

# With a Little Help From My Cross-Group Friend: Reducing Anxiety in Intergroup Contexts Through Cross-Group Friendship

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The authors induced cross-group friendship between Latinos/as and Whites to test the effects of cross-group friendship on anxiety in intergroup contexts. Cross-group friendship led to decreases in cortisol reactivity (a hormonal correlate of stress; W. R. Lovallo & T. L. Thomas, 2000) over 3 friendship meetings among participants high in race-based rejection sensitivity (R. Mendoza-Denton, G. Downey, V. J. Purdie, A. Davis, & J. Pietrzak, 2002) and participants high in implicit prejudice (A. G. Greenwald, B. A. Nosek, & M. R. Banaji, 2003). Cross-group partners' prior intergroup contact moderated the relationship between race-based rejection sensitivity and cortisol reactivity. Following the manipulation, participants kept daily diaries of their experiences in an ethnically diverse setting. Implicitly prejudiced participants initiated more intergroup interactions during the diary period after making a cross-group friend. Participants who had made a cross-group friend reported lower anxious mood during the diary period, which compensated for greater anxious mood among participants high in race-based rejection sensitivity. These findings provide experimental evidence that cross-group friendship is beneficial for people who are likely to experience anxiety in intergroup contexts.

*Keywords:* cross-group friendship, intergroup anxiety, close relationships, intergroup contact, intergroup relations

Even though interactions between members of different social groups are sometimes characterized by anxiety and threat (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Mendes, Blascovich, Lickel, & Hunter, 2002; Stephan & Stephan, 1985, 2000), a growing body of research suggests that cross-group

friendship can attenuate such anxiety. Cross-group friendship is associated with low levels of self-reported intergroup anxiety (Paolini, Hewstone, Voci, Harwood, & Cairns, 2006), and the improvements in intergroup attitudes that result from intergroup contact seem especially evident when such contact is characterized by friendship (Pettigrew & Tropp, 2005, 2006, footnote 4; Tropp, 2007). Longitudinal research on the acquisition of cross-group friends in college (Levin, van Laar, & Sidanius, 2003) revealed that students who acquired more cross-group friends by their 2nd year reported significantly less anxiety about interacting with outgroup members at the end of 4 years of college. Even among groups with a recent history of violent conflict, such as Catholics and Protestants in Northern Ireland, having close friends from the other religious group predicted less anxiety about interactions with members of that group (Paolini, Hewstone, Cairns, & Voci, 2004).

Despite the promise of these findings, the direction of causality between cross-group friendship and anxiety in intergroup contexts needs to be established experimentally. Wright and his colleagues (see Wright, Aron, & Tropp, 2002; Wright, Brody, & Aron, 2005; Wright, Ropp, & Tropp, 1998; Wright & van der Zande, 1999) described research that provided initial evidence for the causal effects of cross-group friendship on self-reported anxiety. Majority-group participants were paired with either a same- or cross-group partner for a series of friendly interactions, after which their mood and attitudes were assessed. The results yielded reductions in self-reported anxiety and increases in closeness after each interaction. The experimental nature of this research allowed for causal inferences regarding the benefits of cross-group friendship, a lack of which had characterized the literature on close intergroup relationships (Pettigrew, 1998).

Building on the experimental paradigm used by Wright and colleagues (Wright et al., 1998, 2002, 2005; Wright & van der

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Zande, 1999), we report a study in which friendship was induced between same- and cross-group dyads of Latinos/as and Whites. We extend prior research in several respects. First, we experimentally examined the effects of cross-group friendship from the perspectives of two groups (c.f. Pettigrew, 1998; Tropp & Pettigrew, 2005b), adopting an approach that centers on individual differences both in prejudicial attitudes and in concerns about being the target of others' prejudicial attitudes. Second, we incorporated a hormonal correlate of stress, cortisol reactivity, when assessing participants' anxious responses to the experimental manipulation of cross-group friendship. Physiological responses have the benefit of not being subject to controlled processes or self-presentation effects (Blascovich et al., 2001). Third, we examined dyadic effects on cortisol reactivity by testing whether a friend's prior intergroup contact moderated the effects of cross-group friendship. Finally, over a diary period following the final friendship meeting, we examined anxious mood and initiation of cross-group social interactions in an ethnically diverse setting. The experimental procedure described in this paper represents a relatively strong situation (Mischel, 1977; Snyder & Ickes, 1985) that maximized conditions for friendship formation, as our interest was in fostering closeness irrespective of participants' preexisting propensities to form cross-group friendships.

### Reducing Anxiety in Intergroup Contexts Through Cross-Group Friendship

Generally, we propose that cross-group friendship improves intergroup interactions through systematic disconfirmations of negative expectations about intergroup experiences (Mendoza-Denton, Page-Gould, & Pietrzak, 2006). If people who are predisposed to anxiety in intergroup contexts experience multiple episodes of intergroup contact with no attendant anxiety—as would likely accompany the development of a new cross-group friendship—then chronic anxious orientations to outgroup members may be attenuated (Paolini et al., 2006). In this way, the formation of a cross-group friendship may improve intergroup interactions among individuals who typically have negative intergroup expectations (Mendoza-Denton et al., 2006).

### *Individual Differences in Anxiety in Intergroup Contexts*

Our approach to addressing the causal benefits of cross-group friendship is couched in the recognition that not everyone who engages in intergroup interaction experiences threat and anxiety to the same degree (Britt, Boniecki, Vescio, Biernat, & Brown, 1996; Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Plant & Devine, 2003; Stephan & Stephan, 1984, 1985). Accordingly, we focus on two processes that prior research and theory have identified as relevant to experiencing threat and anxiety when developing relationships across group boundaries: concerns about being rejected on the basis of group membership (Mendoza-Denton et al., 2002) and prejudiced attitudes (Greenwald, McGhee, & Schwartz, 1998). Although we originally conceptualized these processes as being most relevant to minority and majority participants, respectively, we nevertheless examined their predictive utility for both groups.

### *Concerns of Rejection in Intergroup Contexts*

Given the centrality of concerns of rejection on the basis of group membership for anxiety in intergroup contexts (Mendoza-Denton et al., 2006; Stephan & Stephan, 2000), we used a scale of race-based rejection sensitivity (RS-race; Mendoza-Denton et al., 2002) to tap into Latino/a and White participants' anticipatory rejection concerns. Researchers have previously used this questionnaire to understand minority students' sense of institutional belonging and academic outcomes in predominantly White institutions (Mendoza-Denton et al., 2002; Mendoza-Denton, Pietrzak, & Downey, in press; Piña & Mendoza-Denton, 2003; Walton & Cohen, 2007). Nevertheless, research converges on the notion that concerns of rejection are relevant for members of both minority (Mendoza-Denton et al., 2002; Stephan & Stephan, 1989; Shelton, Richeson, & Salvatore, 2005) and majority groups (Goff, Steele, & Davies, 2008; Plant & Devine, 2003; Stephan & Stephan, 2000; Vorauer, Hunter, Main, & Roy, 2000). Therefore, we measured race-based rejection concerns among members of both groups.

### *Prejudiced Attitudes*

Research similarly suggests that prejudiced attitudes toward a cross-group partner's ethnic group should invoke anxiety in intergroup interactions (Stephan & Stephan, 1985, 2000) and more negative expectations for these interactions (Vorauer & Kumhyr, 2001). Consistent with this view, implicit prejudice has been found to predict subtle manifestations of anxiety and hostility in cross-group interactions (Dovidio, Kawakami, & Gaertner, 2002; Gaertner & Dovidio, 2005), whereas egalitarianism has been linked with more adaptive stress responses during interracial interactions (Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007). In the present research, we focused on implicit prejudice—here measured by the Implicit Association Test (IAT; Greenwald, Nosek, & Banaji, 2003)—rather than explicit prejudice, given that the former measure seems more resistant to demand characteristics (Fazio & Olson, 2003; Nosek, 2005).

### *Hypothesis 1*

Bringing together the above literatures, we hypothesized that only participants who are likely to experience anxiety in intergroup contexts (either because of RS-race or implicit prejudice) should show signs of hormonal stress responses when they first meet a cross-group partner, but that cross-group friendship should attenuate such stress responses over the course of friendship development. As a corollary, participants who scored lower on measures of RS-race or implicit prejudice were not expected to show such attenuation in the cross-group condition because they should have been less likely to exhibit hormonal stress responses in the first place. In addition, we tested whether participants' ethnicity (i.e., Latino/a or White) moderated these predicted patterns.

### *Moderating Effects of Partners' Prior Intergroup Contact*

An implied assumption of Hypothesis 1 is that the mere group membership of a cross-group friend should be sufficient to attenuate hormonal stress responses among individuals who are predisposed to experience anxiety in intergroup contexts. However, cross-group friends may themselves vary substantially in their

ability to navigate cross-group interactions. It seems reasonable to anticipate that those with prior intergroup contact may be more able to promote feelings of comfort in the interaction than outgroup members without prior intergroup experience. In line with this view, White students with prior interracial contact have been shown to perceive upcoming cross-race interactions as less demanding and exhibited more adaptive physiological responses to stress during those interactions (Blascovich et al., 2001; Mendes et al., 2002). Moreover, research examining barriers to the formation of cross-group friendship demonstrated that people with greater intergroup contact tend to be more accurate about how much interest in friendship they convey to cross-group partners (Vorauer & Sakamoto, 2006). Taken together, these perspectives suggest that having a partner with greater intergroup contact should facilitate positive responses to cross-group friendship formation.

On the other hand, research suggests that being highly invested in an intergroup interaction, as might be the case with experienced partners (e.g., Emerson, Kimbro, & Yancey, 2002), can paradoxically lead people to appear less positive and less responsive in intergroup encounters (Vorauer & Turpie, 2004). For individuals who anticipate rejection in intergroup encounters, an outgroup partner who conveys less positivity than is normative may be particularly threatening. Consistent with this notion, Shelton, Richeson, Salvatore, and Trawalter (2005) found that Black participants actually preferred interacting for a short while with implicitly prejudiced White partners more than with White partners who were low in implicit prejudice. Together, these findings present an alternate possibility that cross-group partners with substantial prior contact could engender threat, particularly among individuals who are vigilant for social cues during the interaction.

### *Hypothesis 2*

We expected that partners' prior intergroup contact would moderate the anxiety-reducing effects of cross-group friendship among those participants most likely to experience anxiety in intergroup contexts. On the one hand, we hypothesized that cortisol reactivity should be the least pronounced among participants who were predisposed to anxiety in intergroup contexts but also paired with a cross-group partner with prior intergroup contact. On the other hand, a series of recent findings have led to an alternate hypothesis that participants with prior intergroup contact may engender greater threat among outgroup partners who are vigilant for cues of rejection in intergroup encounters. We also examined changes in these effects over the friendship meetings.

### *Effects Beyond the Friendship*

We were also interested in whether the formation of cross-group friendship would have any intergroup effects beyond the specific friendship dyad. Research and theory suggest that positive experiences with a cross-group friend can have a positive impact on intergroup relations that reaches outside the context of the friendship (Allport, 1954; Paolini, Hewstone, Ruben, & Pay, 2004; Pettigrew & Tropp, 2005), and we examined this possibility using two indicators. The first is participants' anxious mood in a diverse social environment that is characterized by a high likelihood of intergroup interaction. The second involves behaviors toward outgroup members, assessed by initiation of intergroup interactions in this environment.

### *Anxious Mood in Diverse Contexts*

Environments in which one might be the target of exclusion, prejudice, or differential treatment can engender an overall sense of discomfort and anxiety (Inzlicht & Ben-Zeev, 2000; Mendoza-Denton et al., 2002; Walton & Cohen, 2007). Presumably, this discomfort occurs because potential recipients of such rejection have less control over whether rejection actually occurs than do the perpetrators, and thus, the threat of rejection may apply chronically. Given that the setting of the current study was a diverse social environment in which intergroup interactions are likely to form a necessary part of everyday life (see the *Setting* section below), we reasoned that RS-race in particular would be associated with less overall comfort in this environment. To the degree that positive attitudes fostered through cross-group friendship may ease anxious expectations of future rejection, we tested whether our experimental manipulation would lead to decreased anxious mood within this particular setting.

### *Initiation of Cross-Group Interactions*

Past research suggests that avoidance of outgroup members is a behavioral correlate of anxiety in intergroup contexts (Islam & Hewstone, 1993). By contrast, cross-group friendship has been associated with greater openness to future interracial ties (Emerson et al., 2002; Tropp & Pettigrew, 2005a). As such, we tested whether our experimental manipulations of friendship would increase subsequent approach-oriented behaviors toward outgroup members, indexed here as initiation of cross-group interactions in daily life. We also examined initiation of same-group interactions to ensure the findings were specific to outgroup members.

### *Hypothesis 3*

We expected that the effects of forming a new cross-group friendship would persist in daily life. More specifically, we expected that the development of a cross-group friendship would lead to more initiation of intergroup interactions during the diary period, particularly among those who were originally predisposed to anxiety in such interactions. We further hypothesized that participants higher in RS-race would report more anxious mood over the diary period but that this anxiety would be attenuated through the development of cross-group friendship.

### *Overview of Present Research*

To test the above hypotheses, we experimentally manipulated friendship by randomly assigning Latino/a and White undergraduates to same-group or cross-group friendship conditions. Participants completed measures of RS-race, implicit prejudice, and prior intergroup contact prior to the study. As in prior work by Wright and colleagues (Wright et al., 1998, 2002; Wright & van der Zande, 1999), same- and cross-group. Friendship dyads met each week at the same time for 3 consecutive weeks and engaged in a series of closeness-building tasks, modeled after the Fast Friends procedure (Aron, Melinat, Aron, Vallone, & Bator, 1997), which was designed to increase closeness between strangers. In addition, salivary cortisol was assessed at the beginning and end of each friendship meeting. Together, these data allowed us to address Hypotheses 1 and 2. Following the final friendship meeting,



participants completed daily diaries of their social interactions and mood. These additional data allowed us to address Hypothesis 3.

## Methods

### Setting

This study was conducted at the University of California, Berkeley (UC Berkeley) from the Fall of 2003 through the Spring of 2005. Over the course of data collection, the ethnic distribution of the undergraduate population was as follows: 46.8% Asian, 34.4% White, 12.0% Latino/a, 4.3% Black, and 2.5% other.

### Participants and Procedure

#### Design

The experiment was a 2 (Friendship Condition: same or cross group, between participants)  $\times$  2 (Participant Ethnicity: Latino/a or White, between participants)  $\times$  3 (Meeting Number: first, second, and third, within participants) mixed-factorial dyadic design.<sup>1,2</sup> We used the same-group friendship condition as a control condition because it allowed us to compare the effects of making a cross-group friend with the effects of making a new friend without a cross-group component. We conducted separate analyses using RS-race and implicit prejudice as predictors. Prior intergroup contact (Islam & Hewstone, 1993) and interpersonal rejection sensitivity (Downey & Feldman, 1996) were included as covariates in all analyses (see the *Materials* section).

#### Recruitment and Initial Assessment

Undergraduate research assistants recruited Latino/a and White participants from common areas on campus to participate in the "Friendship and Adjustment to College Study" for \$68, a \$5 gift certificate redeemable at a local smoothie store, and a chance to win prizes in a lottery held every semester. Participants were informed that the researchers were studying the effects of friendship formation on adjustment to college, but they were not privy to the ethnic composition of the experimental conditions. Interested participants ( $N = 159$ ) attended an initial information session in groups of 1 to 8 during which they provided informed consent, shared their weekly schedules, and completed the background measures.

*Partner assignment.* After the information session, we matched participants into dyads, following the matching procedure described by Aron et al. (1997). We randomly assigned participants to the same- or cross-group conditions and then matched them with an eligible same-sex partner on the basis of coordinating schedules. Although participants were not matched for similarity on any characteristics other than sex, they were told their partner was chosen on the basis of having a similar personality.

*Attrition.* Eleven participants did not complete the study (6.92% attrition) because they either knew their assigned partner and did not want to be re-paired, or they withdrew from the study because of time constraints. Participants who did not complete the study were debriefed, thanked, and received partial compensation for the aspects of the study they had completed. One dyad elected not to provide saliva samples, so their data were only included in the diary analyses. In addition, one cross-group pair was eliminated from the final sample after they had completed the study because we later learned that one of the participants was Asian American.

*Final sample.* The final sample ( $N = 144$ ) consisted of 64 Latino/a participants (78% female) and 80 White participants (68% female), with a mean age of 19.5 years ( $SD = 1.94$ ). The sample had a mean college class standing of 2.19 years ( $SD = 1.18$  years). There were 26 Latino/a participants and 26 White participants assigned to the cross-group condition; they were paired into 26 cross-group dyads (69% female dyads). There were 54 White and 38 Latino/a participants assigned a same-group partner, for a total of 27 White same-group dyads (67% female) and 19 Latino/a same-group dyads (84% female).

*Experimenters.* The dyads were randomly assigned to 1 of 11 experimenters who represented a diverse set of ethnic groups: 2 African Americans, 4 Asian Americans, 1 East Indian, 1 Latina, and 3 Whites. The assigned experimenter ran all three friendship meetings for each dyad. Experimenters were uninformed of the specific hypotheses of the study.

#### Friendship Meetings

The friendship meetings began within 2 weeks of the information session. We scheduled the meetings for 1 hr at the same time of day each week for 3 consecutive weeks to account for the effects of cortisol's diurnal cycle within participant pairs (Lovallo & Thomas, 2000) and to allow for comparisons of cortisol changes across friendship meetings. Partners were asked not to contact each other during the 2 weeks that separated their three friendship meetings.

During each friendship interaction, participants completed an expanded version of the Fast Friends procedure (Aron et al., 1997) that we adapted for multiple meetings as outlined below. Our paradigm was modeled on the original Fast Friends procedure (Aron et al., 1997) and the multisession Fast Friends procedures used to study cross-group friendship described by Wright et al. (2002). We designed the expanded version of the Fast Friends procedure to mimic the escalations in self-disclosure of the original Fast Friends procedure and, in the final meeting, incorporated a superordinate goal. Participants completed brief filler questionnaires at the beginning and end of each friendship meeting.

*First friendship meeting.* Participants arrived at the lab expecting to complete a series of friendship-building tasks with a same-sex friendship partner, but they did not know anything else about their partner (i.e., the ethnicity of the partner was unknown). The first meeting followed the Fast Friends procedure as outlined by Aron et al. (1997), in which partners took turns reading and answering 36 questions that progressively encouraged self-disclosure.

<sup>1</sup> We use the term *ethnicity* in this article to distinguish between our Latino/a and White participants (cf. United States Census Bureau, Population Division, Social and Demographic Statistics, 2003), recognizing nevertheless that differences between these groups may be characterized as ethnic, racial, cultural, or any mixture of these (Betancourt & López, 1993; Phinney, 1996). Specifically, because we classified White participants of Hispanic origin to be Latino/a, we can only claim to have established friendships across ethnic boundaries as opposed to racial ones. Nevertheless, we keep the term *RS-race* to describe the RS-race questionnaire (Mendoza-Denton et al., 2002) to maintain consistency with prior literature.

<sup>2</sup> The choice of a Latino/a and White sample was due to recruitment access to Latino/a and Chicano/a student organizations. The choice of ethnic groups reflects the work of Stephan and Stephan (1984, 1985), who initially identified intergroup anxiety among Latinos/as and Whites.

*Second friendship meeting.* The second meeting was identical to the first in protocol but used 36 new questions.<sup>3</sup> Potential questions were drawn from the *Book of Questions* (Stock, 1987) and were rated by an independent pilot sample ( $N = 16$ ) on disclosure prompted by the question and degree of comfort answering the question with a stranger. We wanted the new questions to mimic the same increase in self-disclosure as the original Fast Friends procedure, and so the second set of Fast Friends questions was matched to the original set on levels of comfort and self-disclosure. The 36 final questions were rated similarly ( $M = 15.44$ ,  $SD = 7.85$ ) to the original 36 Fast Friends questions ( $M = 15.49$ ,  $SD = 8.43$ ),  $F(1, 35) = 1.15$ ,  $ns$ , and thus were expected to elicit similar levels of disclosure and closeness as the original Fast Friends procedure.

*Third friendship meeting.* For their final meeting, the partners played Hasbro's Jenga, a game in which players remove blocks from a stacked tower with the goal of not pulling the block that makes the entire tower fall. Participants were offered an extra ticket in end-of-semester lotteries for each block the pair successfully pulled from the tower before it fell. We chose Jenga because Wright and colleagues (1998, 1999, 2002) used it successfully and found it to be an effective way to incorporate play and shared leisure activities in the development of friendship (see also Floyd & Parks, 1995; McElwain & Volling, 2005). We also created a cooperative goal for the friendship dyads (Allport, 1954; Sherif et al., 1961) by instructing partners to develop a collective strategy to increase their chances of winning the final lotteries.

### Daily Diaries

Participants completed daily diaries for 10 consecutive evenings beginning the day after the final friendship meeting. At 6:00 each evening, participants were emailed a link to their daily diary Web survey. Participants were asked to complete the diary before they went to sleep each night, but at the latest by 8:00 the following morning. Three participants did not have Internet access in the evening, so their regular experimenters conducted the diaries over the telephone. Participants were contacted by phone after the final diary for debriefing and compensation.

### Materials

All self-report measures were assessed using a Web-based survey programmed in Perl 5.8 by an independent programmer (Miller, 2006). The surveys interfaced with an Apache 1.3 Web server located on a lab computer, and data were stored in a password-protected PostgreSQL database. Collections of free salivary cortisol and reaction-time data are described in greater detail below.

### Background Questionnaire

Participants completed a background questionnaire during the latter half of the information session. The background questionnaire was administered through a Web survey interface in individual cubicles and took approximately 30 min to complete. The descriptive statistics for the background measures are presented in Table 1, and zero-order correlations between background measures are presented in Table 2, with values for Latino/a participants

Table 1  
*Descriptive Statistics for Background Measures*

Measure	Latino/a				White			
	<i>M</i>	<i>SD</i>	<i>N</i>	$\alpha$	<i>M</i>	<i>SD</i>	<i>N</i>	$\alpha$
RS-race	7.22	6.60	64	0.85	3.33	2.46	78	0.79
IAT	-0.195	0.594	54	0.91	0.743	0.432	68	0.86
Prior contact	4.70	1.86	63	0.92	3.63	1.52	78	0.86
RS-personal	9.71	3.94	63	0.65	9.40	4.02	79	0.73

*Note.* RS-race = race-based rejection sensitivity; RS-personal = interpersonal rejection sensitivity.

presented along the upper diagonal and values for White participants presented along the lower diagonal.

*RS-race.* The RS-race scale (Mendoza-Denton et al., 2002) assesses expectations of rejection on the basis of ethnicity across situations in which discrimination is applicable and possible (such as cross-group interactions). Respondents indicate on a 6-point Likert scale how anxious they would feel and how much they would expect race-based rejection (discrimination, exclusion, unfavorable treatment) across a number of situations (e.g., being called on in class, a job interview). Anxious expectations are conceptualized as "hot" cognitions (Metcalf & Mischel, 1999) whereby affect amplifies the effects of a given cognition. Thus, the expectation score is multiplied by the anxiety score within each situation (Downey & Feldman, 1996; Mendoza-Denton et al., 2002). Scores across all situations are averaged to arrive at an RS-race score, in which higher scores indicate greater anxious expectation of race-based rejection. In this study, we administered a 6-item version of the RS-race questionnaire ( $\alpha = .83$ ) composed of highly loading items from the original RS-race questionnaire (see Mendoza-Denton et al., 2002). We administered the same scale to Latino/a and White participants. Reliabilities by ethnic group are listed in Table 1.

*Implicit prejudice.* Implicit prejudice was assessed with a Caucasian-Latino/a lexical IAT (Greenwald et al., 1998, 2003) created using DirectRT v2002 software from Empirisoft (Jarvis, 2002). Participants were asked to sort words into four categories (*bad*, *good*, *Caucasian surnames*, *Latino/a surnames*) using two keys. The top 10 most common White and Latino/a surnames in the United States from the 1990 Census (United States Census Bureau, Population Division, 1995) were used as the ethnicity-related stimuli.<sup>4</sup> We chose lexical stimuli (surnames) instead of visual stimuli (e.g., pictures of morphed White and Latino/a faces) because visual stimuli may not readily differentiate Whites and Latinos/as, whereas the surnames belonging

<sup>3</sup> A detailed protocol for the expanded Fast Friends procedure and the 36 new questions are available at the Relationships and Social Cognition Lab website: <http://rascl.berkeley.edu/tools/>

<sup>4</sup> The 10 most common Latino/a and White surnames from the 1990 United States census (United States Census Bureau, Population Division, 1995) are available for use as lexical IAT stimuli. The surnames are available at the Relationships and Social Cognition Lab website: <http://rascl.berkeley.edu/tools/>

Table 2  
Zero-Order Correlation Matrix of Background Measures

Measure (White)	Measure (Latino/a)			
	RS-race	IAT	Prior contact	RS- personal
RS-race	—	-0.22	-0.3**	0.15
IAT	0.01	—	0.23	-0.19
Prior contact	0.13	-0.004	—	0.031
RS-personal	0.11	0.001	-0.04	—

Note. RS-race = race-based rejection sensitivity; IAT = Implicit Association Test (Greenwald, Nosek, & Banaji, 2003); RS-personal = interpersonal rejection sensitivity.

\*\* $p < .05$ .

to each group are reasonably distinctive.<sup>5</sup> Stimuli for the good and bad categories were taken from Greenwald et al. (1998).

On half of the trials, participants were told to classify Latino/a and good words with the same key and Caucasian and bad words with the other (i.e., Latino/a favoritism block of trials). On the other half of trials, Caucasian and good were paired on one key, and Latino/a and bad were paired on the other key (i.e., Caucasian favoritism block of trials). It is assumed that differences in categorization speed between the Caucasian favoritism and Latino/a favoritism blocks represent the relative degree to which participants associated the concepts of good and bad with Caucasians and Latinos/as. The presentation order of the Latino/a favoritism and Caucasian favoritism blocks were randomized across participants. The IAT  $D$  criterion was calculated according to the revised scoring algorithm and error and response-latency corrections described by Greenwald et al. (2003). We did not record response latencies on practice blocks (Greenwald et al., 1998), and so our only deviation from the revised algorithm (Greenwald et al., 2003) was that we calculated the IAT  $D$  by only averaging reaction times from the experimental blocks. Positive IAT  $D$  scores indicate bias in favor of Caucasians and negative IAT  $D$  scores indicate bias in favor of Latinos/as. The software we used to record the IAT discarded some participants' data when exiting the program, yielding the lower number of completed IAT scores presented in Table 1. IAT scores were reliable ( $\alpha = .89$ ).

**Prior intergroup contact.** We assessed prior intergroup contact using a measure developed by Islam and Hewstone (1993). We controlled for prior intergroup contact to test the effects of making a new cross-group friend above and beyond prior contact effects and because prior intergroup contact may moderate the effects of new contact experiences (Pettigrew & Tropp, 2006). As described in the introduction, partners' prior intergroup contact was also used as a predictor when testing Hypothesis 2. White participants completed the measure with regard to their previous experiences with Latinos/as, and Latino/a participants completed the measure with regard to their previous experiences with Caucasians. The measure includes five questions asking how much contact the participants had with members of the other ethnic group in settings such as college and outgroup members' homes. Participants indicated how often they had engaged in each form of contact using a 7-point Likert scale (1 = *no contact*, 7 = *a great deal of contact*;  $\alpha = .90$ ).

**Interpersonal rejection sensitivity.** General sensitivity to social rejection was assessed using the Interpersonal Rejection Sen-

sitivity Questionnaire (Downey & Feldman, 1996). We included interpersonal rejection sensitivity as a covariate to isolate the influence of race-based rejection concerns from more general, social rejection concerns (cf. Major & O'Brien, 2005). The Interpersonal Rejection Sensitivity Questionnaire is structured in the same way as the RS-race scale, in which respondents indicate how anxious they would feel and how much they would expect rejection across six scenarios in which rejection is possible (e.g., "You ask someone in one of your classes to coffee," "You ask your girlfriend/boyfriend if she/he really loves you"). We averaged the products of the anxiety and expectation questions for each scenario to create a composite score ranging from 1 to 36, where higher values indicate greater interpersonal rejection sensitivity ( $\alpha = .72$ ).

### Laboratory Measures

**Cortisol reactivity.** Measuring free salivary cortisol is a non-invasive method of obtaining hormonal stress responses. Cortisol is released into the saliva approximately 20 min following the onset of a stressor and starts to withdraw approximately 20 min after the removal of the stressor (Dickerson & Kemeny, 2004). In the present study, participants salivated into 1.9ml IBL-Hamburg SaliCap collection vials in front of each other at the beginning and end of each friendship meeting, for a total of six saliva samples per participant. However, 36 saliva samples were not analyzable because of blood in the sample (bleeding gums) or insufficient levels of saliva. Saliva samples were stored in a frost-resistant lab freezer chest until they could be transported to an independent lab for assay analysis. Intra- and interassay coefficients of variation were 3.26 and 5.05, respectively.

There is wide variation in baseline levels of cortisol, both between and within individuals over the course of the day, and thus, only relative changes in cortisol from baseline are psychologically meaningful correlates of anxiety (Lovello & Thomas, 2000), with positive scores indicating activation of the hypothalamic-pituitary-adrenal (HPA) axis and rate of decline in this activation after the removal of the stressor indicating recovery. Although our cortisol scores may be interpreted as either cortisol reactivity or recovery because of the time course of cortisol collection, we retain the term cortisol reactivity to maintain consistency with the literature (Dickerson & Kemeny, 2004). In line with this literature, we computed cortisol reactivity scores for each meeting by subtracting postmeeting cortisol from baseline (pre-meeting) cortisol. These reactivity scores across the three friendship meetings served as our physiological correlates of anxiety. To

<sup>5</sup> To ensure against systematic differences between the lexical stimuli representing each ethnic category, we compared the lengths and phonemes of surnames for each group. The mean letters per surname were not significantly different between ethnicities ( $M_{\text{White}} = 6.2$  letters,  $SD_{\text{White}} = 1.14$ ;  $M_{\text{Latino}} = 6.1$  letters,  $SD_{\text{Latino}} = 0.99$ ),  $F(1,19) = 0.04$ ,  $ns$ , and the standard deviations in word length were not different between ethnicities, Levene's  $F(1,18) = 0.26$ ,  $ns$ . There were 44 total syllables across the 20 Latino/a and White surnames used, and only three syllables were shared by both groups (all three were the phoneme "-or"), whereas 10 syllables out of 24 (42%) were shared among Latino/a surnames and 9 syllables out of 20 (45%) were shared among White surnames.



help account for the diurnal cycle, we ran participant dyads at the same time of day each time they met.

*Closeness with friendship partner.* As a manipulation check, closeness with friendship partner was assessed at the end of each meeting using the Inclusion of Other in Self scale (IOS; Aron, Aron, & Smollan, 1992). The IOS scale is a pictorial 7-point Likert scale, depicting two increasingly overlapping circles, each labeled “Self” and “Partner,” with greater overlap between the circles depicting greater closeness. We chose to exchange “Partner” for the circle typically labeled “Other” to make the scale more relevant to the study. Participants were asked to select the picture that “best represents your relationship with your interaction partner,” where higher values indicate greater closeness.

### Daily Diary Measures

Each diary consisted of filler questions to maintain our cover story, such as daily mood, somatic symptoms, health behaviors, and whether any classes had been missed. Among these mood questions were five items assessing anxious mood (calm, nervous, tense, attentive, worried) on a 7-point Likert scale. *Calm* and *attentive* were reverse coded—participants’ responses were subtracted from 8—so that higher values represented greater anxious mood (average  $\alpha = .90$ ). We only examined anxious mood on days when participants experienced cross-group interactions (97.2% of total days reported), as we had too few instances of days in which no cross-group interactions were reported. Participants also reported on the nature of their longest social interactions with someone of the same ethnic group and someone of another ethnic group each day. If participants had not engaged in a cross-group social interaction longer than 10 min that day, they were asked to leave the questions blank. Participants were asked who had initiated the interaction (self, other, or both), and degree of self-initiated cross-group interactions were compared across friendship conditions over the diary period.

## Results

To address the three hypotheses outlined in the introduction, we conducted analyses using multilevel linear modeling (Bryk & Raudenbush, 1992; Kenny, Kashy, & Bolger, 1998; Singer & Willett, 2003) implemented using the mixed procedure in SAS as outlined by Singer (1998) and Bolger and Zuckerman (1995). The multilevel approach permits the simultaneous analysis of within-person and between-person variation, so it can account for the nesting of participants within friendship pairs and within-person dependence of repeated measures (Bolger & Zuckerman, 1995; Kenny et al., 1998; Singer & Willett, 2003). In line with nested growth-curve analyses (Singer & Willett, 2003), we modeled effects over the friendship meetings using an unstructured covariance matrix to account for the aforementioned dependencies within the data. We covaried participants’ own prior intergroup contact and Interpersonal Rejection Sensitivity Questionnaire score in all analyses below. In addition, for analyses involving cortisol reactivity, we included the time of day during which a given dyad’s meetings took place as a covariate to further control for the effects of the diurnal cycle of cortisol. Prior to conducting the analyses, we centered all continuous predictors (Aiken & West, 1991), with the exception of RS-race and IAT scores, which we

standardized within each ethnic group (see the *Preliminary Analyses* section). We conducted parallel analyses using RS-race and implicit prejudice as predictors.

### Preliminary Analyses

Preliminary analyses revealed that cortisol reactivity was not significantly affected by participant sex, participant age, or experimenter ethnicity, and so these variables were not included in subsequent analyses. Latinos’/as’ IAT scores were reversed so that positive IAT scores would represent greater relative in-group bias for all participants. Latinos/as and Whites differed significantly in their mean IAT *D* scores,  $F(1, 122) = 104.12, p < .0001$ , and had significantly different variances, Levene’s  $F(1, 121) = 3.97, p = .049$ . Similarly, Latinos/as and Whites had significantly different mean RS-race scores,  $F(1, 142) = 23.40, p < .0001$ , and unequal variances, Levene’s  $F(1, 141) = 17.38, p < .0001$ . Thus, we standardized these variables within ethnicity in the analyses below to allow for comparisons between the ethnicities.

### Manipulation Check: Growth in Partner Closeness

Self-reported partner closeness (as measured by the IOS) was modeled as a function of friendship condition, ethnicity, meeting number, and either RS-race or IAT with the aforementioned covariates. Only meeting number predicted changes in partner closeness, so we tested the main effects model of growth in partner closeness as a function of meeting number, retaining the previous predictors as covariates. Consistent with our expectations for the expanded Fast Friends procedure, there was a strong increase in partner closeness over the three friendship meetings ( $M_{\text{first}} = 1.87, SD_{\text{first}} = 1.28; M_{\text{second}} = 2.85, SD_{\text{second}} = 1.30; M_{\text{third}} = 3.27, SD_{\text{third}} = 1.34$ ),  $b = 0.70, F(1, 273) = 135.31, p < .0001$ .

### Reduction of Anxiety in Intergroup Contexts Through Cross-Group Friendship

We modeled change in cortisol reactivity as a function of friendship condition (same group vs. cross group), meeting number (first, second, third), ethnicity (Latino/a, White), and RS-race (continuous), controlling for the effects of the variables described above. This four-way interaction was not significant,  $b = -0.59, F < 1, p = .492$ . Therefore, we collapsed across ethnicity but retained it as a covariate in the final model presented in Table 3. This model revealed a significant three-way interaction of friendship condition, meeting number, and RS-race,  $b = -1.18, F(1, 309) = 7.23, p = .008$ . This interaction remained significant when we controlled for participants’ implicit prejudice,  $b = -1.60, F(1, 251) = 11.61, p = .001$ .

To better understand this pattern, we examined lower order effects in the context of the significant higher order interaction (Aiken & West, 1991). In the cross-group friendship condition, the RS-Race  $\times$  Meeting Number interaction was significant,  $b = -0.64, F(1, 307) = 3.92, p = .049$ . This interaction is plotted in Figure 1. As expected, cortisol reactivity attenuated significantly as a function of meeting number,  $b = -1.18, F(1, 307) = 5.74, p = .017$ . Simple slope analyses within each cross-group friendship meeting revealed that RS-race predicted significantly greater cortisol reactivity in the first meeting,  $b = 1.61, F(1, 307) =$

Table 3  
Model Estimates of Cortisol Reactivity for RS-Race and Implicit Prejudice (IAT)

Effect	RS-race estimate (SE)	IAT estimate (SE)
Intercept	-1.35** (.35)	-1.49** (.42)
Hour	0.36** (.11)	0.38** (.13)
Prior contact	0.04 (.14)	-0.07 (.16)
RS-personal	-.0007 (.06)	0.01 (.07)
Ethnicity	0.47 (.47)	0.52 (.56)
RS-race/IAT	0.40 (.33)	0.22 (.38)
Friendship condition	-.42 (.49)	-.03 (.58)
(RS-Race/IAT) × Friendship Condition	0.58 (.47)	-0.08 (.57)
Meeting no.	0.16 (.30)	0.19 (.34)
(RS-Race/IAT) × Meeting No.	0.54 <sup>†</sup> (.30)	-0.03 (.31)
Friendship Condition × Meeting No.	-.65 (.49)	-0.97 <sup>†</sup> (.57)
(RS-Race/IAT) × Friendship Condition × Meeting No.	-1.18** (.44)	-0.83 <sup>†</sup> (.47)

Note. RS-race = race-based rejection sensitivity; RS-personal = interpersonal rejection sensitivity.  
<sup>†</sup> $p < .10$ . \*\* $p < .05$ .

10.69,  $p = .001$ , whereas there were no differences in cortisol reactivity as a function of RS-race by the third friendship meeting,  $b = 0.34$ ,  $F < 1$ ,  $p = .427$ . Among participants lower in RS-race in the cross-group condition, however, meeting number did not significantly predict cortisol reactivity,  $b = 0.14$ ,  $F < 1$ ,  $p = .791$ .

The Meeting Number × RS-Race interaction approached significance in the same-group condition,  $b = 0.54$ ,  $F(1, 307) = 3.30$ ,  $p = .070$ , but cortisol reactivity did not significantly change over the same-group friendship meetings for people low in RS-race,  $b = -0.39$ ,  $F(1, 307) < 1$ ,  $p = .350$ , or for those high in RS-race,  $b = 0.70$ ,  $F(1, 307) = 2.55$ ,  $p = .111$ . Thus, we did not pursue findings from the same-group condition further.

We conducted a parallel analysis for implicit prejudice. The four-way interaction of friendship condition, meeting number, implicit prejudice, and ethnicity was not significant,  $b = 1.18$ ,  $F(1, 245) = 1.63$ ,  $p = .204$ . Collapsing across and controlling for ethnicity yielded a marginal three-way interaction of friendship condition, meeting number, and implicit prejudice,  $b = -0.83$ ,  $F(1, 252) = 3.13$ ,  $p = .078$ . The significance of this interaction was similar when we controlled for RS-race,  $b = -0.84$ ,  $F(1, 251) = 3.33$ ,  $p = .069$ . Even though this interaction did not reach conventional significance levels, we proceeded to examine our a priori planned comparisons (cf. Tybout & Sternthal, 2001). As expected, the Implicit Prejudice × Meeting Number interaction was not significant in the same-group condition,  $b = -0.026$ ,  $F < 1$ ,  $p = .932$ , but was significant in the cross-group condition,  $b = -0.85$ ,  $F(1, 252) = 5.88$ ,  $p = .016$ . As illustrated in Figure 2, results for the cross-group friendship condition show that the slope for cortisol reactivity was significantly negative as a function of meeting number among participants higher in implicit prejudice,  $b = -1.68$ ,  $F(1, 252) = 7.45$ ,  $p = .007$ , whereas no significant relationship was observed between cortisol reactivity and meeting number among participants lower in implicit prejudice,  $b = -0.25$ ,  $F < 1$ ,  $p = .668$ . Implicit prejudice marginally predicted heightened cortisol reactivity during the first cross-group meeting,  $b = 1.01$ ,  $F(1, 252) = 2.88$ ,  $p = .09$ , and was reversed but not

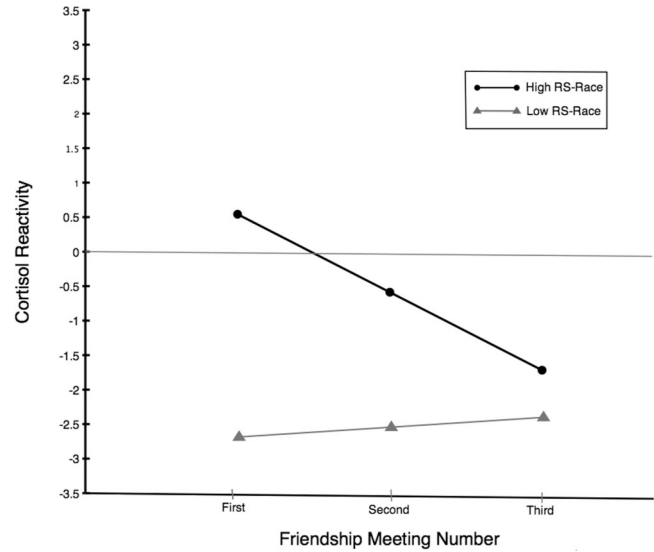


Figure 1. Cortisol reactivity as a function of race-based rejection sensitivity (RS-race) over three cross-group friendship meetings. Least squares means for high and low RS-race are estimated at one standard deviation above and below the means of RS-race within each ethnic group, respectively.

significant by the final meeting,  $b = -0.71$ ,  $F(1, 252) = 2.10$ ,  $p = .149$ .

Moderating Effects of Partners' Prior Intergroup Contact

To address our second hypothesis, we ran the same analyses as above but included an additional predictor in the model that was not included in the prior analyses: the amount of prior intergroup contact that each participant's partner reported. No effects were found with partner's prior contact for implicit prejudice, either in the full model or only when examined in the cross-group condi-

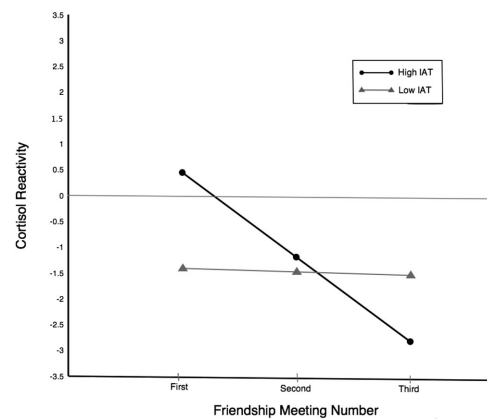


Figure 2. Cortisol reactivity as a function of implicit prejudice over three cross-group friendship meetings. Least squares means for high and low implicit prejudice are estimated at one standard deviation above and below the means of implicit prejudice within each ethnic group. IAT = Implicit Association Test (Greenwald, Nosek, & Banaji, 2003).



tion. Thus, we do not discuss effects for implicit prejudice further in this section.

Analyses with RS-race, however, yielded a significant Friendship Condition  $\times$  Meeting Number  $\times$  RS-Race  $\times$  Partner's Prior Contact interaction,  $b = -1.51$ ,  $F(1, 294) = 9.36$ ,  $p = .002$ . Model estimates are shown in Table 4. As above, this interaction was not moderated by participant ethnicity,  $b = -0.65$ ,  $F < 1$ ,  $p = .446$ , yet remained robust when we controlled for participants' implicit prejudice,  $b = -1.78$ ,  $F(1, 238) = 11.63$ ,  $p = .001$ . Simple slope analyses revealed that the three-way interaction of RS-race, meeting number, and partner's prior contact was not significant among participants in the same-group condition,  $b = 0.47$ ,  $F(1, 294) = 1.44$ ,  $p = .231$ , but was significant in the cross-group condition,  $b = -1.04$ ,  $F(1, 294) = 13.49$ ,  $p = .0003$ . As Figure 3 illustrates, the effect of meeting number was not significant among participants lower in RS-race, regardless of whether his/her partner had low contact,  $b = 0.26$ ,  $F < 1$ ,  $p = .747$ , or high contact,  $b = 0.30$ ,  $F < 1$ ,  $p = .604$ .

An interesting pattern emerged for participants high in RS-race. The slope for cortisol reactivity was significantly positive for high-RS-race participants paired with an inexperienced partner,  $b = 1.46$ ,  $F(1, 294) = 4.89$ ,  $p = .028$ . By contrast, this slope was significantly negative for high-RS-race participants paired with an experienced partner,  $b = -2.57$ ,  $F(1, 294) = 25.86$ ,  $p < .0001$ . Among higher RS-race participants in particular, the effect of partner prior contact was significant in the first friendship meeting,  $b = 3.31$ ,  $F(1, 294) = 32.9$ ,  $p < .0001$ , but not significant by the last friendship meeting,  $b = -0.79$ ,  $F(1, 294) = 1.78$ ,  $p = .238$ .

Table 4  
Model Estimates for Effects of Partners' Prior Contact on Cortisol Reactivity by RS-Race

Effects	Estimate (SE)
Intercept	-1.28** (.35)
Hour	0.36** (.11)
Prior contact	0.04 (.14)
RS-personal	-0.02 (.74)
Ethnicity	0.47 (.48)
RS-race	0.44 (.38)
Friendship condition	-0.56 (.49)
RS-Race $\times$ Friendship Condition	0.69 (.55)
Partner's prior contact	0.30 (.30)
RS-Race $\times$ Partner's Prior Contact	-.24 (.46)
Friendship Condition $\times$ Partner's Prior Contact	0.43 (.47)
RS-Race $\times$ Friendship Condition $\times$ Partner's Prior Contact	0.81 (.58)
Meeting no.	0.18 (.26)
RS-Race $\times$ Meeting No.	0.61 <sup>†</sup> (.33)
Friendship Condition $\times$ Meeting No.	-0.32 (.43)
RS-Race $\times$ Friendship Condition $\times$ Meeting No.	-1.03** (.47)
Partner's Prior Contact $\times$ Meeting No.	-.0005 (.27)
RS-Race $\times$ Partner's Prior Contact $\times$ Meeting No.	0.47 (.40)
Friendship Condition $\times$ Partner's Prior Contact $\times$ Meeting No.	-0.98** (.42)
RS-Race $\times$ Friendship Condition $\times$ Partner's Prior Contact $\times$ Meeting No.	-1.51** (.49)

Note. RS-race = race-based rejection sensitivity; RS-personal = interpersonal rejection sensitivity.  
<sup>†</sup> $p < .10$ . \*\* $p < .05$ .

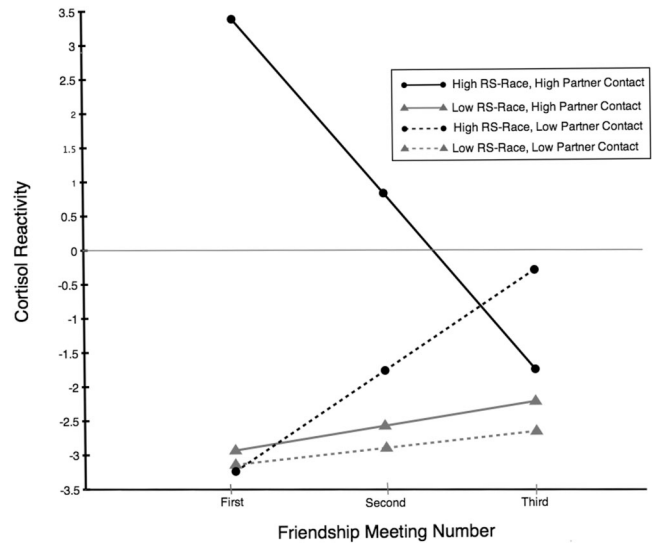


Figure 3. Moderating effects of partners' prior intergroup contact on cortisol reactivity as a function of race-based rejection sensitivity (RS-race) in the cross-group condition. Least squares means for both high and low values of participants' RS-race and partners' prior intergroup contact are estimated at a standard deviation above and below the means of each predictor, respectively.

### Effects Beyond the Friendship

To examine the effects of the friendship manipulation over time, we assessed self-initiated cross-group interactions (vs. same-group interactions) over the diary period and anxious mood on days when cross-group interaction was reported. We analyzed diary reports using an autoregressive covariance matrix to examine daily trends while properly accounting for dependence within dyads and individuals across days (Bolger & Zuckerman, 1995).

### Self-Initiated Cross-Group Interaction

We modeled self-initiated cross-group interactions on friendship condition and either RS-race or implicit prejudice, including the same covariates as above. There was no main effect of RS-race,  $b = 0.09$ ,  $F(1, 394) = 1.75$ ,  $p = .193$ , nor was there an interaction effect of RS-Race  $\times$  Friendship Condition,  $b = -0.05$ ,  $F < 1$ ,  $p = .551$ , found for this dependent variable. For the model involving implicit prejudice, however, we found a significant Friendship Condition  $\times$  Implicit Prejudice interaction,  $b = -0.10$ ,  $F(1, 394) = 4.64$ ,  $p = .032$ . Model estimates are provided in Table 5. The interaction remained significant when controlling for RS-race,  $b = -0.10$ ,  $F(1, 393) = 5.04$ ,  $p = .025$ . As Figure 4 illustrates, the effect of friendship condition was not significant among participants low in implicit prejudice,  $b = -0.06$ ,  $F(1, 394) = .93$ ,  $p = .191$ , but was marginally significant among those high in implicit prejudice,  $b = 0.12$ ,  $F(1, 394) = 3.76$ ,  $p = .059$ . The simple effect of implicit prejudice on self-initiated interactions was not significant either in the same-group condition,  $b = -0.05$ ,  $F(1, 394) = 2.14$ ,  $p = .191$ , nor in the cross-group condition,  $b = 0.05$ ,  $F(1, 394) = 2.56$ ,  $p = .146$ . To ensure that the findings were specific to cross-group interactions, we ran a subsequent analysis that also controlled for the frequency of self-initiated same-group interac-

Table 5  
Model Estimates for Self-Initiated Cross-Group Contact by  
Implicit Prejudice

Effects	Estimate (SE)
Intercept	0.21** (.03)
Prior contact	0.02 (.01)
RS-personal	0.005 (.005)
Ethnicity	0.09† (.05)
IAT	-0.04 (.03)
Friendship condition	0.003 (.05)
IAT × Friendship Condition	0.09** (.04)

Note. RS-personal = interpersonal rejection sensitivity; IAT = Implicit Association Test (Greenwald, Nosek, & Banaji, 2003).

†  $p < .10$ . \*\*  $p < .05$ .

tions; this analysis continued to yield the Friendship Condition × Implicit Prejudice interaction, now of marginal significance,  $b = 0.08$ ,  $F(1, 393) = 3.64$ ,  $p = .057$ .

Anxious Mood

Anxious mood was modeled as a function of friendship condition and either RS-race or implicit prejudice. The model involving RS-race, despite not yielding a significant Friendship Condition × RS-Race interaction, did reveal a significant main effect of RS-race,  $b = 0.315$ ,  $F(1, 470) = 8.84$ ,  $p = .003$ , such that participants higher in RS-race experienced greater anxious mood. The analysis also yielded a compensatory main effect of friendship condition,  $b = -0.41$ ,  $F(1, 470) = 3.98$ ,  $p = .0519$ , such that participants in the cross-group condition felt less anxious over the period follow-

ing the friendship manipulation than did those in the same-group condition. The main effect of RS-race remained significant when we controlled for implicit prejudice,  $b = 0.29$ ,  $F(1, 470) = 7.78$ ,  $p = .007$ , but the main effect of friendship condition became marginally significant when we controlled for IAT,  $b = -0.42$ ,  $F(1, 470) = 3.50$ ,  $p = .066$ . This pattern is illustrated in Figure 5. No effects involving implicit prejudice were found for anxious mood (all  $F$ s < 1).

Discussion

The pattern of results reported here provide experimental evidence for the benefits of cross-group friendship, particularly among people who are most likely to experience anxiety in intergroup contexts. Participants who were implicitly prejudiced or concerned about outgroup rejection responded to the first cross-group interaction with heightened cortisol reactivity. Despite this initial display consistent with intergroup anxiety (Stephan & Stephan, 1985), both participants high in implicit prejudice and participants high in RS-race experienced significant decreases in cortisol reactivity over three cross-group friendship meetings. These findings suggest that the attenuation of anxiety in intergroup contexts that has been observed as a function of cross-group friendship (e.g., Levin et al., 2003; Paolini, Hewstone, Cairns, & Voci, 2004) can occur relatively early in the development of cross-group friendship. Furthermore, over the week and a half after the final cross-group friendship meeting, implicitly prejudiced participants sought out more intergroup interactions, and participants felt less anxious in the diverse university environment that constituted the setting for the study. These findings provide initial experimental support for the process of intergroup anxiety reduction described by Paolini et al. (2006) as a function of cross-group friendship.

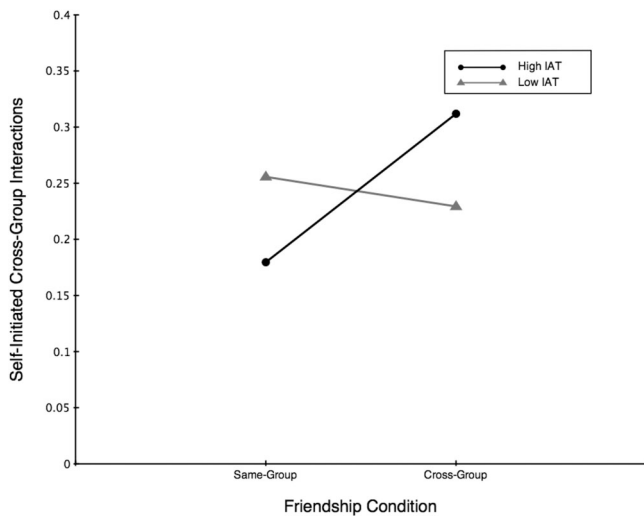


Figure 4. Effects of implicit prejudice and cross-group friendship on initiation of cross-group interactions in daily life. Least squares means for high and low implicit prejudice are estimated respectively at one standard deviation above and below the mean of implicit prejudice within each ethnic group. Self-initiated cross-group interaction was coded as a dummy variable (where 1 indicated a self-initiated interaction), so the values for initiation can be interpreted as the average likelihood of initiating cross-group contact on a given day during the diary period. IAT = Implicit Association Test (Greenwald, Nosek, & Banaji, 2003).

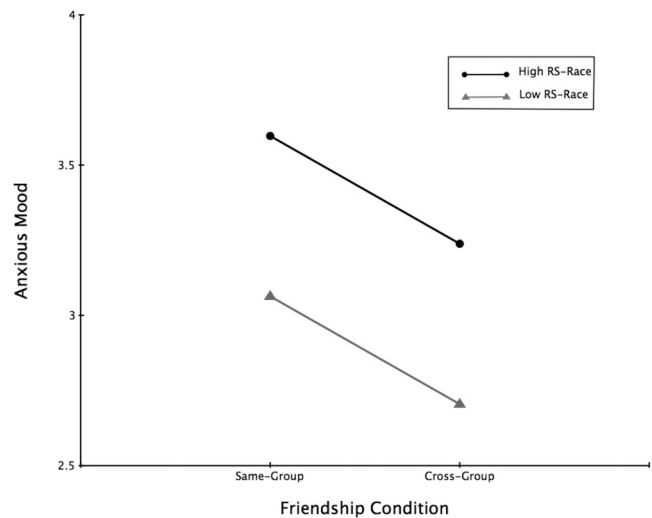


Figure 5. Anxious mood on days with cross-group contact as a function of race-based rejection sensitivity (RS-race) and friendship condition. Least squares means for high and low RS-race are estimated at one standard deviation above and below the mean of RS-race within each ethnic group, respectively.

It is important to note that RS-race and implicit prejudice were both related to cortisol increases in the first cross-group meeting. Chronic activation of the HPA axis is associated with immunosuppression (Chrousos & Gold, 1992), heart disease (Whitworth, Brown, Kelly, Williamson, 1995), Type II diabetes (Raikkonen, Keltikangas-Jarvinen, Adlercreutz, & Hautanen, 1996), and cancer (Wei et al., 2001). When paired with the inevitability of intergroup interaction among members of minority groups (e.g., Hallinan & Smith, 1985), this hormonal reaction to the first cross-group friendship meeting may have relevance to ethnic health disparities in the United States across the aforementioned health conditions (United States Department of Health and Human Services, 2000). Our findings also suggest the possibility that cross-group friendship may provide a coping mechanism for people who hold negative intergroup expectations, perhaps by providing repeated and unambiguous disconfirmations of such expectations (McLaughlin-Volpe, Mendoza-Denton, & Shelton, 2005; Mendoza-Denton et al., 2006). An intriguing direction for future research is to directly investigate the health implications of reductions in intergroup anxiety as a function of cross-group friendship.

#### *Lack of Differences as a Function of Ethnicity*

We began this investigation with an expectation that ethnicity would moderate the effects of RS-race and implicit prejudice. This was based on the notion that concerns about being targets of prejudice would be more relevant to minority group members and that its converse, prejudice, would be more relevant to majority group members. Although there were ethnic differences in the means and variances of RS-race and implicit prejudice, we consistently found that individual variation on these measures accompanied variations in anxiety in intergroup contexts similarly for both Latino/a and White participants. This is consistent with Stephan and Stephan's (1985) view of prejudice and rejection concerns as being applicable antecedents of intergroup anxiety for all groups.

How can we reconcile the fact that the RS-race scale has been previously found to be uniquely predictive among minority students? One reason may be that prior research with RS-race has largely focused on institutional outcomes (e.g., sense of belonging) in universities where minority students have been traditionally marginalized (e.g., Aronson & Inzlicht, 2004; Mendoza-Denton et al., 2002; Mendoza-Denton et al., in press). White students have less reason to question their belonging and acceptance in such institutions because of their race, reducing the applicability of institutional outcomes for this group. On the other hand, intergroup anxiety seems applicable to both majority and minority group members (Stephan & Stephan, 1985). Thus, even with the restricted range of RS-race scores among White students that we observed here and in prior studies, the applicability of anxiety in intergroup social contexts for both groups—particularly in a diverse campus such as UC Berkeley—may render such variability meaningful for Whites.

With respect to this last point, it is important to note that no ethnic group constitutes a majority on the UC Berkeley campus, although Asian American students are the plurality in this diverse context. It is possible that our Latino/a and White samples responded similarly because they both represented members of numerical minority groups within the particular institutional context

of the study. We interpret the lack of differences as a function of ethnic group with caution given the nonrepresentativeness of the setting and the moderate size of the sample in this study.

It is also worth noting that the psychological causes of RS-race or implicit prejudice may be qualitatively different for majority and minority group members. For a minority group member, concerns about being rejected on the basis of race often center around concerns about others' perceptions of one's belonging in a particular milieu (Mendoza-Denton et al., 2002). Among majority group members, by contrast, race-based rejection concerns may center more around assumptions about one's own prejudice (Goff et al., 2008). Similarly, being prejudiced against a minority group may not be associated with the same psychological motivations as being prejudiced against a majority group, which has at times been conceptualized as a self-protective reaction to stigma (Worrell, Cross, & Vandiver, 2001). Although these differences may not be differentially predictive for how much stress one experiences during intergroup interaction, as suggested by the current findings, other outcomes related to RS-race and implicit prejudice may indeed be moderated by ethnicity.

#### *Moderating Effects of Partners' Prior Intergroup Contact*

As Figure 3 illustrates, the effect of partner's prior contact in the first session was positive for cortisol reactivity among participants high in RS-race, such that participants evidenced greater hormonal stress responses the more contact their partners reported. This finding seems to run counter to the intuition that participants with greater intergroup contact should behave comfortably during intergroup interactions and engender a positive atmosphere.

The literature on intergroup interaction suggests two possible explanations for this finding. The first possibility is based on research suggesting that high investment in the positivity of intergroup interaction can lead people to "choke" under the pressure and appear less positive and responsive in intergroup encounters (Vorauer & Turpie, 2004). It is possible that high-contact partners—who are presumably more motivated to build future intergroup ties (Emerson et al., 2002)—might be especially likely to be concerned about the impression they are making on outgroup partners. For participants who were high in RS-race, less positivity from an outgroup partner could be perceived as a rejection cue, which in turn would trigger intense reactions (Mendoza-Denton et al., 2002) that might be reflected in cortisol reactivity. The second possibility is based on recent research on counterstereotypical exemplars showing that ratings of an interaction partners' atypicality predicted physiological patterns consistent with threat (cf. Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003; Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). Assuming that participants high in RS-race anxiously expect negativity in novel intergroup settings (Mendoza-Denton et al., 2002), high-contact partners may seem especially schema inconsistent and thus engender threat among this group. Future research could collect video data of the meetings to disentangle whether partners' intergroup contact was related to RS-race because the experienced partners behaved negatively or with surprising aptitude.

Nonetheless, the effects of partners' prior intergroup experience seemed to catch up with the pair over time and exert the opposite influence, a pattern suggested by Shelton, Richeson, Salvatore, and Trawalter (2005, p. 401) when discussing ironic effects of preju-

dice. Thus, partners' prior contact may have eventually had the effect of making participants who were high in RS-race feel at ease. However, this trend is difficult to interpret in the absence of HPA activation.

Another question to consider is why might we have observed partner effects for RS-race and not for implicit prejudice? The findings for RS-race are consistent with the notion that being the potential target of rejection sensitizes individuals to cues from others, as research on interpersonal rejection sensitivity has shown (e.g., Ayduk, May, Downey, & Higgins, 2003). Prejudiced attitudes, however, may be applied to others, regardless of their behavior or disposition; as such, people high in implicit prejudice may be less likely to focus attentional resources on individuating information about their partners and thus miss cues associated with prior contact.

### *Effects Beyond the Friendship*

A recent review of intergroup anxiety research (Paolini et al., 2006) contends that if people who normally experience intergroup anxiety have repeated positive intergroup contact, then chronic experiences of intergroup anxiety may be attenuated. Though the present study did not assess intergroup anxiety per se, our findings offer initial support for the dynamic process of intergroup anxiety change described by Paolini et al. (2006). More specifically, Paolini et al. (2006) distinguished between *episodic* intergroup anxiety, which is anxiety experienced during any given intergroup interaction, and *chronic* intergroup anxiety, which is a generalized anxiety about intergroup interactions. According to these authors, experiences of episodic intergroup anxiety feed chronic intergroup anxiety; in turn, chronically feeling anxious about outgroup members feeds anxiety experienced in future intergroup episodes. In the present research, we observed reductions in anxiety during each of three cross-group meetings, which would be consistent with reductions in episodic intergroup anxiety. We further observed reductions in anxious mood within a diverse social environment, which can be roughly approximated to chronic intergroup anxiety.

Consistent with this interpretation, it seems that the development of a new cross-group friendship at least temporarily increased interest in intergroup interactions among implicitly prejudiced participants. The increases in intergroup initiation among implicitly prejudiced participants who made a cross-group friend add to past findings regarding the role that intergroup anxiety can play in avoidance of outgroup members (Islam & Hewstone, 1993; Paolini, Hewstone, Cairns, & Voci, 2004). It is possible that increased self-initiation of intergroup contact represents an early phase of attitude change among implicitly prejudiced individuals, whereby the development of closeness with an outgroup member disconfirmed negative expectations and piqued curiosity about people from other groups. Further, initiating more intergroup interactions does not guarantee future friendships, as the initiation finding could also represent an information-gathering phase. Here, it is important to note that we did not test for such effects longer than 10 days following the final friendship meeting, nor beyond the particular institutional context of the study. Thus, a necessary direction for future research is to chart the trajectory of behavioral, emotional, and attitudinal change that may occur over an extended period following the development of cross-group friendship.

We tested for effects of both RS-race and implicit prejudice on anxious mood and cross-group initiation but observed that the scales predicted intergroup outcomes in different domains of daily life. Prejudice has long been related to avoidance of intergroup contact (Allport, 1954; Paolini, Hewstone, Cairns, & Voci, 2004), which might explain why implicit prejudice related specifically to initiation of intergroup interaction following the formation of a new cross-group friendship. Nonetheless, the experimental manipulation of cross-group friendship appeared to improve anxious mood among all participants in this setting. Further research on the mechanisms through which cross-group friendship improves intergroup interactions will serve to elucidate the domains of intergroup interaction that are most relevant to attitudes versus social rejection concerns.

### *Limitations and Future Directions*

Although these results are encouraging with respect to the power of close positive intergroup contact, several methodological limitations are worth noting. Despite the strength of our manipulation to foster closeness among those most reticent about intergroup interaction (i.e., high RS-race, high implicit prejudice), it is important to recognize that this was a relatively safe environment, where both the laboratory setting and the relatively diverse campus environment provided sanction by authority (Allport, 1954). In addition, the participants involved in this study were attracted by the opportunity to make a new friend and were therefore motivated to expand themselves through the development of a new relationship (Aron, Aron, & Norman, 2001; Wright et al., 2002). These conditions may explain why partner closeness increased steadily in both friendship conditions, unaffected by RS-race or implicit prejudice, despite the more nuanced patterns for cortisol reactivity. Such trends suggest that, even though everyone experienced subjective increases in closeness, the experience of closeness was not equally stress free for all participants across all time points. Future research should explore whether a friendship manipulation would be comparably successful in nonoptimal conditions or between groups with histories of intense and violent conflict (cf. Islam & Hewstone, 1993; Paolini, Hewstone, Cairns, & Voci, 2004).

It should also be noted that when participants first met, they knew they would have to interact with their partner twice more in the near future. Thus, our participants may have been particularly motivated to have a good interaction during the initial friendship meeting. Although this methodological feature diverges from past intergroup anxiety research, the first meeting may reflect some aspects of real-life cross-group interactions, especially between acquaintances, where the possibility exists of meeting the outgroup member on another occasion (e.g., Towles-Schwen & Fazio, 2003).

In this study, we systematized the content of the cross-group interactions such that participants' opportunity to discuss ethnicity-related issues were generally minimized. However, some theorists have argued that group membership must be salient during intergroup contact for positive outcomes to generalize from experiences with individual outgroup members to the outgroup as a whole (see Brown & Hewstone, 2005; Hewstone & Brown, 1986). On the other hand, a cross-group friendship may provide a safe environment in which to discuss difficult group-based issues with an outgroup member, as the intergroup closeness existing



between friends implies a certain degree of trust and confidence that the discussion can take place without discrimination (see Tropp, in press; Tropp & Bianchi, 2007). Relatedly, Wright et al. (1998, 2005) found that discussing racial issues as a part of the friendship-building process did not undermine the positive effects of friendship, and they proposed that such discussions may in fact be important for promoting generalization. On the other hand, it is conceivable that hearing a friend say something discriminatory or prejudiced would likely be more hurtful than experiencing discrimination from a stranger. Thus, a remaining question of interest is whether conversations about group processes, such as racism or stigmatization, are more productive when discussed among cross-group friends, or whether such difficult topics unravel advances towards closeness (Pettigrew & Tropp, 2006; Wright et al., 2002).

The findings reported here also have implications for research surrounding the common ingroup identity model (Gaertner, Dovidio, Nier, Ward, & Banker, 1999). This model suggests that viewing outgroup members as part of a common ingroup fosters benefits, such as reduced intergroup bias (Gaertner, Rust, Dovidio, Bachman, & Anastasio, 1994) and greater institutional belonging and commitment among minority group members (Dovidio, Gaertner, Flores Niemann, & Snider, 2001). Cross-group closeness may facilitate this process, as the self-expansion theory of closeness predicts that both ingroups and the group memberships of close cross-group friends become included in the self-concept (Aron et al., 2004). Thus, cross-group friendship may be a particularly effective means to open the door to inclusive ingroup representations.

### Conclusions

When our research is considered together with previous examinations of cross-group friendship on intergroup anxiety (i.e., Levin et al., 2003; Paolini, Hewstone, Cairns, & Voci, 2004; Paolini et al., 2006; Wright et al., 2002; Wright & van der Zande, 1999), there seems to be a consistent pattern: The formation of cross-group friendship leads to reduced anxiety in intergroup contexts. The findings presented here causally demonstrate that cross-group friendship reduces anxiety in intergroup contexts among people who are predisposed to experience such anxiety. By combining several methods to assess anxiety, we convergently tested the anxiety-reducing effects of cross-group friendship within one study. The longitudinal elements of the design allowed us to observe the intermediate effects of friendship development. Future research on cross-group friendship can therefore explore more detailed questions, such as the boundary conditions under which intergroup conflict outweighs the potential of friendship and the mechanisms through which friendship shapes affective experiences with outgroup members. Altogether, this experiment demonstrated substantial benefits of cross-group friendship formation across multiple manifestations of anxiety in intergroup contexts.

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