



Published in final edited form as:

*J Youth Adolesc.* 2015 December ; 44(12): 2197–2210. doi:10.1007/s10964-015-0373-2.

## Peer Influence, Peer Status, and Prosocial Behavior: An Experimental Investigation of Peer Socialization of Adolescents' Intentions to Volunteer

Sophia Choukas-Bradley<sup>1</sup>, Matteo Giletta<sup>2</sup>, Geoffrey L. Cohen<sup>3</sup>, and Mitchell J. Prinstein<sup>1</sup>

<sup>1</sup>Department of Psychology, University of North Carolina at Chapel Hill, Davie Hall, Campus Box 3270, Chapel Hill, NC 27599-3270, USA <sup>2</sup>Department of Developmental Psychology, Tilburg University, P.O. Box 90153, 5000 LE Tilburg, The Netherlands <sup>3</sup>Department of Psychology, Stanford University, Jordan Hall, Building 01-420, 450 Serra Mall, Stanford, CA 94305, USA

### Abstract

Peer influence processes have been documented extensively for a wide range of maladaptive adolescent behaviors. However, peer socialization is not inherently deleterious, and little is known about whether adolescents influence each other's prosocial behaviors, or whether some peers are more influential than others towards positive youth outcomes. This study addressed these questions using an experimental "chat room" paradigm to examine in vivo peer influence of prosocial behavior endorsement. A school-based sample of 304 early adolescents (55 % female, 45 % male;  $M_{age} = 12.68$ ) believed they were interacting electronically with same-gender grademates (i.e., "e-confederates"), whose peer status was experimentally manipulated. The participants' intent to engage in prosocial behaviors was measured pre-experiment and in subsequent "public" and "private" experimental sessions. Overall, the adolescents conformed to the e-confederates' prosocial responses in public; yet, these peer influence effects were moderated by the peer status of the e-confederates, such that youth more strongly conformed to the high-status e-confederates than to the low-status ones. There also was some evidence that these peer influence effects were maintained in the private session, indicating potential internalization of prosocial peer norms. These findings help bridge the positive youth development and peer influence literatures, with potential implications for campaigns to increase prosocial behaviors.

---

Correspondence to: Sophia Choukas-Bradley; Mitchell J. Prinstein.

**Author Contributions** SCB participated in the coordination of the study and drafted the manuscript; MG participated in the coordination of the study, performed the statistical analyses, and participated in manuscript preparation; GLC was co-PI on the grant that funded the study and helped to design the study; MJP was PI on the grant that funded the study, participated in manuscript preparation, and led all aspects of the study design and coordination. All authors read and approved the final manuscript.

**Ethical Declarations** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Conflicts of interest** The authors declare that they have no conflicts of interest.

Copyright of Journal of Youth & Adolescence is the property of Springer Science & Business Media B.V. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.

## Keywords

Peer influence; Prosocial behavior; Positive youth development; Peer status; Popularity; Adolescence

---

## Introduction

One of the most consistent, robust findings in the youth development literature regards the similarity in attitudes and behaviors among adolescents and their friends. Many studies from developmental, health, and social psychology—as well as economics, political science, and marketing—suggest not only that youth desire to affiliate with peers with similar interests, but also that these peer relationships provide a rich context for the socialization of behaviors. A vast literature indicates that one of the strongest predictors of adolescents' engagement in deviant or criminal behavior, aggression, health risk behavior (e.g., substance use, sexual risk behavior, weight-related behavior), and even self-injury, is engagement in similar behaviors among adolescents' peers (see Brechwald and Prinstein 2011). Prevention scientists interested in reducing maladaptive youth outcomes have increasingly dedicated efforts toward the study of deleterious peer influences.

However, peer influence is not an inherently negative process; it also may be relevant for understanding the adoption of adaptive behaviors. Processes of peer socialization involve adolescents' attunement to social norms, attention to peer reinforcement, and adoption of peers' valued behaviors. Allen and Antonishak (2008) note that these socialization processes are not necessarily deleterious; in fact, engagement in these processes is “actually very close to being precisely the definition of what it means to be a well-socialized individual” (p. 142). Adolescents' engagement in peer socialization processes in the context of maladaptive *values* promotes risk. However, socialization toward adaptive values can be beneficial for youth development. Unfortunately, this has been studied rarely.

A separate, growing body of research on positive youth development, and within the field of positive psychology more broadly, examines factors that promote positive psychosocial outcomes. Theory and research on positive youth development focus on understanding how youth can effectively navigate the multiple contexts in which they are embedded (e.g., Larson and Tran 2014). This strengths-based body of work suggests that the promotion of adaptive skills and behaviors is important not only for understanding potential protective factors in the context of risk, but also for the realization of multifaceted positive outcomes at the individual, interpersonal, and community levels. Theories of positive youth development highlight the importance of adolescents' adoption of values and behaviors that promote and foster the development of positive self-concepts (e.g., a sense of self-efficacy and self-regulation), positive interpersonal relationships (e.g., altruistic, empathic, and cooperative values and behaviors), and positive standing in and contributions to the broader community (e.g., civic engagement, including volunteering and community service behaviors; school achievement; preparation for adult roles; e.g., Larson and Tran 2014). Although the primary focus of prior peer influence research has been the study of risk and maladjustment, peers also are likely instrumental in positive youth development outcomes.

Indeed, the results from prior peer influence studies offer promising evidence to suggest that peers may influence adolescents towards positive outcomes, including a range of prosocial and adaptive behaviors. Much of this research has examined youth's perceptions of their peers' adaptive attitudes and behavior as concurrent or prospective predictors of adolescents' own behavior. For instance, several studies have suggested that youth's perceptions of their peers' academic achievement, engagement, and motivation are associated with youth's own adaptive academic outcomes, both concurrently (e.g., Lynch et al. 2013) and over time (e.g., Altermatt and Pomerantz 2005). Preliminary research also has suggested that children and adolescents are more likely to engage in prosocial behavior—including altruistic, cooperative, helping, sharing, and community service behaviors—if they have friends who value or demonstrate these same behaviors. For example, studies have found concurrent associations between adolescents' perceptions of their friends' volunteering behaviors and their own self-reported volunteering behaviors in China (Law et al. 2013) and the Netherlands (van Goethem et al. 2014). Additionally, prior work has revealed associations between perceived prosocial peer group norms and youth's own self-reported prosocial behaviors among US preadolescents and early adolescents (Masten et al. 2009). Extant longitudinal studies also have found evidence of peer influence of prosocial behavior over time. For instance, a study of US adolescents found that participants' reports of their friends' prosocial behaviors were associated over time with adolescents' own sociometrically rated prosocial behaviors 1 year later, via their own goal pursuit (Barry and Wentzel 2006). A study of US preadolescents using stochastic actor-based models found evidence for the socialization of adolescents' socio-metrically rated prosocial behaviors within friendship networks from the beginning to the end of a school year (Logis et al. 2013). Additionally, in a short-term longitudinal study of Canadian preadolescents and early adolescents, in peer groups with high group centrality (a measure of groups' social status), evidence of peer group influence of sociometrically rated prosocial behavior was found over a three-month period; prosocial peer influence was not found within peer groups low in centrality (Ellis and Zarbatany 2007).

Despite analytical advances in disentangling selection and socialization effects in correlational studies (e.g., stochastic actor-based modeling; Snijders et al. 2010), experimental research still represents the most valid approach to estimating socialization effects, and remains the only method that permits causal inferences (see de Castro et al. 2015). However, to date, such research remains rare—for adolescent behavior broadly speaking, and especially for prosocial behavior—perhaps in part due to the perceived difficulties involved in creating ecologically valid experimental contexts (see de Castro et al. 2015). That said, prior studies have experimentally examined *in vivo* peer influence processes for maladaptive behaviors. For example, Steinberg and colleagues have found that adolescents increase their risk-taking behaviors in a driving video game task when in the presence of peers (e.g., Gardner and Steinberg 2005). Additionally, Prinstein and colleagues have found that adolescents increase their maladaptive responses to hypothetical scenarios involving deviant and health-risk behaviors, after being exposed to the risky responses of experimentally-manipulated “peers” in a simulated Internet “chat room” (e.g., Cohen and Prinstein 2006). Only one recent study has employed an experimental paradigm (i.e., social dilemma task) to examine peer influence effects in relation to prosocial behaviors (van

Hoorn et al. 2014). The findings from that study showed that, when playing an online game, adolescents were more likely to endorse prosocial behaviors (i.e., donate more tokens to a peer group rather than keep the tokens for themselves) when they were exposed to unknown peers who provided prosocial feedback (i.e., approval of prosocial behavior) as compared to antisocial feedback (i.e., approval of pro-self behavior) or no feedback.

One key question that can be addressed through experimental designs is whether specific types of peers may be especially influential on adolescents' prosocial behaviors. Most past work on prosocial peer influence has focused on the influence of adolescents' *friends*, driven by the idea that such close relationships might be particularly influential (Wentzel 2014). Yet, youth may be influenced by a broad range of peers (Brechwald and Prinstein 2011), and recent work suggests that even the mere presence of unknown peers can alter adolescents' behavior (e.g., Weigard et al. 2014), including prosocial behavior (van Hoorn et al. 2014). What most extant peer influence research has neglected, especially in the context of prosocial behavior, is the role of adolescents' peers' social status. In fact, the *high-status* peers in adolescents' school contexts may be especially influential on other youth's behaviors and attitudes (see Sandstrom 2011). Recent studies have demonstrated the influence of peers who are high in social status (e.g., considered popular or well-liked by peers) on other adolescents' behaviors and attitudes, including the endorsement of aggression and health-risk behaviors (Cohen and Prinstein 2006) and longitudinal trajectories of numbers of sexual intercourse partners (Choukas-Bradley et al. 2014). It is currently unclear whether the influence of such peers is restricted to the promotion of *maladaptive* values and behaviors. However, one previously mentioned study examined the characteristics of peer groups and found that the influence of prosocial behaviors was magnified within the peer groups with high centrality (i.e., visibility) in the peer network (Ellis and Zarbatany 2007).

## The Current Study

This study used a rigorous experimental approach to examine the influences of high-status peers on adolescents' endorsement of prosocial behaviors, operationalized as the intention to volunteer for community service projects. Civic engagement, including volunteerism, has been noted as a key aspect of positive youth development (e.g., Eccles and Gootman 2002). Volunteering is commonly examined in studies of adolescent prosocial behavior, and reflects connection with and contribution to one's community. Adolescents' volunteering behaviors are likely influenced by peer norms and influences, given the socially visible nature of such activities and past cross-sectional work revealing associations between peers' volunteering behaviors and adolescents' own volunteering (e.g., van Goethem et al. 2014).

The current study used an experimental "chat room" procedure designed by Cohen and Prinstein (2006), in which adolescents believed they were communicating electronically with high-status or low-status peers from their grade, who in fact were electronic confederates ("e-confederates") endorsing prosocial behaviors. This innovative experimental design allowed for the systematic examination of the study hypotheses under controlled conditions. Given the differences in the structure of the chat room conditions for boys versus girls (discussed below), the effects were estimated separately by gender.

In both the high-status and low-status peer chat room conditions, the participants watched their ostensible “peers” (i.e., the e-confederates) endorse prosocial responses to hypothetical scenarios shown in the chat room; participants had responded to these same hypothetical scenarios before participation in the chat room. If participants increased in their prosocial endorsements after being exposed to the e-confederates’ prosocial responses, this indicated public conformity (i.e., peer influence or socialization of prosocial behavior). It was hypothesized that the adolescents would be more strongly influenced by their high-status peers (relative to low-status peers) to endorse prosocial behaviors.

Finally, in addition to testing adolescents’ *public* conformity, the experimental design permitted the examination of adolescents’ *private* acceptance of prosocial attitudes after observing peers’ responses. More specifically, in some assessments the participants were led to believe their peers could view their responses to hypothetical scenarios (i.e., “public” assessments), and in other assessments, participants responded to the same hypothetical scenarios once they were ostensibly “logged-off” the public chat room (i.e., “private” assessments). If the adolescents continued to show an adoption of prosocial attitudes once they believed their peers could no longer see their responses, this indicated an internalization of socialized norms. Adolescents’ public endorsement of behavior and private internalization of norms are important and distinct outcomes to consider (see Cohen and Prinstein 2006). Youth are likely to participate in volunteering projects in a public and social context—suggesting the ecological validity of the public chat room assessment—while the adoption of private attitudes may be a strong predictor of more enduring behavior. It was hypothesized that adolescents would show both higher public conformity, and greater internalization of norms, in response to their high-status (versus low-status) peers’ endorsement of prosocial behavior.

## Methods

### Participants

The participants were 304 adolescents (54.6 % female;  $M_{\text{age}} = 12.68$  years;  $SD = .56$ ) at two rural, low-income middle schools in the southeastern United States. The sample was ethnically heterogeneous (42.6 % Caucasian, 29.4 % African American, 24.3 % Hispanic/Latino, 3.7 % Other). Approximately 67 % of students in the school district were eligible for free or reduced-price lunch, according to school records. The participants in this study were enrolled in a project examining peer influences on adolescents’ risk behaviors and wellbeing. All students in seventh and eighth grade from three schools in a single county ( $n = 1463$ ) were recruited for participation in the overarching project, with the exception of students in self-contained special education classes who would not have regular access to the larger peer group. A letter of consent was distributed to each adolescent’s family with an option for parents to grant or deny consent. Numerous adolescent-, teacher-, and school-based incentives were used to ensure the return of consent forms (e.g., a \$10 gift card was given to each student who returned the form, regardless of whether it provided or denied consent to participate). The consent forms were returned by 82.4 % of families ( $n = 1205$ ); of these, 74.7 % of parents gave consent for their child’s participation ( $n = 900$ ). Of these 900 students, data were unavailable for 32 students (due to moving away from the area,

withdrawing from school, school absence, or declining participation), yielding a baseline sample of 868 adolescents for the overarching project (54.5 % girls, ages 12–15).

Because the experimental paradigm used in this study was a highly time-consuming procedure involving deceptive elements, for feasibility, only seventh graders from two of the three schools ( $n = 350$ ) were selected to participate in the chat room paradigm.<sup>1</sup> Of those 350 students, 324 participated (24 were no longer enrolled in the school by the time of the assessment; 2 were absent) and complete data were available for a total of 304 adolescents (7 were excluded due to special chat room conditions; 13 were lost due to technical difficulties or incomplete data). Because only 13 participants had missing data, listwise deletion was used (this approach is appropriate when missingness is below 5 %; see Graham 2009).

In comparing the sample who participated in the chat room and the full original sample ( $n = 868$ ), it was revealed that the chat room sample had a higher percentage of African American participants,  $\chi^2(4) = 10.26, p = .04$ ; no significant differences were found based on gender or baseline (i.e., pre-experiment) prosocial scores. Additionally, no significant differences emerged between the seventh graders who participated in the chat room and the seventh graders who did not (all  $ps > .05$ ).

## Procedures

Youth provided assent to participate in the study at baseline. The university human subjects committee approved all study procedures, including the debriefing process. All data were collected in participants' schools using privatizing dividers. The participants were compensated with gift cards totaling \$30 for participation in the assessments described in this study. Adolescents completed a sociometric assessment, as well as self-report questionnaires measuring responses to prosocial hypothetical scenarios, in the late spring of seventh grade. Participation in the chat room assessment occurred in early fall of eighth grade.

## Measures

**Demographic Factors**—Adolescents were asked to report their gender (male or female), age (in whole numbers), and race or ethnicity (African-American/Black, Asian, White/Caucasian [not Latino/a], Hispanic/Latino, Other).

**Sociometric Assessment**—A standard sociometric assessment was conducted with all 350 initial participants in seventh grade at the two selected schools, in order to measure adolescents' peer status (i.e., peer-perceived popularity and likeability) and friendships. The participants were provided with five alphabetized rosters of all students in their grade. The

---

<sup>1</sup>The selection of participants who were in seventh grade at baseline—and the exclusion of those in eighth grade—was necessary, given that the chat room would occur during the start of the following school year. It was crucial for the chat room participants to be enrolled in the same school (and with the same group of grademates) during both the baseline questionnaire data collection and the chat room paradigm phases of the study, and participants who were in eighth grade at baseline had transitioned to high school. Additionally, given the time-intensive nature of the administration of the chat room paradigm, it was not possible to include all three schools; two were selected based on compatible scheduling. Importantly, there were no significant differences in student characteristics across the three schools (with regard to gender, ethnicity, or SES).



order of alphabetized names was counterbalanced to control for possible order effects. On two of these rosters, participants nominated an unlimited number of peers who were “most popular” and “least popular,” respectively. A sum of the number of nominations each adolescent received was computed and standardized within grade. As is customary, a difference score between standardized “most popular” and “least popular” nominations was computed and restandardized to obtain a measure of peer-perceived popularity, with higher scores indicating greater popularity among peers (e.g., Prinstein and Cillessen 2003). The adolescents also nominated an unlimited number of peers whom they “like the most” and “like the least,” with the ultimate standardized difference score reflecting likeability among peers (Coie and Dodge 1983). On a fifth roster, participants selected an unlimited number of students who were their “closest friends” and then, from this selection, specified a “very best friend” and two additional “best friends.” Sociometric nomination procedures are widely accepted as the most reliable and valid measures of peer status and friendship nominations (see Rubin et al. 2009). In the current study, these sociometric peer status and friendship nominations were not used directly in the primary analyses; rather, these data were used in the construction of the experimental paradigm—specifically, as described below, to create e-confederates with different levels of implied peer status.

**Hypothetical Scenarios**—Three hypothetical scenarios, adapted from previous work demonstrating the reliability and validity of hypothetical scenarios regarding health risk and deviant behaviors (e.g., Prinstein et al. 2011), were used to assess adolescents’ endorsement of prosocial behaviors—specifically, reflecting civic engagement in the form of volunteering. These scenarios were developed in collaboration with focus groups of middle school students, and they depicted hypothetical situations in which adolescents were asked how likely they would be to volunteer to (a) help raise money for a community center through participation in a car wash, (b) tutor at an elementary school, and (c) participate in a new recycling program. Each of these scenarios included language suggesting peer encouragement of these volunteering behaviors (i.e., “a bunch of well-liked kids in your school are helping”; “some of the most popular kids in your school have been talking about how they volunteer”; “a lot of kids in your grade have volunteered”). Each scenario ended with a question about how likely participants would be to volunteer in the situation. The response options were in the form of a 9-point Likert scale and reflected increasing likelihood to engage in prosocial behavior, from 1 = *not at all likely* to 9 = *definitely*.

As in prior work (e.g., Cohen and Prinstein 2006), this instrument was used in three ways. First, it was administered to all 350 adolescents selected to participate in the chat room paradigm. The data from this baseline assessment were analyzed to determine the normative (i.e., mean) response to each scenario, within gender. Subsequently, this information was used to define a response, for each scenario, that was “above average” (i.e., +1 *SD*) in its level of prosocial endorsement (see “Experimental Paradigm” section). As described later, these prosocial responses were later attributed to “peers” (i.e., e-confederates) in the context of the chat room paradigm. Second, each of the hypothetical scenarios was again presented during the chat room experiment (in both “public” and “private” assessments); the participants’ responses to the scenarios in this context were used as dependent variables.

Third, the participants' pre-experiment scores on this instrument were included in analyses assessing the effects of the experimental manipulation.

For each participant and within each assessment context (i.e., pre-experiment, public chat room, private chat room), responses to the three prosocial hypothetical scenarios were combined to create a mean score. The internal consistency was good among both boys (Cronbach's  $\alpha$ s = .83 at pre-experiment assessment, .82 at public chat room assessment, .87 at private chat room assessment) and girls (Cronbach's  $\alpha$ s = .78, .78, and .83, respectively).

The prosocial scores at each of the assessments were negatively skewed; therefore, scores were first reversed and subsequently transformed using a square root transformation for use in all main study analyses.

**Experimental Paradigm**—The experimental paradigm simulated an Internet chat room. For a thorough description of this paradigm (e.g., creation of e-confederates, plausibility augmentation, debriefing), see Cohen and Prinstein (2006). The description provided here focuses on aspects of the procedure that are critical to an understanding of the current study.

**Procedures for “Public” Phase of Chat Room:** The participants were told that they would be participating in a study of how teens communicate through the Internet. They were told that for these purposes, they would be communicating electronically, via an Internet chat room, with three same-gender students in their grade who were working on computers in other rooms of the school. In actuality, the three “peers” in each chat room were preprogrammed e-confederates, computer-generated using Direct RT software (Jarvis 2004). The participants were randomly assigned to a high-status or low-status peer condition; the peer status of each e-confederate was manipulated such that adolescents would believe they were interacting with high-status or low-status peers from their school and grade. Specifically, for each e-confederate, peer status was indicated by two types of information provided on chat room screens, and associated with the specific e-confederate's identity: (1) the names of two ostensible “friends” of the e-confederate who were of high or low peer status, and (2) two hobbies associated with high or low peer status. The names of the two ostensible “friends” were in the form of first name and last initial, and were chosen for each specific peer status condition based on the results from the sociometric assessments described earlier (i.e., peer-perceived popularity and likeability). The two hobbies were determined based on focus group input regarding hobbies associated with high- and low-status peers.

Numerous methods were used to increase the plausibility and verisimilitude of the chat room. For example, screens designed by graphic designers mimicked a live Internet chat room, including an image of the researchers' university homepage, animated screens depicting apparent log-in and log-off processes, and screens showing the e-confederates' information being downloaded. Additionally, in order to account for why participants were able to see information about the e-confederates' friends and hobbies, participants were asked to provide this information about themselves before logging into the chat room, ostensibly so that the “peers” in the chat room could get to know each other via this personal information.



After “logging in” and receiving an orientation to the chat room, participants provided responses to the same set of hypothetical scenarios they had completed during the pre-experiment questionnaire-based assessment. These included the three prosocial scenarios used in the current study, as well as other scenarios related to health-risk behaviors, deviance, and aggression. The scenarios appeared one by one on the screen, with e-confederate #1 providing a response, followed by e-confederate #2, e-confederate #3, and finally the real participant. (When receiving instructions about the chat room, each participant had been told that he/she would communicate with peers in a specific order, and that he/she had been randomly selected to respond to all items last.) This procedure ensured that all participants were exposed to the responses of the three e-confederates before providing their own responses to the hypothetical scenarios. In response to the prosocial scenarios, the e-confederates consistently endorsed highly prosocial behavioral responses (i.e., approximately + 1 *SD* above *M* levels established at baseline). However, for verisimilitude, the responses from e-confederate to e-confederate and from item to item varied slightly, and pauses between e-confederates’ responses suggested that the participant’s peers’ were considering their responses. For each hypothetical scenario, after viewing the three e-confederates’ highly prosocial responses, participants selected the likelihood that they would engage in the volunteering behavior (1–9 scale discussed above); the participants believed their “peers” (i.e., the e-confederates) could see their responses. These “public” chat room responses to the three prosocial scenarios were used to compute participants’ public chat room scores.

**Procedures for “Private” Phase of Chat Room:** After the participants responded to the hypothetical scenarios while “logged on” to the chat room, they were told that they would “log off” and enter a “private session.” Several screens depicting “log off” and “redirection” processes bolstered the credibility of this shift in context. The participants then responded to the same set of hypothetical scenarios, but were told that in this private session, their fellow chat room members would not be able to view their responses (or vice versa); the participants were shown a screen in which only the scenarios and their own responses were visible. They were told (via computer instructions) that because this was a study about how people communicate online, they would now be answering some of the same questions offline. To reduce any pressure the participants may have felt to provide answers consistent with their previous responses, computerized instructions stated: “Feel free to change your answers, or to give the same answers. Just make sure that whatever answer you give, it captures how you really feel.” The participants’ responses to the three prosocial scenarios in this “private,” “offline” context were used to compute their private chat room scores.

**Gender Differences in Chat Room Construction:** Two differences between the chat room conditions for boys versus girls should be noted, as they necessitated the running of statistical analyses separately by gender. The first issue concerns ethnicity. The friend names that appeared in the girls’ conditions included a mix of adolescents from the three primary ethnic groups of this sample: African American, Latino, and Caucasian. In the boys’ conditions, however, the friend names were only of Caucasian students. Among boys, it was not possible to identify a sufficient number of students from ethnic minority groups who (1) consented to participate, (2) received high peer status ratings, and (3) had identified other

consented, high-status friends of the same ethnicity. Thus, among boys, the decision was made to use only Caucasian e-confederates to minimize potential confounding effects of ethnicity.

The second issue concerns peer status. For boys, it was possible to identify e-confederates who were high in both popularity and likeability (based on sociometric assessments); yet this was not possible for girls. This gender difference is consistent with past work; the correlation between popularity (a reputation-based construct) and likeability (a preference-based construct) has been found to be significantly lower for girls than for boys by late elementary school, and to decrease more steeply among girls from fifth to ninth grade (Cillessen and Mayeux 2004). Although not unexpected, this gender difference precluded the creation of equivalent chat room conditions for girls versus boys. Instead, for boys, two chat room conditions were created—high-popularity/high-likeability and low-popularity/low-likeability (as in past work; Cohen and Prinstein 2006), whereas for girls, because a high-popularity/high-likeability condition was not possible, three conditions were required—high-popularity/low-likeability, low-popularity/high-likeability, and low-popularity/low-likeability. However, for parsimony and ease of comparison with boys' analyses, girls' high-popularity/low-like-ability and low-popularity/high-likeability conditions were combined for the primary analyses, such that girls then had two conditions: high-status (high-popularity/low-likeability and low-popularity/high-likeability) and low-status (low-popularity/low-likeability).

**Manipulation Check:** At the end of the chat room paradigm, the participants completed two measures concerning the peer status of the “peers” with whom they had interacted in the chat room (i.e., the e-confederates). Specifically, they were asked to report on a 7-point Likert scale how popular (1 = one of the least popular, 7 = one of the most popular) and how liked (1 = one of the least liked, 7 = one of the most liked) each “peer” was within their grade. Subsequently, the participants' responses for the three e-confederates were averaged to create an overall measure of adolescents' perceptions of the e-confederates' popularity and likeability, separately for boys (Cronbach's  $\alpha$ s = .85 and .89 for popularity and likeability, respectively) and girls (Cronbach's  $\alpha$ s = .62 and .69 for popularity and likeability, respectively). These measures were used to ensure that the manipulation of peer status was successful.

**Debriefing Procedures:** All adolescents were thoroughly debriefed after all students had completed the experimental paradigm (in order to minimize the chances of diffusion), using a “funnel” procedure approved by the human subjects committee. The participants were asked first to report general impressions of the study, followed by more specific questions about their “peers” in the chat room and the perceived purpose of the study. Next, the participants were provided with an explanation of the deceptive elements of the study protocol, including that the participants had communicated with e-confederates (not actual peers) and that the e-confederates endorsed responses that differed from the average responses of the sample.

## Data Analyses

Preliminary analyses were conducted to examine mean differences in adolescents' perceptions of the e-confederates' peer status across the two experimental conditions (i.e., high-status vs. low-status e-confederates), separately by gender (i.e., for the manipulation check), as well as gender differences in pre-experiment prosocial behavior intentions. The primary study hypotheses were examined using repeated measures analyses of variance (ANOVAs). Specifically, a 3 (time of assessment)  $\times$  2 (experimental condition) repeated measures ANOVA was conducted separately for boys and girls, in order to examine the mean-level differences in prosocial behavior between the experimental conditions (high-status vs. low-status e-confederates) across the three assessment times (i.e., pre-experiment, public chat room, and private chat room assessments). Three sets of follow-up analyses were conducted to interpret the hypothesized significant interaction effects (i.e., time of assessment by experimental condition). First, independent *t* tests were conducted to compare the average prosocial scores at each of the three assessments between the two experimental conditions. Second, paired *t* tests were conducted separately by experimental condition to examine the within-condition changes in prosocial scores between assessments (e.g., from pre-experiment to public chat room). Finally, between-condition differences in changes in prosocial scores between two consecutive assessments were evaluated, comparing the difference scores via independent *t* tests. Specifically, the difference scores were calculated by subtracting the prosocial responses at the pre-experiment assessment from those at the public chat room assessment, as well as the prosocial responses at the public chat room from those at the private assessment. These difference scores indicate the extent to which participants changed their responses between two consecutive assessments (e.g., from the pre-experiment to the public chat room assessment).

For all analyses, the effect sizes and 95 % confidence intervals (95 % CI) for mean differences are reported in addition to *p* values. For ANOVAs, the effect sizes are presented using partial eta squares ( $\eta_p^2 = .01, .06, .14$  indicating small, medium and large effect sizes, respectively; Cohen, 1988) and for *t* test comparisons, Cohen's *d* are presented ( $d = .2, .5$  and  $.8$ , indicating small, medium, and large effect sizes, respectively; Cohen 1988).

## Results

### Preliminary Analyses

Tables 1 and 2 present the means and standard deviations of the main study variables separately by experimental condition (high-status vs. low-status e-confederates) for boys and girls, respectively. With regard to the manipulation check, as shown in Tables 1 and 2, independent samples *t* tests revealed significant differences in the participants' perceptions of the e-confederates' likeability and popularity between the two experimental conditions. Specifically, both boys and girls in the high-status peer conditions perceived the e-confederates as more liked and popular than participants in the low-status peer conditions. Across all comparisons, large effect sizes were observed (see Tables 1, 2), supporting the validity of the experimental manipulation. No significant gender differences were observed in the pre-experiment prosocial scores.

### Chat Room Results for Boys

A  $3 \times 2$  repeated measures ANOVA was conducted, with the prosocial scores at the three times of assessment (pre-experiment, public chat room, and private chat room assessments; square root transformed) as the within-subjects factor, and the experimental condition (high-status vs. low-status e-confederates) as the between-subjects factor. A significant main effect of time of assessment was revealed, Wilks'  $\lambda = .74$ ;  $F(2, 135) = 24.33$ ,  $p < .001$ ;  $\eta_p^2 = .27$ .

However, this effect was moderated by the experimental condition, Wilks'  $\lambda = .96$ ;  $F(2, 135) = 3.21$ ,  $p < .05$ ;  $\eta_p^2 = .05$ . This interaction effect is depicted in Fig. 1. This non-linear trend for pre-experiment, public chat room, and private chat room assessments necessitated a series of supplemental post hoc analyses in order to fully understand the nature of this significant effect.

Follow-up independent sample  $t$  tests (see Table 1) indicated that, whereas no differences in prosocial scores at pre-experiment were observed between boys in the two conditions, the boys in the high-status peer condition reported significantly higher prosocial scores than the boys in the low-status peer condition at the public as well as the private chat room assessments.

To further examine the significant interaction effect, follow-up paired samples  $t$  tests also were conducted separately for the two experimental conditions. The results indicated that the boys in the high-status peer condition reported more highly prosocial responses at the public chat room assessment than at pre-experiment [ $t(69) = 6.17$ ,  $p < .001$ , 95 % CI (.29, .56),  $d = .85$ ]. Moreover, although prosocial responses decreased from the public to the private chat room assessment [ $t(69) = -3.30$ ,  $p < .01$ , 95 % CI (-.18, -.04),  $d = .24$ ], prosocial responses at the private chat room assessment remained significantly higher than at pre-experiment [ $t(69) = 4.22$ ,  $p < .001$ , 95 % CI (.16, .46),  $d = .55$ ]. The boys in the low-status peer condition also reported more highly prosocial responses at the public chat room assessment than at pre-experiment [ $t(67) = 2.52$ ,  $p < .05$ , 95 % CI (.04, .33),  $d = .34$ ]; however, the prosocial responses decreased from the public to the private chat room assessment [ $t(67) = -2.01$ ,  $p < .05$ , 95 % CI (-.13, .00),  $d = .10$ ], and no significant differences in the prosocial responses were observed between the private chat room assessment and the pre-experiment assessment [ $t(67) = 1.45$ ,  $p = .15$ , 95 % CI (-.04, .28),  $d = .20$ ]. Finally, independent sample  $t$  tests comparing difference scores (see Table 1) revealed significant between-condition differences in changes in prosocial scores, indicating that on average, boys in the high-status condition showed a stronger increase in prosocial scores from the pre-experiment to the public chat room assessment, as compared to boys in the low-status condition.

Overall, these results suggest that boys conformed to their peers' endorsement of prosocial behaviors, and the effects were more powerful among the boys in the high-status peer condition. In the high-status condition, significant conformity was observed not only at the public assessment, but also at the private chat room assessment (see Fig. 1).

### Chat Room Results for Girls

A  $3 \times 2$  repeated measures ANOVA was conducted with prosocial scores at the three times of assessment as the within-subjects factor, and the experimental condition as the between-

subjects factor. As with the boys, a significant main effect of time of assessment was revealed, Wilks'  $\lambda = .70$ ;  $F(2, 163) = 34.29$ ,  $p < .001$ ;  $\eta_p^2 = .30$ , and this effect was moderated by the experimental condition, Wilks'  $\lambda = .95$ ;  $F(2, 163) = 4.41$ ,  $p < .05$ ;  $\eta_p^2 = .05$ . This interaction effect is depicted in Fig. 2. As with the results for boys, a series of supplemental post hoc analyses allowed further examination of this significant non-linear effect from the pre-experiment to the public chat room to the private chat room assessments.

Follow-up independent sample  $t$  tests (see Table 2) revealed no significant differences between the girls' prosocial scores in the high-status versus low-status peer conditions at pre-experiment or in the private chat room condition. However, a non-significant trend was found with regard to prosocial behavior in the public chat room assessment, with the girls in the high-status condition reporting somewhat higher levels of prosocial behavior as compared to the girls in the low-status condition.

Follow-up paired sample  $t$  tests designed to further examine the statistically significant interaction effect indicated that, as compared to the pre-experiment assessment, the girls in the high-status peer condition reported more highly prosocial responses at the public chat room assessment [ $t(111) = 9.10$ ,  $p < .001$ , 95 % CI (.33, .52),  $d = .99$ ] as well as at the private chat room assessment [ $t(111) = 6.73$ ,  $p < .001$ , 95 % CI (.25, .45),  $d = .70$ ]. However, there was a significant decrease from the public to the private assessment [ $t(111) = -2.95$ ,  $p < .01$ , 95 % CI (-.13, -.03),  $d = .18$ ] among those in the high-status condition. The girls in the low-status peer condition also reported more highly prosocial responses at the public chat room assessment than at pre-experiment [ $t(53) = 3.72$ ,  $p < .001$ , 95 % CI (.10, .35),  $d = .48$ ] and at the private chat room assessment than at pre-experiment [ $t(53) = 3.31$ ,  $p < .01$ , 95 % CI (.09, .36),  $d = .46$ ], with no significant decreases from the public to private assessments [ $t(53) = -0.10$ ,  $p = .92$ , 95 % CI (-.06, .06),  $d = .00$ ].<sup>2</sup> More importantly, independent sample  $t$  tests comparing difference scores (see Table 2) revealed significant between-condition differences with regard to changes from the pre-experiment to the public chat room assessment. This effect suggests that, on average, the girls in the high-status condition showed a more pronounced increase in prosocial scores from the pre-experiment to the public chat room assessment, as compared to the girls in the low-status condition. A marginally significant effect emerged when comparing difference scores from the public chat room to the private assessment.

<sup>2</sup>As noted previously, two of the girls' chat room conditions were combined for the primary analyses. However, a highly similar pattern of results was revealed when examining all three conditions separately. Specifically, a  $3 \times 3$  repeated measures ANOVA was conducted, and a significant time of assessment by condition effect was found, Wilks'  $\lambda = .94$ ;  $F(4, 324) = 2.45$ ,  $p = .046$ ;  $\eta_p^2 = .03$ .

To better understand this interaction effect, a series of followup univariate ANOVAs and Tukey's HSD post hoc tests were performed with prosocial behavior at the preexperiment, public chat room, or private chat room assessments as the dependent variable. No differences were observed in prosocial behavior across the three experimental conditions (high-popularity/low-likeability, low-popularity/high-likeability, low-popularity/low-likeability) at pre-experiment or in the private chat room condition. However, marginally significant differences were observed when examining prosocial behavior assessed during the public chat room assessment, ( $F(2) = 2.85$ ,  $p = .06$ ,  $\eta_p^2 = .03$ ). Tukey's HSD post-hoc indicated that during the public chat room assessment, girls in the popular/unliked condition reported (on average) somewhat higher levels of prosocial behavior, as compared to girls in the unpopular/unliked condition (untransformed means:  $M = 8.33$ ,  $SD = 0.94$  vs.  $M = 7.76$ ,  $SD = 1.45$ ;  $p = .05$ ).

Overall, these results suggest that the girls' exposure to high levels of peers' prosocial endorsement increased their prosocial responses at both the public and private assessments. From pre-experiment to the public assessment, the increases were especially strong among the girls in the high-status as compared to the low-status peer condition (see Fig. 2).<sup>3</sup>

## Discussion

Peer socialization of deviant and health-risk behaviors has been well documented in the literature; yet, less is known about the role peers may play in influencing adaptive outcomes. Researchers have noted that peer influence is not inherently deleterious and that, in fact, the tendency to adapt one's own behaviors to match the behaviors of peers is a healthy developmental process (Allen and Antonishak 2008). Nevertheless, far more peer influence studies have focused on maladaptive than on adaptive outcomes (see Brechwald and Prinstein 2011). Additionally, the majority of extant studies on peer influence of prosociality have used correlational designs and/or focused on the role of friends or general "peers," leaving unanswered questions about causality and about which types of peers may be especially influential. The current study tested hypotheses about peer influence of prosocial volunteering behaviors using an experimental paradigm, allowing an examination of whether peers influence adolescents' endorsement of prosocial behaviors, and whether the social status of the influencing peer affects the level of conformity. The adolescents responded to hypothetical scenarios involving the opportunity to engage in volunteering behaviors three times—first when alone, again in a public "Internet chat room" after being exposed to the responses of ostensible "peers" (i.e., "e-confederates") who endorsed prosocial responses, and a third time in private after being exposed to the "peer" responses. The peer status of the e-confederates was systematically manipulated, such that the adolescents were randomly assigned to conditions in which they interacted electronically with "high-status peers" or "low-status peers" who were believed to be same-gender grademates from their school. Overall, both male and female adolescents conformed in "public" to the prosocial responses of their peers in the chat room—in other words, they increased in their prosocial intentions after viewing those of their peers. However, this effect was moderated by the peer status of the e-confederates: Adolescents more strongly conformed to the high-status peers' than the low-status peers' endorsement of prosocial behaviors. Additionally, exposure to peers' prosocial endorsement resulted in higher levels of prosocial responses in the private assessment following the chat room (relative to pre-experiment scores), once the adolescents believed their peers could no longer view their responses (among boys, differences were only significant in the high-status condition). These findings indicate that some of the gains due to peer influence were maintained, and thus that adolescents may have internalized the prosocial norms. Collectively, the results make several important contributions to the literatures on peer influence and positive youth development.

<sup>3</sup>The main study analyses also were conducted while covarying the participants' popularity and likeability. For both the boys and girls, the results from the repeated measures ANOVAs remained unchanged, showing a significant interaction effect between the time of assessment and the experimental condition, for boys, Wilks'  $\lambda = .95$ ;  $F(2, 133) = 3.18$ ,  $p < .05$ ;  $\eta_p^2 = .05$ , and for girls, Wilks'  $\lambda = .95$ ;  $F(2, 161) = 4.67$ ,  $p < .05$ ;  $\eta_p^2 = .06$ .



First, this study provides further support for the role of peers in socializing adolescents' prosocial behaviors, using a rigorous experimental design. Prior correlational work had linked peers' prosocial behaviors and attitudes—including volunteering—with adolescents' own behaviors and attitudes, concurrently (e.g., van Goethem et al. 2014) and over time (e.g., Barry and Wentzel 2006). Consistent with recent experimental work on peer influence of prosocial behavior (van Hoorn et al. 2014), the results of the current study provide support for the role of peers in influencing adolescents' prosocial volunteering behaviors using a rigorous experimental design. Previously, this experimental chat room paradigm had been used to demonstrate peer influence of maladaptive behaviors, including aggression and deviance (Cohen and Prinstein 2006) and weight-related behaviors (Rancourt et al. 2014). Consistent with the idea that peer influence is not inherently negative (Allen and Antonishak 2008), the current study demonstrates that peers also can socialize positive behaviors. Moreover, conformity to peers occurred not only in public, in the presence of ostensible peers, but also in private, once adolescents believed their responses could no longer be viewed by peers; future work will need to examine whether the internalization of prosocial norms is especially predictive of later behaviors.

Second, the results provide further evidence for the especially influential role of *high-status* peers. The vast majority of prior studies on peer influence of both adaptive and maladaptive outcomes has focused on friends, with a few studies focusing on general peers (see Brechwald and Prinstein 2011). Most of this work was built on the assumption that the high levels of intimacy and closeness that characterize friendships, as compared to other types of peer relations, offer a uniquely powerful context for socialization effects. However, much of this research has not taken into account the developmental phenomenon in which adolescents become highly oriented toward and motivated to achieve social status among their peers (e.g., Crone and Dahl 2012). Therefore, high-status peers are likely to play a special role in influencing other adolescents' behaviors. Existing work has provided empirical evidence supporting this hypothesis, with regard to deviant and health risk behaviors (e.g., Cohen and Prinstein 2006). The current study provides evidence that high-status peers also may be influential in the development of prosocial behaviors; conformity was stronger when the e-confederates appeared to be high-status. This finding partially corroborates evidence from one prior short-term longitudinal study in which prosocial peer influence was found only within peer groups with high group centrality—a construct that may indicate the social visibility and popularity of a group (Ellis and Zarbatany 2007). Overall, these findings are consistent with developmental, neurobiological, and psychosocial theories regarding the role of high-status youth in shaping social norms. For example, during puberty, developmental changes involving brain reward circuitry may contribute to adolescents' heightened desire to achieve social status among peers (e.g., Crone and Dahl 2002). Moreover, high-status peers may serve as important “reference groups” during adolescence, and youth may be motivated to conform to the social norms associated with high-status peers in order to align themselves with these reference groups, and perhaps to receive social rewards in the form of increases in their own social status (Brechwald and Prinstein 2011). Thus, if behaviors are associated with high-status peer prototypes or are perceived to be common among high-status peers, other adolescents may be more likely to engage in those behaviors (Gibbons et al. 2008).

Third, and perhaps most importantly, the findings of the current study have significant implications for a broader understanding of positive youth development. Whereas past research examining adolescents' problem behaviors has raised concerns about the special and problematic influence of high-status peers (see Sandstrom 2011), the current findings highlight a potential new and exciting avenue for research on how high-status peers might be involved in campaigns to increase positive behavior. For instance, perhaps interventions targeting high-status adolescents could indirectly influence the prosocial attitudes and behaviors of the wider student body. Specifically, campaigns to engage high-status youth in higher levels of prosocial behavior (e.g., community service projects) could change the social norms associated with prosociality, thereby indirectly contributing to the positive youth development outcomes for a broader network of adolescents. Additionally, the use of peer leaders has been demonstrated to be effective in efforts to change social norms regarding maladaptive behaviors (e.g., sexual risk behaviors; see Pedlow and Carey 2004), and such efforts may also be beneficial in improving prosocial attitudes and behaviors; the use of high-status peer leaders may be especially effective. Finally, some of the observed changes in prosociality were maintained following the chat room, when youth believed their peers could no longer view their responses—but effects were stronger when adolescents believed their peers could view their responses. These findings indicate the value of bringing adolescents together to participate with peers on community service projects.

This study provides an important investigation of whether prosocial attitudes are adopted by adolescents in a controlled experimental context, operationalized as adolescents' endorsement of prosocial responses to hypothetical scenarios involving volunteering. However, several limitations and directions for future work should be noted. The findings may not generalize to real-world contexts, and the socialization of actual behaviors will need to be examined (e.g., whether adolescents are more likely to actually volunteer following the chat room manipulation); these questions could be examined within future laboratory studies (e.g., with tasks in which adolescents have the opportunity to behave prosocially). The current study aimed to understand between-group differences in prosocial endorsement, comparing adolescents who were randomly assigned to conditions in which they interacted with high-status versus low-status "peers." An important direction for future research will be to examine individual differences in susceptibility to peer influence regarding prosocial behavior as predictors of longitudinal behaviors, as has previously been examined with regard to deviant behaviors over time (Prinstein et al. 2011) and trajectories of numbers of sexual partners (Choukas-Bradley et al. 2014). The results also must be interpreted in light of specific characteristics of the sample, and aspects of the experimental paradigm construction. Specifically, this study focused on early adolescents in a rural school context, and the findings will need to be replicated in samples of younger children and older adolescents, as well as in a broader range of contexts. Additionally, although this study included an ethnically diverse sample, power was insufficient to test interactions by ethnic groups, and the inability to create parallel chat room conditions for boys and girls precluded a meaningful examination of ethnic differences. Furthermore, because it was not possible to create parallel chat room conditions, gender moderation could not be tested. In this regard, it should be noted that the results from the manipulation check indicated that the construction of chat room conditions was not as "clean" for the girls as for the boys; within the chat room

conditions, the girls' perceptions of the three e-confederates' popularity and likeability (respectively) were not as highly correlated with one another, as compared to boys' perceptions. It is possible that this methodological limitation may help explain why the pattern of results appeared generally stronger among boys. The roles of gender and ethnicity in prosocial peer socialization remain important areas for future research. Future work also will need to disentangle the influence of different types of high-status peers on other adolescents' prosocial behaviors, especially among girls, for whom the correlation between likeability and popularity is especially low by adolescence (see Cillessen and Mayeux 2004). Theory regarding the role of popular peers as reference groups suggests that adolescents high in peer-perceived popularity may be especially influential on the broad network of peers, and this idea has been supported for risky behaviors (see Sandstrom 2011) but will need to be examined empirically for prosocial behaviors. Finally, future work using this experimental paradigm should include a condition in which the e-confederates are of average peer status, to serve as a control group in the examination of the effects of peers' social status on adolescents' conformity.

## Conclusion

Overall, the findings underscore the important role of peers—and especially high-status peers—in the socialization of adolescents' prosocial behaviors. The results help bridge gaps between the positive youth development and peer influence literatures, and suggest that a sole focus on deleterious influences may fail to fully capture the role of peers in adolescent development. More specifically, this study used a rigorous experimental design to demonstrate that prosocial responses can be socialized in vivo through exposure to prosocial peer norms. The first main finding was that adolescents on average provided more strongly prosocial responses to hypothetical volunteering situations after viewing the prosocial endorsements of their "peers" (i.e., e-confederates in a simulated chat room). Additionally, there was some evidence that the conformity effects were maintained following the chat room (in the high-status condition for boys, and in both conditions for girls), when the adolescents believed their peers could no longer view their responses, suggesting that peer norms may be influential on adolescents' prosocial behaviors even when they are not in the direct presence of peers – but effects were strongest when the participants believed their peers could see their responses. Finally, this study provides empirical evidence that high-status peers may be especially influential on other adolescents' prosocial behaviors, as had previously been documented for risk behaviors (e.g., Cohen and Prinstein 2006); the participants conformed more strongly to the prosocial norms when they believed they were interacting with high-status peers. The results indicate the potential value of prevention and intervention efforts that use high-status peer leaders and renorming campaigns to increase adolescents' prosocial behaviors.

## Acknowledgments

This work was supported in part by National Institutes of Health Grant R01-HD055342 awarded to the fourth author. Additional support was provided by the University of North Carolina at Chapel Hill Center for AIDS Research Developmental and Social and Behavioral Sciences Research cores (P30 AI50410).

## Biographies

**Sophia Choukas-Bradley, M.A.** is a doctoral candidate in clinical psychology at the University of North Carolina at Chapel Hill. Her research focuses primarily on the roles of interpersonal factors, media influences, and gender in adolescents' and young adults' health risk behaviors, mental health, and wellbeing.

**Matteo Giletta** is an Assistant Professor at Tilburg University. He received a joint Ph.D. in behavioral science and developmental psychology at the Radboud University Nijmegen (the Netherlands) and University of Turin (Italy). His research focuses on investigating how peer relations affect adolescent development. He is particularly interested in examining the interplay between peer relations and biological responses to stress.

**Geoffrey L. Cohen, Ph.D.** is the James G. March Professor of Organizational Studies in Education and Business, and Professor in the Department of Psychology at Stanford University. He received his Ph.D. in psychology from Stanford University. His research examines processes related to identity maintenance and their implications for social problems and interventions to address them.

**Mitchell J. Prinstein, Ph.D.** is the John Van Seters Distinguished Professor of Psychology and Neuroscience, in the clinical psychology program of the University of North Carolina at Chapel Hill. He received his Ph.D. in clinical psychology from the University of Miami. His research uses a developmental psychopathology framework to understand how adolescents' interpersonal experiences, particularly among peers, are associated with depression, self-injury, and health risk behaviors.

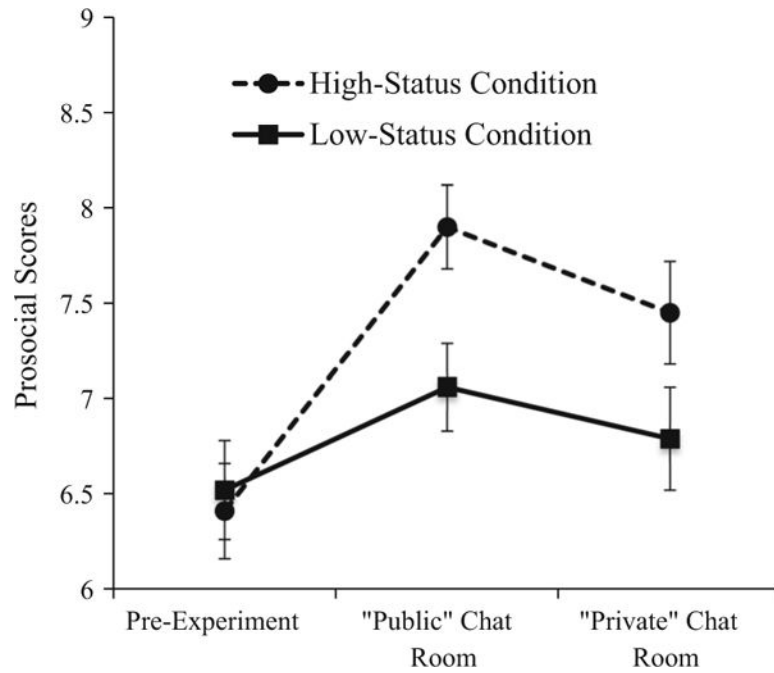
## References

- Allen, JP., Antonishak, J. Adolescent peer influences: Beyond the dark side. In: Prinstein, MJ., Dodge, KA., editors. *Understanding peer influence in children and adolescents*. New York: Guilford Press; 2008. p. 141-160.
- Altermatt E, Pomerantz EM. The implications of having high-achieving versus low-achieving friends: A longitudinal analysis. *Social Development*. 2005; 14(1):61–81.
- Barry C, Wentzel KR. Friend influence on prosocial behavior: The role of motivational factors and friendship characteristics. *Developmental Psychology*. 2006; 42(1):153–163. [PubMed: 16420125]
- Brechwald WA, Prinstein MJ. Beyond homophily: A decade of advances in understanding peer influence processes. *Journal of Research on Adolescence*. 2011; 21(1):166–179. [PubMed: 23730122]
- Choukas-Bradley S, Giletta M, Widman L, Cohen GL, Prinstein MJ. Experimentally measured susceptibility to peer influence and adolescent sexual behavior trajectories: A preliminary study. *Developmental Psychology*. 2014; 50(9):2221–2227. [PubMed: 24999763]
- Cillessen A, Mayeux L. From censure to reinforcement: Developmental changes in the association between aggression and social status. *Child Development*. 2004; 75(1):147–163. [PubMed: 15015681]
- Cohen, J. *Statistical power analysis for the behavioral sciences*. New York, NY: Academic Press; 1988. (Rev ed.)
- Cohen GL, Prinstein MJ. Peer contagion of aggression and health-risk behavior among adolescent males: An experimental investigation of effects on public conduct and private attitudes. *Child Development*. 2006; 77:967–983. [PubMed: 16942500]

- Coie J, Dodge K. Continuities and changes in children's social status: A five-year longitudinal study. *Merrill-Palmer Quarterly*. 1983; 29(3):261–282.
- Crone EA, Dahl RE. Understanding adolescence as a period of social–affective engagement and goal flexibility. *Nature Reviews Neuroscience*. 2012; 13(9):636–650. [PubMed: 22903221]
- de Castro BO, Thomaes S, Reijntjes A. Using experimental designs to understand the development of peer relations. *Journal of Research on Adolescence*. 2015; 25(1):1–13.
- Eccles, J., Gootman, J. Community programs to promote youth development. Washington, DC: Committee on Community-Level Programs for Youth Board on Children, Youth, and Families, National Research Council and Institute of Medicine; 2002.
- Ellis WE, Zarbatany L. Peer group status as a moderator of group influence on children's deviant, aggressive, and prosocial behavior. *Child Development*. 2007; 78(4):1240–1254. [PubMed: 17650136]
- Gardner M, Steinberg L. Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology*. 2005; 41(4):625–635. [PubMed: 16060809]
- Gibbons, FX., Pomery, EA., Gerrard, M. Cognitive social influence: Moderation, mediation, modification, and... The media. In: Prinstein, MJ., Dodge, KA., editors. *Understanding peer influence in children and adolescents*. New York, NY: Guilford Press; 2008. p. 45-71.
- Graham JW. Missing data analysis: Making it work in the real world. *Annual Review of Psychology*. 2009; 60:549–576.
- Jarvis, B. DirectRT [Computer software]. New York, NY: Empirisoft Corp; 2004.
- Larson RW, Tran SP. Invited commentary: Positive youth development and human complexity. *Journal of Youth and Adolescence*. 2014; 43(6):1012–1017. [PubMed: 24777648]
- Law BF, Shek DL, Ma CS. Validation of family, school, and peer influence on volunteerism scale among adolescents. *Research on Social Work Practice*. 2013; 23(4):458–466.
- Logis HA, Rodkin PC, Gest SD, Ahn H. Popularity as an organizing factor of preadolescent friendship networks: Beyond prosocial and aggressive behavior. *Journal of Research on Adolescence*. 2013; 23(3):413–423.
- Lynch A, Lerner RM, Leventhal T. Adolescent academic achievement and school engagement: An examination of the role of school-wide peer culture. *Journal of Youth and Adolescence*. 2013; 42(1):6–19. [PubMed: 23076767]
- Masten CL, Juvonen J, Spatzier A. Relative importance of parents and peers: Differences in academic and social behaviors at three grade levels spanning late childhood and early adolescence. *The Journal of Early Adolescence*. 2009; 29(6):773–799.
- Pedlow CT, Carey MP. Developmentally appropriate sexual risk reduction interventions for adolescents: Rationale, review of interventions, and recommendations for research and practice. *Annals of Behavioral Medicine*. 2004; 27(3):172–184. [PubMed: 15184093]
- Prinstein MJ, Brechwald WA, Cohen GL. Susceptibility to peer influence: Using a performance-based measure to identify adolescent males at heightened risk for deviant peer socialization. *Developmental Psychology*. 2011; 47:1167–1172. [PubMed: 21463036]
- Prinstein MJ, Cillessen AN. Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merrill-Palmer Quarterly: Journal of Developmental Psychology*. 2003; 49(3): 310–342.
- Rancourt D, Choukas-Bradley S, Cohen GL, Prinstein MJ. An experimental examination of peers' influence on adolescent girls' intent to engage in maladaptive weight-related behaviors. *International Journal of Eating Disorders*. 2014; 47(5):437–447. [PubMed: 24482093]
- Rubin, KH., Bukowski, WM., Laursen, B. *Handbook of peer interactions, relationships, and groups*. New York, NY: Guilford Press; 2009.
- Sandstrom, MJ. The power of popularity: Influence processes in childhood and adolescence. In: Cillessen, AN, Schwartz, D., Mayeux, L., editors. *Popularity in the peer system*. New York, NY: Guilford Press; 2011. p. 219-244.
- Snijders TAB, van de Bunt GG, Steglich CEG. Introduction to stochastic actor-based models for network dynamics. *Social Networks*. 2010; 32:44–60.

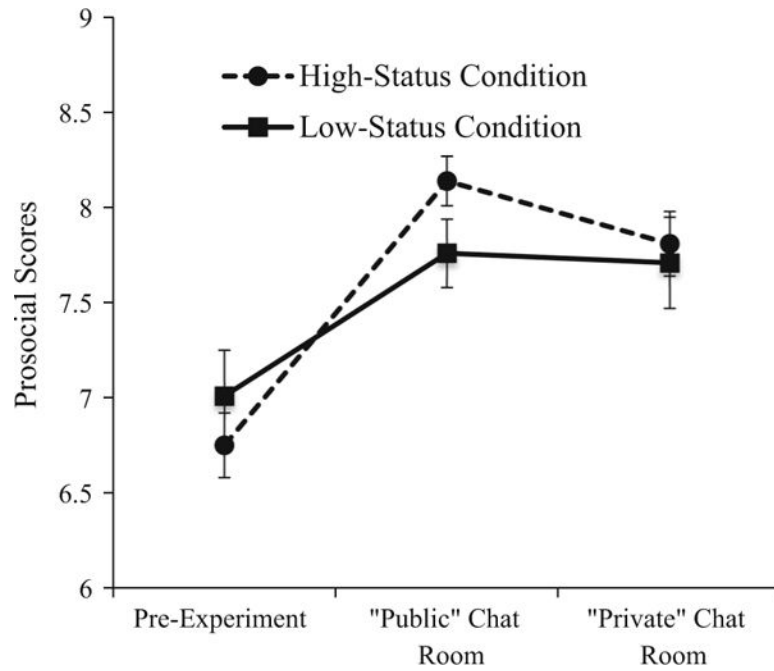
- van Goethem AJ, van Hoof A, van Aken MG, de Castro B, Raaijmakers QW. Socialising adolescent volunteering: How important are parents and friends? Age dependent effects of parents and friends on adolescents' volunteering behaviours. *Journal of Applied Developmental Psychology*. 2014; 35(2):94–101.
- van Hoorn J, van Dijk E, Meuwese R, Rieffe C, Crone EA. Peer influence on prosocial behavior in adolescence. *Journal of Research on Adolescence*. 2014; (Online First). doi: 10.1111/jora.12173
- Weigard A, Chein J, Albert D, Smith A, Steinberg L. Effects of anonymous peer observation on adolescents' preference for immediate rewards. *Developmental Science*. 2014; 17(1):71–78. [PubMed: 24341973]
- Wentzel, KR. Prosocial behavior and peer relations in adolescence. In: Padilla-Walker, LM., Carlo, G., editors. *Prosocial development: A multidimensional approach*. New York, NY: Oxford University Press; 2014. p. 178-200.





**Fig. 1.**

Boys' estimated marginal means of prosocial scores at pre-experiment and in "public" and "private" chat room assessments, by peer status experimental condition. *Error bars* represent standard errors. Figure shows untransformed prosocial scores (square root transformed scores were used in analyses to test the effects shown). Prosocial scores = responses to hypothetical scenarios; response options were in the form of a 9-point Likert scale and reflected increasing likelihood to engage in prosocial behavior, from 1 = not at all likely to 9 = definitely. Pre-experiment = scores provided privately pre-experiment; "public" chat room = scores in "public" in front of peers (i.e., in the presence of e-confederates); "private" chat room = scores provided privately and "offline" (i.e., after being "logged off" from chat room) following exposure to e-confederates' prosocial responses. High-status and low-status conditions refer to experimental conditions based on the manipulated peer status of e-confederates



**Fig. 2.**

Girls' estimated marginal means of prosocial scores at pre-experiment and in "public" and "private" chat room assessments, by peer status experimental condition. *Error bars* represent standard errors. Figure shows untransformed prosocial scores (square root transformed scores were used in analyses to test the effects shown). Prosocial scores = responses to hypothetical scenarios; response options were in the form of a 9-point Likert scale and reflected increasing likelihood to engage in prosocial behavior, from 1 = not at all likely to 9 = definitely. Pre-experiment = scores provided privately pre-experiment; "public" chat room = scores in "public" in front of peers (i.e., in the presence of e-confederates); "private" chat room = scores provided privately and "offline" (i.e., after being "logged off" from chat room) following exposure to e-confederates' prosocial responses. High-status and low-status conditions refer to experimental conditions based on the manipulated peer status of e-confederates

**Table 1**

Means (and standard deviations) of study variables by experimental condition among boys

	High-status peer condition (N = 70)		Low-status peer condition (N = 68)		t	df	p	95 % CI	Cohen's d
	M	SD	M	SD					
<b>Manipulation check</b>									
Perception of e-confederates' likeability	4.93	1.16	3.42	1.34	7.12	136	<.001	[1.10, 1.94]	1.20
Perception of e-confederates' popularity	4.72	1.19	3.29	1.25	6.89	136	<.001	[1.02, 1.84]	1.17
<b>Prosocial scores<sup>a</sup></b>									
Pre-experiment	6.41/1.81	2.18/.57	6.52/1.79	2.04/.53	.18	136	.856	[-.17, .20]	.04
"Public" chat room	7.90/1.38	1.47/.43	7.06/1.61	2.22/.60	-2.49	121.58	.014	[-.40, -.05]	.44
"Private" chat room	7.45/1.50	2.01/.56	6.79/1.67	2.41/.65	-1.72	136	.088	[-.38, .03]	.28
DS "Public" chat room-Pre-experiment	1.49/-.42	2.16/.57	.54/-.18	2.27/.60	-2.40	136	.018	[-.44, -.04]	.41
DS "Private"- "Public" chat room	-.45/.11	1.02/.29	-.27/.07	.91/.27	.96	136	.338	[-.05, .14]	.14

Positive raw scores indicate increases in prosocial scores and negative raw scores indicate decreases in prosocial scores. 95 % CI = 95 % confidence intervals for mean differences

**DS Difference scores**

<sup>a</sup>Both raw and transformed (i.e., inverse square-root transformed) mean scores of prosocial behavior are presented in the table (i.e., raw/transformed). Comparisons between the two experimental conditions and the resulting *t* tests, 95 % CI and Cohen's *d*s were calculated using transformed scores

**Table 2**

Means (and standard deviations) of study variables by experimental condition among girls

	High-status peer condition (N = 112)		Low-status peer condition (N = 54)		t	df	p	95 % CI	Cohen's d
	M	SD	M	SD					
<b>Manipulation check</b>									
Perception of e-confederates' likeability	4.32	.89	3.43	1.03	5.76	164	<.001	[-.59, 1.20]	.94
Perception of e-confederates' popularity	4.31	1.06	3.31	.80	6.76	134.06	<.001	[.71, 1.29]	1.01
<b>Prosocial scores<sup>a</sup></b>									
Pre-experiment	6.75/1.74	1.77/.48	7.01/1.66	1.78/.51	1.01	164	.314	[-.08, .24]	.16
"Public" chat room	8.14/1.31	1.28/.38	7.76/1.43	1.45/.44	-1.70	91.35	.093	[-.26, .02]	.30
"Private" chat room	7.81/1.39	1.87/.52	7.71/1.43	1.60/.49	-.53	164	.595	[-.21, .12]	.08
DS "Public" chat room-Pre-experiment	1.38/-.43	1.73/.50	.75/-.23	1.65/.44	-2.53	164	.012	[-.36, -.04]	.42
DS "Private"- "Public" chat room	-.33/.08	1.01/.28	-0.05/.003	.76/.22	1.88	130.53	.062	[-.004, .15]	.29

Positive raw scores indicate increases in prosocial scores and negative raw scores indicate decreases in prosocial scores. 95 % CI = 95 % confidence intervals for mean differences

DS Difference scores

<sup>a</sup>Both raw and transformed (i.e., inverse square-root transformed) mean scores of prosocial behavior are presented in the table (i.e., raw/transformed). Comparisons between the two experimental conditions and the resulting *t* tests, 95 % CI and Cohen's *d*s were calculated using transformed scores