Wang, M. Q., Eddy, J. M., & Fitzhugh, E. C. (2000). Smoking acquisition: Peer influence and self-selection. *Psychological Reports*, *86,* 1241–1246.

Whitley, B. E. (1998). False consensus on sexual behavior among college women: Comparison of four theoretical explanations. *Journal of Sex Research*, *35,* 206–214.

Wills, T. A., and Cleary, S. D. (1999). Peer and adolescent substance use among 6th–9th graders: Latent growth analyses of influence versus selection mechanisms. *Health Psychology*, *18,* 453–463.

Wilcox, S., & Udry, R. (1986). Autism and accuracy in adolescent perceptions of friends' sexual attitudes and behavior. *Journal of Applied Sociology*, *16,* 361–374.

Zakriski, A. L., & Coie, J. D. (1996). A comparison of aggressive-rejected and nonaggressive-rejected children's interpretation of self-directed and other-directed rejection. *Child Development*, *67,* 1048–1070.