

Affective Mediators of Intergroup Contact: A Three-Wave Longitudinal Study in South Africa

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Intergroup contact (especially cross-group friendship) is firmly established as a powerful strategy for combating group-based prejudice (Pettigrew & Tropp, 2006). Great advances have been made in understanding how contact reduces prejudice (Brown & Hewstone, 2005), highlighting the importance of affective mediators (Pettigrew & Tropp, 2008). The present study, a 3-wave longitudinal study undertaken among minority-status Colored high school children in South Africa ($N = 465$), explored the full mediation of the effects of cross-group friendships on positive outgroup attitudes, perceived outgroup variability, and negative action tendencies via positive (affective empathy) and negative (intergroup anxiety) affective mediators simultaneously. The target group was the majority-status White South African outgroup. As predicted, a bidirectional model described the relationship between contact, mediators, and prejudice significantly better over time than either autoregressive or unidirectional longitudinal models. However, full longitudinal mediation was only found in the direction from Time 1 contact to Time 3 prejudice (via Time 2 mediators), supporting the underlying tenet of the contact hypothesis. Specifically, cross-group friendships were positively associated with positive outgroup attitudes (via affective empathy) and perceived outgroup variability (via intergroup anxiety and affective empathy) and were negatively associated with negative action tendencies (via affective empathy). Following Pettigrew and Tropp (2008), we compared two alternative hypotheses regarding the relationship between intergroup anxiety and affective empathy over time. Time 1 intergroup anxiety was indirectly negatively associated with Time 3 affective empathy, via Time 2 cross-group friendships. We discuss the theoretical and empirical contributions of this study and make suggestions for future research.

Keywords: intergroup contact, cross-group friendship, full longitudinal mediation, intergroup anxiety, empathy

Allport's (1954) *contact hypothesis*, which proposed that positive intergroup contact is capable of reducing intergroup prejudice and improving intergroup relations, has received robust empirical

support, most impressively in Pettigrew and Tropp's (2006) meta-analysis of over 500 studies, and it has arguably now developed into an integrative *theory* (Hewstone, 2009). Advances in intergroup contact theory over the past decade have substantially deepened our understanding of the contact-prejudice relationship. These advances include the emergence of cross-group friendship as an important dimension of contact (for reviews, see Turner, Hewstone, Voci, Paolini, & Christ, 2007; Vonofakou et al., 2008), and an understanding of how intergroup contact promotes prejudice reduction by simultaneously reducing negative affect (e.g., intergroup anxiety; see Paolini, Hewstone, Cairns, & Voci, 2004; Pettigrew & Tropp, 2008; Turner, Hewstone, & Voci, 2007) and increasing positive affect (e.g., empathy; see Harwood, Hewstone, Paolini, & Voci, 2005; Pettigrew & Tropp, 2008; Turner, Hewstone, & Voci, 2007). There remain, however, a number of gaps in the contact literature that warrant further exploration. These include a full understanding of both the affective mechanisms that underlie the temporal contact-prejudice relationship (Brown & Hewstone, 2005; Pettigrew, 1997, 1998; Pettigrew & Tropp, 2008)

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and the precise relationship between contact and prejudice over time.

The present research aimed to address these two particular theoretical gaps in the existing contact literature. First, we investigated the simultaneous longitudinal role of positive (affective empathy) and negative (intergroup anxiety) *affective* mediators of contact in a single, three-wave longitudinal study (allowing us to test for full longitudinal mediation effects). Second, we responded to Pettigrew and Tropp's (2008) call for longitudinal research on the relationship between the two main mediators of contact effects, namely intergroup anxiety and empathy. To this end, we explored two rival longitudinal hypotheses regarding the relationship between these two affective variables (see Aberson & Haag, 2007; Pettigrew & Tropp, 2008). This particular avenue of enquiry is important for deepening our understanding of *how* contact reduces prejudice over time. The present research also aimed to contribute to the ever-advancing methodology of contact research by using a three-wave longitudinal design, employing structural equation modeling (SEM) to analyze the data, and comparing alternative longitudinal models to one another.

Below, we first discuss the important role played by cross-group friendships as a dimension of contact for prejudice reduction, followed by a discussion of intergroup anxiety and affective empathy as two key affective mediators of the contact–prejudice relationship. We then review some of the most important contributions made by the existing longitudinal contact literature toward our understanding of the contact–prejudice relationship as well as some of the remaining lacunae in this existing body of research. This is followed by a description of our three-wave longitudinal study.

Cross-Group Friendship and the Reduction of Prejudice

Direct cross-group friendship typically involves long-term contact between individuals with similar interests (Pettigrew, 1997) and provides a context for contact in which many of the important conditions for positive intergroup contact (including voluntary contact, equal status, contact intimacy, common goals, and stereotype disconfirmation) might be met (Pettigrew, 1998). A number of cross-sectional studies—spanning a variety of contexts, participants, and targets—have reported a negative relationship between cross-group friendships and a range of measures of prejudice (for reviews, see Turner, Hewstone, Voci, Paolini, & Christ, 2007; Vonofakou et al., 2008). The meta-analytic findings of Pettigrew and Tropp (2006) provide clear support for the effects of cross-group friendships on prejudice. They found that the 154 tests that included cross-group friendship as a measure of contact showed a significantly stronger ($p < .05$) negative relationship with prejudice (mean $r = -.25$) than did the remaining 1,211 tests that did not use cross-group friendships as a measure of contact (mean $r = -.21$). Of course, the causal direction between the development of cross-group friendships and positive outgroup attitudes cannot be clearly established from cross-sectional studies. We discuss below the need for experimental and/or longitudinal studies to better explore this question of causality.

Understanding *how* cross-group friendships are capable of reducing prejudice is crucial. One of the mediating mechanisms via which cross-group friendships are considered to reduce prejudice

is through the generation of affective ties (including the reduction of negative affect and the augmentation of positive affect; Pettigrew, 1998). Two of the most common affective mediators of intergroup contact effects studied in the literature to date are intergroup anxiety and empathy (Pettigrew & Tropp, 2008), and we now briefly discuss each mediator in turn. Pettigrew and Tropp (2008) recently conducted a meta-analytic review comparing the mediating effects of the three most common mediators explored in intergroup contact research—namely, outgroup knowledge, intergroup anxiety, and empathy. Intergroup anxiety was the strongest mediator, followed by empathy; the effects of outgroup knowledge were considerably weaker and are therefore not considered further here.

Affective Mediators of Contact Effects

Although an impressive body of cross-sectional literature on the affective mediation of intergroup contact effects exists (for a detailed review, see Brown & Hewstone, 2005), there is as yet limited high-quality research on the mediation of intergroup contact effects over time (for an exception, see Binder et al., 2009). Moreover, there exists no research that we know of that explores the mediation of contact effects over more than two time points (i.e., contact at Time 1, mediators at Time 2, and prejudice at Time 3, while controlling for the mediators and prejudice at Time 1, and contact and prejudice at Time 2), or what Selig and Preacher (2009) have termed “full longitudinal mediation.” We consider, first, intergroup anxiety, then empathy, then the longitudinal relationship between these two affective mediators.

Intergroup Anxiety

Stephan and Stephan (1985) proposed that individuals anticipating future intergroup encounters are more likely to experience (intergroup) anxiety if they anticipate negative psychological, behavioral, and/or evaluative consequences for the self arising from such intergroup encounters (but see Mallett, Wilson, & Gilbert, 2008, who show that, ironically, intergroup encounters often turn out to be *more pleasant* than people initially expect them to be). These negative expectations, they suggest, might be brought about by a lack of prior intergroup contact, large status differences, a history of intergroup conflict, or negatively skewed outgroup knowledge and stereotypes. The resulting intergroup anxiety might have a range of consequences, including behavioral (e.g., contact avoidance), cognitive (e.g., information processing biases), and/or affective effects (e.g., augmented emotional responses during the contact and negative evaluative responses after the contact; Stephan & Stephan, 1985). Close friendships serve a stress-buffering role in peer relationships (S. Cohen, Sherrod, & Clark, 1986) and are associated with a reduction in social anxiety (La Greca & Lopez, 1998). Cross-group friendships can serve a similar function in the realm of intergroup contact by reducing the negative expectancies previously associated with intergroup encounters (Page-Gould, Mendoza-Denton, & Tropp, 2008), often by highlighting unexpected similarities (e.g., common interests; Mallett et al., 2008).

Evidence in support of the mediational role of intergroup anxiety is impressive (for reviews, see Brown & Hewstone, 2005; Paolini, Hewstone, Voci, Harwood, & Cairns, 2006; Pettigrew &

Tropp, 2008). Numerous cross-sectional studies have consistently shown that intergroup contact (and specifically cross-group friendship) is associated with reduced intergroup anxiety that, in turn, is associated with reduced prejudice on a variety of measures (e.g., Harwood et al., 2005; Islam & Hewstone, 1993; Paolini et al., 2004; Turner, Hewstone, & Voci, 2007; Voci & Hewstone, 2003; Vonofakou, Hewstone, & Voci, 2007).

Empathy

The empathic response is a prototypical positive response that would be increased as a result of close friendships; it is characterized by “the ability to engage in the cognitive process of adopting another’s psychological point of view, and the capacity to experience affective reactions to the observed experience of others” (Davis, 1994, p. 45). Both forms of empathic responding are associated with positive outcomes in interpersonal and intergroup relations (e.g., Batson et al., 1997; Finlay & Stephan, 2000; Galinsky & Moskowitz, 2000; Miller & Eisenberg, 1988; Stephan & Finlay, 1999).

Cross-group friendships provide a powerful context for the experience of cognitive and/or affective empathy toward the outgroup exemplar. The sense of similarity and interpersonal attraction that are a feature of friendships not only encourage greater perspective-taking (Galinsky & Moskowitz, 2000), but attributes used to describe the self or the ingroup are, as a result, also attributed to the outgroup friend (Aron, Aron, & Smollan, 1992; Aron et al., 2004). Given sufficient category salience or typicality, these benefits are extended to the outgroup as a whole (Brown & Hewstone, 2005), yielding a more complex view of the outgroup (see Harwood et al., 2005, for such moderated mediation involving the perspective-taking aspect of empathy). Comparatively little attention has been paid thus far to the mediating effect of empathy in the contact literature (Pettigrew & Tropp, 2008), but results show that intergroup contact (including cross-group friendships) is positively associated with empathy that, in turn, is negatively associated with prejudice (e.g., Aberson & Haag, 2007; Harwood et al., 2005; Pagotto, Voci, & Maculan, 2010; Tam, Hewstone, Harwood, Voci, & Kenworthy, 2006; Turner, Hewstone, & Voci, 2007).

The Relationship Between Intergroup Anxiety and Empathy

We also lack knowledge concerning the temporal relationship between intergroup anxiety and empathy, a gap that our research seeks to fill. Relevant prior research has addressed both cognitive (perspective-taking) and affective (affective empathy) aspects of empathy in this context. Stephan and Finlay (1999) suggested that intergroup anxiety may be reduced through learning to view the world through the perspective of the outgroup. Aberson and Haag (2007) found support for this suggestion in a cross-sectional study of Caucasians’ contact with African Americans, which found that contact promoted perspective-taking, which reduced anxiety, which itself was associated with prejudice. They did not, however, test an alternative model in which lower intergroup anxiety precedes greater perspective-taking. Pettigrew and Tropp (2008) proposed an alternative hypothesis, suggesting that intergroup anxiety should be reduced before the empathic response can be developed.

We focus on affective empathy (as opposed to perspective-taking) in this research, so as to consider longitudinally the role of *affective* mediators of contact specifically, because these have received strongest support in prior research (Brown & Hewstone, 2005; Pettigrew & Tropp, 2008). We tested the two alternative hypotheses (reduction of empathy promotes reduction of anxiety vs. reduction of anxiety promotes empathy) in our longitudinal study reported below.

The existing contact literature exploring affective mediators is characterized by (a) a predominance of cross-sectional studies, (b) a limited number of studies that have explored the simultaneous mediating role of positive and negative affect (for recent cross-sectional exceptions, see Harwood et al., 2005; Tam et al., 2006; Turner, Hewstone, & Voci, 2007), and (c) a lack of research exploring the sequencing of affective mediators (Pettigrew & Tropp, 2008). The present research addresses these issues by focusing on the simultaneous effects of positive (affective empathy) and negative (intergroup anxiety) mediators of the effect of cross-group friendship over time, and explores the temporal relationship between intergroup anxiety and affective empathy.

The Temporal Relationship Between Contact and Prejudice

The contact literature has often been criticized on the grounds that it is difficult to distinguish actual contact effects (where intergroup contact reduces prejudice) from selection bias (i.e., initial low vs. high levels of prejudice are associated with increased contact vs. avoidance; Allport, 1954; Amir, 1969; Pettigrew, 1998). A number of studies in which cross-sectional data were analyzed using specialized statistical methods such as non-recursive SEM (e.g., Pettigrew, 1997; van Dick et al., 2004; Wagner, van Dick, Pettigrew, & Christ, 2003) have supported the underlying tenet of the contact hypothesis (see also Pettigrew & Tropp, 2006). Importantly, these findings suggest that (a) bidirectional pathways are essential for understanding the relationship between intergroup contact and prejudice, (b) the path from intergroup contact to prejudice is generally stronger than the reciprocal path from prejudice to intergroup contact, and (c) these effects need to be explored in a wide variety of settings as they may differ across groups or contexts. Cross-sectional studies are, by design, not suitable for testing causal hypotheses (MacCallum & Austin, 2000). Experimental designs (where third variable effects can be controlled for) offer the best means of exploring causal hypotheses but may lack external validity. When it comes to nonexperimental, survey data, longitudinal studies are better suited than cross-sectional studies for exploring questions of causality.

Though sparse, the longitudinal contact literature supports the contact–prejudice relationship implied by the contact hypothesis (that intergroup contact reduces prejudice). This support is encouraging, as it complements the meta-analytic findings of Pettigrew and Tropp (2006; based largely on cross-sectional data), and it has been generated across a wide range of ingroup–outgroup comparisons. Two ambitious longitudinal studies stand out—namely, those of Levin, van Laar, and Sidanius (2003) as well as Binder et al. (2009).

Levin et al.’s (2003) study included data collected over a 4-year period (for a detailed description of their entire research program, see Sidanius, Levin, van Laar, & Sears, 2009). Using a large

sample of students from an American college (drawn from four ethnic groups), Levin et al. studied the relationship between cross-group friendships, intergroup anxiety, and ingroup bias over time. They found evidence in favor of equivalent bidirectional paths between contact and prejudice (although they did not report any statistical comparison of these bidirectional pathways to one another). They further found that ingroup bias and intergroup anxiety at the end of the first year of college were negatively associated with cross-group friendships during the second and third years of college. Conversely, cross-group friendships in the second and third years of college were negatively associated with ingroup bias and intergroup anxiety at the end of the fourth year at college.

Binder et al. (2009) undertook a two-wave longitudinal study (over approximately 6 months) among both minority- and majority-status secondary school children in Belgium, Germany, and England. They explored the relationship between two measures of contact (quality and quantity), intergroup anxiety, and two measures of prejudice (social distance and negative intergroup emotions). Similar to Levin et al. (2003), Binder et al. found support for the bidirectional relationship between contact and prejudice. They also found that intergroup anxiety mediated the relationship between contact and prejudice over time. The size of these effects was generally greater for majority- than minority-status participants, as found by Tropp and Pettigrew (2005; in fact, for Binder et al., 2009, effects were, in some cases, nonsignificant for minorities). Given the relative lack of research on longitudinal contact effects among minority-status samples, the present longitudinal study attempted to add to this literature by considering the longitudinal effects of contact for a minority-status group in relation to their interactions with a majority-status group.

Due to the scarcity of longitudinal research on intergroup contact, we identified five particular areas where further research is needed. First, it is necessary to gauge to what extent the existing longitudinal contact effects reported among predominantly American and European samples can be replicated within entirely novel social contexts (Pettigrew, 1998; Pettigrew & Tropp, 2006). Second, although the cross-sectional contact literature has highlighted important mediation effects within the contact–prejudice relationship, Cole and Maxwell (2003) cautioned that cross-sectional mediation effects should not automatically be assumed to be identical to longitudinal mediation effects. It is therefore imperative that findings from cross-sectional contact studies are tested within longitudinal studies. Third, the existing longitudinal literature does not address questions relating to the simultaneous mediation of contact effects over time by at least two affective mediators. Fourth, most hypotheses in the existing longitudinal contact literature have focused exclusively on the relationship between contact and prejudice. Our understanding of the processes mediating the contact–prejudice relationship can be deepened by understanding how such mediators influence one another within the context of the contact–prejudice relationship over time. Finally, the results reported by Binder et al. (2009), in which the longitudinal contact effects were reduced to nonsignificance among minority-status groups, warrant further investigation insofar as these results are at odds with existing meta-analytic evidence. Tropp and Pettigrew (2005) found that, despite the significant difference in contact effects as a function of group status, such contact effects nevertheless continued to remain significant among minority-status samples.

We also sought to improve the methodology of longitudinal research on intergroup contact with respect to issues of sample size, measurement invariance, and multiple time points. We need studies with larger samples of matched respondents (i.e., where each respondent participates at each wave of data collection, allowing for an individual's responses to be matched over time). The vast majority of existing longitudinal contact studies rely on small ($N < 100$) sample sizes matched over time (the two notable exceptions being Binder et al., 2009, and Levin et al., 2003). Small matched samples restrict the type of statistical analyses that can be conducted on the data and limit the complexity of the hypotheses that can be tested. Thus, for example, although statistical techniques such as SEM offer a range of advantages over various forms of regression analyses (MacCallum & Austin, 2000; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), they require relatively large sample sizes to generate reliable parameter estimates (Hoyle, 1995; Hu & Bentler, 1999).

Longitudinal studies also need to include an analysis of whether measurement invariance exists in the measurement model over time. This is particularly relevant to longitudinal survey research because survey questions may be interpreted differently by respondents over time as a result of events that might have occurred in between the waves of data collection, making comparisons of responses to the same question(s) over time untenable. Thus, establishing measurement invariance for each of the constructs over time is a necessary precondition for any meaningful comparisons of participants' responses (and the relationships between these responses) over time (Cole & Maxwell, 2003; Meredith, 1993; Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). As far as we can tell, none of the previous longitudinal analyses have reported on this important question.

Finally, longitudinal studies need to collect data over more than two time points if they are to explore full longitudinal mediation effects (Selig & Preacher, 2009). As far as we are aware, the study by Levin et al. (2003), undertaken over five waves, is the only one that collected data over more than two time points, although they did not test statistically the mediation of contact effects over time. Although previous studies (e.g., Binder et al., 2009; Eller & Abrams, 2003, 2004) have explored the mediation of contact effects over two time points, three-wave longitudinal models are a minimum requirement when attempting to explore full longitudinal mediation (Cole & Maxwell, 2003; Selig & Preacher, 2009). Cole and Maxwell (2003) emphasized the importance of satisfying the assumption of stationarity before longitudinal mediation analyses can be undertaken. Stationarity refers to the assumption that "the degree to which one set of variables produces change in another set remains the same over time" (Cole & Maxwell, 2003, p. 560; see also Kenny, 1979). This assumption of stationarity cannot be fully tested in a two-wave model, and there exists the possibility of biased parameter estimates when such stationarity is (incorrectly) assumed (Cole & Maxwell, 2003). Any longitudinal study capable of exploring full longitudinal mediation over the course of three waves of data collection would be the first strict test of the longitudinal mediation of contact effects over time. Such a study would be an important test of the mediation effects implied (in the case of Levin et al., 2003) and tested (in the case of Binder et al., 2009) in the existing longitudinal contact literature, but it would additionally test multiple mediators and their relationships over time. Our longitudinal study attempted to address these the-

oretical and methodological gaps described above. Before describing the details of the present study, we take a brief look at the intergroup context of our study.

The South African Context

South African history is dominated by accounts of intergroup conflict (characterized by over 40 years of legislated racial discrimination—a period known as Apartheid—that ended in 1990). The legacy of the Apartheid racial categories—namely, White, Black (African), Colored (of mixed racial heritage), and Indian (of Asian descent)—persists within post-Apartheid South Africa, and race-related issues remain salient among South Africans in general (Pillay & Collings, 2004; Slabbert, 2001). Furthermore, despite the fact that the political power has shifted from White to Black South Africans in post-Apartheid South Africa, Whites continue to enjoy a socioeconomic advantage over Black and Colored South Africans. The intermediate, or marginalized, status of Colored South Africans has remained relatively unchanged (Grossberg, 2002), and they continue to occupy an arguably lower group-status than that of majority-status White South Africans.

Intergroup contact remains limited in South Africa and is often characterized by a sense of discomfort and mistrust (e.g., Durrheim & Dixon, 2005; Gibson, 2004; Hofmeyr, 2006). Schools and residential areas remain, by-and-large, racially homogeneous (Chisholm & Nkomo, 2005), whereas meaningful contact in the workplace or in social settings is rare (Gibson, 2004; Hofmeyr, 2006; Schrieffer, Tredoux, Finchilescu, & Dixon, 2010). Of particular concern, large proportions of South Africans from all population groups report having no cross-group friends, and they find it hard to imagine ever having a cross-group friend (Gibson, 2004). More encouragingly, cross-sectional studies have shown that where positive intergroup contacts are reported, they are associated with reduced prejudice (e.g., Finchilescu, Tredoux, Muianga, Mynhardt, & Pillay, 2006; Moholola & Finchilescu, 2006; Swart, Hewstone, Christ, & Voci, 2010), although self-selection bias cannot be ruled out as a possible explanation of these findings.

The Present Study

To address the respective theoretical gaps described earlier, the present research planned to (a) explore longitudinal contact effects within a novel social context relative to previous longitudinal contact studies; (b) provide a necessary test of a number of the now established cross-sectional findings relating to the relationship between intergroup contact, affective mediators, and prejudice; (c) explore the longitudinal mediation of contact effects by two affective mediators simultaneously; and (d) explore these longitudinal contact effects among a minority-status sample. We planned to address the methodological gaps identified earlier by, specifically, having a sufficiently large matched sample to employ more complex statistics and to test more complex hypotheses; by testing for measurement invariance over time; and, for the first time, by exploring the full longitudinal mediation of contact effects by collecting the requisite minimum of three waves of data.

The present study focused on the relationship between Colored (as the minority-status perceiver group) and White (as the majority-status target group) South Africans, using a three-wave

longitudinal design, over a period of 12 months. We explored the impact of Time 1 contact on Time 3 prejudice, via Time 2 affective mediators. Specifically, cross-group friendship, as a particularly potent form of contact (Pettigrew & Tropp, 2006), was selected as the measure of contact. We chose intergroup anxiety and affective empathy as key negative and positive affective mediators, respectively (based on Pettigrew & Tropp, 2008). We selected three widely used outcome measures (e.g., Brown & Hewstone, 2005), each representing a different dimension of prejudice. These included a measure of affective prejudice (outgroup attitudes) focusing on feelings toward the outgroup, cognitive prejudice (perceived outgroup variability) exploring that component of stereotyping that concerns whether outgroup members are cognitively represented as similar to or different from each other, and quasi-behavioral prejudice (negative action tendencies) exploring the desire to engage in negative behaviors against the outgroup. These multiple measures of prejudice allowed us to explore the full longitudinal mediation of contact effects on affective, cognitive, and quasi-behavior dimensions of prejudice simultaneously for the first time. We had previously explored these particular measures within the South African context in cross-sectional research among Colored South Africans (see Swart et al., 2010).

Predictions

We tested three predictions in this study. First, we predicted that a model describing bidirectional relationships between the various variables would describe the data better than either a “forward” (i.e., Time 1 contact to Time 2 mediators to Time 3 prejudice) or a “reverse” (i.e., Time 1 prejudice to Time 2 mediators to Time 3 contact) unidirectional model alone. This prediction was formulated on the basis of previous cross-sectional studies that have employed nonrecursive SEM (e.g., Pettigrew, 1997; van Dick et al., 2004; Wagner et al., 2003) and the recent longitudinal study reported by Binder et al. (2009), all of which showed bidirectional paths to be operational.

Second, we predicted that Time 1 cross-group friendships would be negatively associated with Time 3 outgroup prejudice (i.e., be positively associated with positive outgroup attitudes and perceived outgroup variability, and be negatively associated with negative action tendencies) via the mediation of intergroup anxiety and affective empathy at Time 2. In other words, we predicted that cross-group friendships at Time 1 would be significantly negatively associated with intergroup anxiety at Time 2, and would be significantly positively associated with affective empathy at Time 2. Intergroup anxiety at Time 2 would, in turn, be significantly negatively associated with positive outgroup attitudes and perceived outgroup variability at Time 3, and would be significantly positively associated with negative action tendencies at Time 3. In contrast, affective empathy at Time 2 would be significantly positively associated with positive outgroup attitudes and perceived outgroup variability at Time 3, and would be significantly negatively associated with negative action tendencies at Time 3. It is worth emphasizing here that, given the longitudinal nature of the data, this second prediction concerning longitudinal mediation effects specifically tests for the presence of *partial* mediation effects (i.e., any full longitudinal mediation effects after the effects

of all prior levels of each of the outcome variables have been controlled for).

Finally, we predicted that there would be an inverse relationship between intergroup anxiety and affective empathy over time. Given the existence of two alternative hypotheses in this regard (as described earlier), we did not specify any particular sequencing order with respect to this inverse temporal relationship.

Method

Respondents

The data were collected among Colored junior high school pupils in the Western Cape Province of South Africa from a school where Coloreds make up 90% of the student body (the remaining 10% is made up by Black pupils). There were no White students attending the respondents' school. The Head of the school, acting *in loco parentis*, gave consent for the students' participation in this research for each wave of data collection. This consent notwithstanding, students were informed during the first wave of data collection (and reminded at subsequent data collection points) that they were free to withdraw their participation from the study at any time (none did). Participants were assured that their responses would be treated as confidential and anonymous.

The surveys were completed during regular class times. The three waves were approximately 6 months apart, with data collected in September 2005, and March and September 2006. Only the data from those surveys where respondents identified themselves as Colored South Africans were used in the reported analyses. Data were collected from 465 (out of a total of 483) Colored respondents ($n = 261$ male adolescents, and $n = 201$ female adolescents) at Time 1 (mean age = 14.74 years, $SD = 1.10$ years), constituting a 97.5% participation rate (18 students from the potential Time 1 cohort were absent due to illness or other academic commitments at the time of data collection). Of these 465 original respondents, 394 participated at Time 2, and 351 participated at Time 3. Subsequent to the completion of the third wave of data collection, we were able to match the data of 331 Colored respondents ($n = 134$ male adolescents, and $n = 197$ female adolescents) across all three waves (Time 1 mean age for matched respondents = 14.69 years, $SD = 1.07$ years).

Materials

Respondents were asked to supply various biographical details about themselves, including age, gender, date of birth, first (home) language, current school grade (8, 9, or 10), and the broad population group they identify themselves with (Black, Colored, Indian, or other). The target group was the White outgroup. The questionnaire was presented in both English and Afrikaans (the two primary languages of tuition at the school), and the ordering of the constructs was counterbalanced. The measures were all constructed as Likert scales, with five response options available for each question. The scales were coded such that higher scores (or means) denote higher levels of a particular construct.

Cross-group friendship. A two-item measure of cross-group friendship asked respondents the following: "How many close friends do you have who are White?" (scaled as follows: 0 = *none*, 1 = *one friend*, 2 = *2–5 friends*, 3 = *5–10 friends*, 4 = *more than*

10 friends), and "How often do you spend time with your White friends?" (scaled from 0 = *never* to 4 = *all the time*).

Intergroup anxiety. Intergroup anxiety was measured on a six-item scale adapted from Stephan and Stephan's (1985) original 10-item scale.¹ This scale asked respondents the following question:

Imagine that your class is having a student exchange trip to a school where there are mostly White pupils. On this trip you have to work on different activities with a group of White students whom you do not know. How do you think you would feel in this situation?

Respondents were asked to rate their feelings along six bipolar adjective sets (scaled from 1 to 5 and anchored as follows: 1 = *relaxed*, 5 = *nervous*; 1 = *pleased*, 5 = *worried*; 1 = *not scared*, 5 = *scared*; 1 = *at ease*, 5 = *awkward*; 1 = *open*, 5 = *defensive*; and 1 = *confident*, 5 = *unconfident*).

Affective empathy. A measure of affective empathy (based on Davis, 1994; Dovidio et al., 2004; Turner, Hewstone, & Voci, 2007) asked respondents to indicate the extent to which they agreed or disagreed with the following three statements: "If I heard that a White person was upset, and suffering in some way, I would also feel upset"; "If I saw a White person being treated unfairly, I think I would feel angry at the way they were being treated"; and "If a White person I knew was feeling sad, I think that I would also feel sad" (scaled for each statement from 1 = *strongly disagree* to 5 = *strongly agree*).

Positive outgroup attitudes. Outgroup attitudes were measured on a four-item scale adapted from Wright, Aron, McLaughlin-Volpe, and Ropp (1997) that asked respondents the following: "Based on your experience, please rate the extent to which you have the following feelings about White people." Respondents were asked to respond along four bipolar adjective scales (scaled from 1 to 5 and anchored as follows: 1 = *negative*, 5 = *positive*; 1 = *hostile*, 5 = *friendly*; 1 = *suspicious*, 5 = *trusting*; 1 = *contempt*, 5 = *respect*).

Perceived outgroup variability. Perceived outgroup variability was measured on a two-item scale (adapted from Kashima & Kashima, 1993): Respondents were asked to indicate the extent to which they agreed with each of two statements: "All White people think the same and have similar views and opinions on things"; "I think all White people behave in the same way" (scaled for both statements from 1 = *completely agree* to 5 = *completely disagree*).

Negative action tendencies. Negative action tendencies were assessed on a three-item measure adapted from Mackie, Devos, and Smith (2000) that asked respondents, thinking of White people in general, to indicate the extent to which they would like to perform the following actions: "argue with them," "have a fight with them," and "stand up to them" (scaled for each item from 1 = *never* to 5 = *always*).

¹ The particular six items used in this study were selected on the basis of having previously been used within the South African context among Colored South African high school students, and shown to form a reliable measure of intergroup anxiety (Swart et al., 2010).

Results

Preliminary Data Analyses

Before proceeding with any analysis of the data itself, we first ran two multivariate analyses of variance to determine whether those individuals who dropped out of the study after Time 1 ($N = 51$) and Time 2 ($N = 63$) were significantly different from those respondents who completed the questionnaire at all three time points, along the biographical variables of gender, age, and grade in school,² as well as each of the six constructs under study. Results from these analyses showed multivariate differences between those respondents who dropped out after Time 1 and the matched respondents, $F(9, 372) = 2.81, p < .01$, partial $\eta^2 = .06$, as well as between those respondents who dropped out after Time 2 and the matched respondents, $F(9, 383) = 2.92, p < .01$, partial $\eta^2 = .06$.

A closer inspection of the univariate statistics showed, however, very few significant differences. Respondents who dropped out after Time 1 (mean age = 15.08 years, $SD = 1.44$) were significantly older than the matched respondents (mean age = 14.69 years, $SD = 1.07$) at Time 1, $F(1, 380) = 6.81, p < .05$, partial $\eta^2 = .01$, and respondents who dropped out after Time 2 (mean age = 9.57, $SD = 0.71$) were on average in a significantly lower grade at school than the matched respondents at Time 2 (mean age = 9.87, $SD = 0.82$), $F(1, 391) = 4.71, p < .01$, partial $\eta^2 = .01$. It is moreover important to point out here that (a) these univariate significant differences notwithstanding, the effect size for each univariate difference is considered small (J. Cohen, 1988), and (b) neither those respondents who dropped out after Time 1, nor those respondents who dropped out after Time 2, differed significantly from the matched respondents along any of the six main variables under study. These preliminary analyses suggest that any missing data are missing at random. As such, all the respondents who participated at Time 1 ($N = 465$) were included in the final analyses of the longitudinal SEM with latent constructs (irrespective of whether some of the respondents may have dropped out after Time 1 or Time 2) using the full information maximum likelihood method. When undertaking SEM with latent constructs, full information maximum likelihood allows for the generation of more accurate parameter estimates where partially recorded (or missing) data may be considered missing at random (see Enders, 2001; Newman, 2003; Schafer & Graham, 2002).

Next, we assessed the item distributions for each item at each time point by exploring the extent of item skewness and kurtosis using the cutoff criteria suggested by West, Finch, and Curran (1995). Using Monte Carlo simulation studies, West et al. proposed that values of skewness between -2.00 and 2.00 and values of kurtosis between -7.00 and 7.00 suggest sufficient normality of item distributions when planning to undertake confirmatory factor analyses (CFAs) using the maximum likelihood estimator. Preliminary analyses of the item distributions across all three waves of data showed values of skewness ($M = 0.12, SD = 0.84$; minimum = -1.40 , maximum = 1.76) and kurtosis ($M = -0.19, SD = 0.75$; minimum = -1.06 , maximum = 2.34) well within the acceptable ranges suggested by West et al. A wave-by-wave analysis yielded a similar pattern of item distributions.

We initially explored construct factor validity independently for each factor at each time point via exploratory factor analyses using

a maximum likelihood estimator. Each construct proved to be unidimensional at each time point. Furthermore, each measure showed good stability over time. The scale reliability, mean, and standard deviation for each measure at each time point are given in Table 1. Means were calculated by averaging the raw scores of the observed variables that were retained for the final analyses separately for each of the primary constructs.

Each of the measures showed acceptable scale reliability across all three time points (see Table 1). To further explore the scale reliability for perceived outgroup variability at each time point, we calculated the inter-item correlations between the two items of the construct at each time point. The average inter-item correlations ranged between $r = .41$ and $r = .52$ across the three time points. These values fall predominantly within the acceptable range from $r = .15$ to $r = .50$ suggested by Clark and Watson (1995). Nonetheless, any measurement error associated with the relatively low Cronbach's alpha for the two-item measure of perceived outgroup variability at Time 1 (Cronbach's $\alpha = .57$) is taken into account in the subsequent SEM, described below.³

SEM With Latent Constructs

To explore the temporal effects of cross-group friendships, we used SEM with latent constructs (Mplus Version 3.11; Muthén & Muthén, 1998–2006) to investigate the structural relationships between cross-group friendships, intergroup anxiety, affective empathy, outgroup attitudes, perceived outgroup variability, and negative action tendencies over the course of three waves of data collection. Each of the explored constructs can be regarded as a latent (unobserved) construct, measured by manifest (observed) indicators (the individual items). For cross-group friendships, affective empathy, outgroup attitudes, perceived outgroup variability, and negative action tendencies, the individual items used to measure each particular latent construct served as the manifest indicators for that latent construct. The six indicators used to measure the underlying latent construct of intergroup anxiety were parceled into three parcels of two items per parcel using the item-to-construct method proposed by Little, Cunningham, Shahar, and Widaman (2002). Whenever latent constructs are measured by more than four manifest indicators, this parceling procedure allows for the creation of item parcels that have balanced factor loadings onto the latent variable. This technique increases model parsimony and reduces the influence of various sources of potential measurement error associated with each individual item (for a more detailed discussion of the benefits of parceling, see Little et al., 2002).

² Only 11 of the 465 respondents who were included in this study indicated English as their first language. The remaining 454 all indicated Afrikaans as their first language. A series of multivariate analyses of variance showed no significant relationships between first language of respondents and any of the other biographical variables or the six main variables under study.

³ The entire set of analyses for this study, including each of the longitudinal structural equation models, was rerun without the perceived outgroup variability measure. Excluding this variable completely from the study did not change any of the overall results or significantly improve model fit. As such, it was decided to retain this variable in our analyses.

Table 1
Scale Reliability (Cronbach's Alpha), Mean, and Standard Deviation for Each Measure at Time 1, Time 2, and Time 3

Scale	Cronbach's α		
	Time 1 (<i>N</i> = 465)	Time 2 (<i>N</i> = 394)	Time 3 (<i>N</i> = 351)
Direct cross-group friendships	.75	.80	.75
<i>M</i> (<i>SD</i>)	0.95 (0.97)	0.99 (1.00)	0.91 (0.94)
Intergroup anxiety	.78	.78	.80
<i>M</i> (<i>SD</i>)	2.46 (0.82)	2.52 (0.88)	2.37 (0.85)
Affective empathy	.69	.73	.80
<i>M</i> (<i>SD</i>)	3.46 (1.00)	3.65 (0.99)	3.66 (1.04)
Positive outgroup attitudes	.68	.68	.73
<i>M</i> (<i>SD</i>)	3.86 (0.76)	3.61 (0.90)	3.77 (0.84)
Perceived outgroup variability	.57	.63	.68
<i>M</i> (<i>SD</i>)	3.65 (1.04)	3.88 (1.05)	4.03 (0.96)
Negative action tendencies	.72	.74	.72
<i>M</i> (<i>SD</i>)	1.79 (0.85)	1.91 (0.96)	1.71 (0.83)

Note. Each measure was scaled on a Likert scale ranging from 1 to 5, except for cross-group friendships, which was scaled from 0 to 4. Scales were scored (and where necessary reverse scored) such that higher scores reflect more cross-group friendships, greater intergroup anxiety, greater affective empathy, more positive outgroup attitudes, greater perception of outgroup variability, and greater negative action tendencies.

Model fit of the measurement models. In the first step, we explored the model fit of the measurement model. We followed up our initial exploratory factor analyses with a CFA using a robust maximum likelihood estimator to determine the goodness-of-fit of the measurement model at each of the three time points. The model fit indexes for the measurement models at Time 1 (*N* = 465), $\chi^2(104) = 147.97$, $p < .01$, $\chi^2/df = 1.42$, comparative fit index (CFI) = .97, root-mean-square error of approximation (RMSEA) = .030, standardized root-mean-square residual (SRMR) = .037; Time 2 (*N* = 394), $\chi^2(104) = 193.42$, $p < .001$, $\chi^2/df = 1.86$, CFI = .94, RMSEA = .047, SRMR = .047; and Time 3 (*N* = 350), $\chi^2(104) = 142.64$, $p < .01$, $\chi^2/df = 1.37$, CFI = .97, RMSEA = .033, SRMR = .039, suggested acceptable model fit at each time point.⁴

Establishing measurement invariance. In the second step, we undertook a series of tests of equivalence. To determine whether the measurement model could be considered equivalent (or invariant) over time, we tested the model fit of two alternative models (differing in levels of parameter restrictions) and compared them to one another using the corrected chi-square difference test (Satorra & Bentler, 2001). Establishing measurement invariance is necessary prior to any meaningful comparison of the results achieved over time (Cole & Maxwell, 2003; Meredith, 1993; Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). Partial measurement invariance (metric invariance) is often regarded as sufficient for the purposes of model comparisons (Byrne, Shavelson, & Muthén, 1989; Steenkamp & Baumgartner, 1998), and this was set as our minimum criterion for measurement invariance.

We first undertook a longitudinal CFA, specifying a model that included all observed and latent variables from each time point, with freely estimated parameters⁵ (see Little, Preacher, Selig, & Card, 2007). As was the case for each of the three individual

measurement models (at Time 1, Time 2, and Time 3), the longitudinal CFA model (*N* = 465) also showed good model fit, $\chi^2(1047) = 1,326.55$, $p < .001$, $\chi^2/df = 1.27$, CFI = .95, RMSEA = .024, SRMR = .043 (the good model fit of the freely estimated longitudinal CFA model, together with the good model fit for the three individual measurement models described earlier, supports the factorial validity and construct independence of the latent constructs at each time point, as well as for the longitudinal model as a whole).

We then compared the model fit of this unrestrictive longitudinal model (specifying freely estimated parameters across all three time points) to that of a more restrictive longitudinal model, the longitudinal metric invariance model (specifying equal factor loadings within constructs across the three time points), $\chi^2(1067) = 1,352.78$, $p < .001$, $\chi^2/df = 1.27$, CFI = .95, RMSEA = .024, SRMR = .044. This comparison, using the corrected chi-square difference test (Satorra & Bentler, 2001), showed that the model fit of the more restrictive longitudinal model, specifying metric invariance, was not significantly worse than that of the less restrictive longitudinal model (specifying freely estimated parameters), $\Delta\chi^2(20) = 20.51$, $p = .43$, confirming partial metric invariance in the measurement model across all three waves.

Comparing alternative longitudinal models. Having established partial measurement invariance across all three time points, we began testing the model fit of alternative longitudinal models as part of our third step in the analyses. These alternative models essentially serve as rival hypotheses relating to the interrelationships of the latent constructs over time. As described earlier, we predicted that a bidirectional longitudinal model would describe the relationships between the latent constructs better than any other theoretically plausible longitudinal model. To this end, we assessed a number of theoretically plausible, nested longitudinal models (varying in parameter restrictions) and compared them to one another using the corrected chi-square difference test (Satorra & Bentler, 2001; see Table 2). We began with the most basic longitudinal model, specifying only autoregressive relationships between constructs over time, and worked our way toward the most complex longitudinal model, one specifying bidirectional longitudinal relationships between constructs over time.

Autoregressive longitudinal model. The most basic (baseline) longitudinal model is a first-order autoregressive model of the within-construct relationships over time. This model suggests that each construct is the best predictor of itself over time (in other words, that there are no cross-lagged relationships over time). In the first autoregressive longitudinal model, we allowed the various parameter estimates to be freely estimated, achieving acceptable

⁴ The criteria for acceptable model fit suggested by Hu and Bentler (1999) are a CFI close to .95, a RMSEA close to .06, and a SRMR close to .08. Furthermore, Kline (1998) suggested that a normal (relative) chi-square (χ^2/df) ratio smaller than 3:1 is indicative of acceptable model fit.

⁵ Initial analyses suggested that model fit would be significantly improved by removing the autocorrelations between the indicator residuals of our third empathy item. Thus, we included autocorrelations between each of the indicator residuals (excluding those of our third empathy item) in this longitudinal CFA model (and in all subsequent longitudinal models we tested).

Table 2

Comparisons of Autoregressive, Unidirectional, and Bidirectional Longitudinal Models

Model	Model fit	Model comparison ^a	Corrected chi-square difference (df)
1a	$\chi^2(1163) = 1,572.02^{***}$; CFI = .93; RMSEA = .028; SRMR = .069		
1b	$\chi^2(1169) = 1,575.42^{***}$; CFI = .93; RMSEA = .027; SRMR = .071	1b vs. 1a	$\Delta\chi^2(6) = 2.32, p = .88$
1c	$\chi^2(1173) = 1,590.75^{***}$; CFI = .93; RMSEA = .028; SRMR = .073	1c vs. 1b	$\Delta\chi^2(4) = 9.22, p = .06$
2a	$\chi^2(1157) = 1,536.24^{***}$; CFI = .94; RMSEA = .027; SRMR = .063		
2b	$\chi^2(1165) = 1,544.11^{***}$; CFI = .94; RMSEA = .026; SRMR = .064	2b vs. 2a	$\Delta\chi^2(8) = 5.75, p = .68$
		2b vs. 1c	$\Delta\chi^2(8) = 43.27^{***}$
3a	$\chi^2(1157) = 1,550.41^{***}$; CFI = .93; RMSEA = .027; SRMR = .065		
3b	$\chi^2(1165) = 1,552.75^{***}$; CFI = .93; RMSEA = .027; SRMR = .065	3b vs. 3a	$\Delta\chi^2(8) = 1.91, p = .98$
		3b vs. 1c	$\Delta\chi^2(8) = 31.06^{***}$
4a	$\chi^2(1157) = 1,496.28^{***}$; CFI = .94; RMSEA = .025; SRMR = .054	4a vs. 1c	$\Delta\chi^2(16) = 82.13^{***}$
		4a vs. 2b	$\Delta\chi^2(8) = 39.12^{***}$
		4a vs. 3b	$\Delta\chi^2(8) = 52.43^{***}$
4b	$\chi^2(1129) = 1,472.69^{***}$; CFI = .94; RMSEA = .026; SRMR = .050		
4c	$\chi^2(1143) = 1,480.38^{***}$; CFI = .94; RMSEA = .025; SRMR = .052	4c vs. 4b	$\Delta\chi^2(14) = 6.22, p = .96$
		4c vs. 4a	$\Delta\chi^2(14) = 12.82, p = .54$
4d	$\chi^2(1186) = 1,526.16^{***}$; CFI = .94; RMSEA = .025; SRMR = .059	4d vs. 4a	$\Delta\chi^2(29) = 26.73, p = .59$

Note. CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual; 1a = autoregressive model (freely estimated parameters); 1b = autoregressive model (within construct path equivalence); 1c = autoregressive model (between construct path equivalence); 2a = “forward” model: predictor → mediators → outcomes (freely estimated parameters); 2b = “forward” model (within construct path equivalence); 3a = “reverse” model: outcomes → mediators → predictor (freely estimated parameters); 3b = “reverse” model (within construct path equivalence); 4a = bidirectional model (Model 2b + Model 3b); 4b = bidirectional model including all previously excluded paths (freely estimated parameters for new paths); 4c = bidirectional model including all previously excluded paths (within construct equivalence for new paths); 4d = most parsimonious version of model 4a.

^a When comparing more restrictive and less restrictive versions of the same model (1b vs. 1a, 1c vs. 1b, 2b vs. 2a, etc.), the more restrictive model of the two being compared should not result in a significant worsening in model fit ($p > .05$) for it to be retained. When comparing different models to one another (2b vs. 1c, 3b vs. 1c, 4a vs. 2b, etc.), only those models that produce a significant improvement in model fit ($p < .05$) are retained.

*** $p < .001$; all χ^2/df ratios < 2.1 ; $N = 465$.

model fit (Model 1a in Table 2).⁶ We then tested a more restricted autoregressive model, where we constrained the within-construct paths between Time 1 and Time 2 to equivalence with the same within-construct paths between Time 2 and Time 3, yielding acceptable model fit that was not significantly worse than that of the freely estimated autoregressive model (see Model 1b in Table 2). This constraint of equality tests the assumption of stationarity (Cole & Maxwell, 2003) and is tenable because the time lag between each wave of data collection was approximately equidistant (Cole & Maxwell, 2003; Finkel, 1995). To further increase model parsimony, these within-construct autoregressive effects were further constrained to between-construct equality (with the exception of cross-group friendships, which, due to its significantly greater stability over time, was only constrained to within-construct equivalence over time).⁷ This parsimonious autoregressive model (Model 1c in Table 2) showed acceptable model fit that was not significantly worse than that of the autoregressive model with within-construct equivalence (Model 1b in Table 2).

Table 3 summarizes the unstandardized beta coefficients for each of the significant paths in the best fitting autoregressive model (Model 1c in Table 2) as well as the 95% confidence intervals associated with these coefficients. The robust beta coefficients illustrate the relative stability of each of the constructs over time and support the assumptions of autoregressive stationarity. The identical unstandardized beta coefficients (and 95% confidence intervals) for each of the constructs (resulting from the equality constraints imposed on the parameter estimates) suggest that these constructs were of equivalent stability over time, whereas the cross-group friendship construct was

significantly more stable than any of the other constructs over time.

Unidirectional longitudinal models. Building on the best autoregressive model (Model 1c in Table 2), we first tested the model fit of a series of “forward” unidirectional longitudinal models (each varying in parameter constraints), followed by that of a series of “reverse” unidirectional longitudinal models (again, each varying in parameter constraints). Unidirectional “forward” (contact to mediators to prejudice) and “reverse” (prejudice to mediators to contact) longitudinal models each represent a slightly more advanced model than the autoregressive longitudinal model.

⁶ In each of the longitudinal models we tested, the latent variables were allowed to covary at Time 1, whereas the latent variable residuals (disturbance terms) at Time 2 and Time 3 were correlated with one another at each respective time point. In the most parsimonious bidirectional model, illustrated in Figure 1, the nonsignificant latent variable covariances at Time 1 and the latent variable residual correlations at Time 2 and Time 3 were constrained to zero.

⁷ The model fit of an autoregressive model specifying complete between-construct equality, $\chi^2(1174) = 1,598.57, p < .001, \chi^2/df = 1.36$, CFI = .93, RMSEA = .028, SRMR = .071, was significantly worse than that of the autoregressive model specifying within-construct equality constraints (Model 1b in Table 1), $\Delta\chi^2(5) = 12.99, p < .05$. Releasing the between-construct equality constraints between cross-group friendships and each of the other constructs yielded a parsimonious autoregressive model with partial between-construct equivalence (Model 1c in Table 1) that did not differ significantly from the autoregressive model specifying within-construct equivalence (Model 1b in Table 1).

Table 3

Unstandardized Regression Coefficients for Autoregressive Longitudinal Model 1c (See Table 2)

Time 1 variable	Time 2 variable	Time 3 variable	<i>b</i>	95% confidence interval	
				Lower limit	Upper limit
Friendships	Friendships	Friendships	.69***	.59	.79
	Friendships		.69***	.59	.79
Anxiety	Anxiety	Anxiety	.49***	.42	.56
	Anxiety		.49***	.42	.56
Empathy	Empathy	Empathy	.49***	.42	.56
	Empathy		.49***	.42	.56
Attitudes	Attitudes	Attitudes	.49***	.42	.56
	Attitudes		.49***	.42	.56
Variability	Variability	Variability	.49***	.42	.56
	Variability		.49***	.42	.56
Action tendencies	Action tendencies	Action tendencies	.49***	.42	.56
	Action tendencies		.49***	.42	.56

Note. Identical unstandardized coefficients and confidence intervals are the result of the equality constraints imposed upon those paths. These equality constraints are tenable given the equidistant time lags between Time 1 and Time 2 and between Time 2 and Time 3 (Finkel, 1995), which is supported by the overall good model fit achieved for this model with the equality constraints imposed.

*** $p < .001$.

These unidirectional models suggest that over-and-above the autoregressive relationships within constructs, there are also unidirectional cross-lagged relationships between constructs over time in either a “forward” (from contact at Time 1 to mediators at Time 2 to prejudice at Time 3) or a “reverse” (from prejudice at Time 1 to mediators at Time 2 to contact at Time 3) direction.

In the “forward” unidirectional models (Models 2a and 2b in Table 2), we included paths from Time 1 contact to Time 2 mediators, from Time 1 mediators to Time 2 prejudice, from Time 2 contact to Time 3 mediators, and from Time 2 mediators to Time 3 prejudice. In each case, these “forward” unidirectional paths test for relationships in the direction from contact to mediators, and from mediators to prejudice. In the “reverse” unidirectional models (Model 3a and 3b in Table 2), we included paths from Time 1 prejudice to Time 2 mediators, from Time 1 mediators to Time 2 contact, from Time 2 prejudice to Time 3 mediators, and from Time 2 mediators to Time 3 contact. In this case, these “reverse” unidirectional paths test relationships in the direction from prejudice to mediators, and from mediators to contact.

As with the autoregressive model, we again first allowed the parameter estimates of these newly added unidirectional paths to be freely estimated before increasing the parameter restrictions by constraining the between construct paths between Time 1 and Time 2 to equality with the same paths between Time 2 and Time 3 (to once again test assumptions of stationarity; Cole & Maxwell, 2003). Each unidirectional model showed good model fit under these parameter restrictions (see Model 2b and Model 3b in Table 2), and each fit the data significantly better than the best autoregressive model alone (Model 1c in Table 2).

In the most parsimonious “forward” unidirectional model (Model 2b in Table 2), Time 1 cross-group friendship was significantly negatively associated with Time 2 intergroup anxiety and was significantly positively associated with Time 2 affective empathy. Intergroup anxiety at Time 1 was significantly negatively associated with perceived outgroup variability at Time 2. Affective empathy at Time 1 was significantly negatively associated with negative action tendencies at Time 2 and was significantly positively associated with positive outgroup attitudes and perceived outgroup variability at Time 2.

This pattern of significant relationships in the Time 1–Time 2 data panel was replicated in the Time 2–Time 3 data panel due to the equality constraints that were imposed.

In the most parsimonious “reverse” unidirectional model (Model 3b in Table 2), Time 1 negative action tendencies were significantly negatively associated with Time 2 affective empathy, whereas positive outgroup attitudes at Time 1 were significantly positively associated with affective empathy at Time 2. Intergroup anxiety at Time 1 was significantly negatively associated with cross-group friendships at Time 2. Once again, due to the equality constraints that were imposed, the pattern of significant relationships found in the Time 1–Time 2 data panel was replicated in the Time 2–Time 3 data panel. The path coefficients for both these parsimonious unidirectional models are identical to those reported in the bidirectional model reported below (see Figure 1).

Bidirectional longitudinal models. The bidirectional models combine the best unidirectional “forward” and the best unidirectional “reverse” models (while controlling for the autoregressive within-construct relationships over time). The most parsimonious version of this bidirectional model (including cross-lagged parameter equality constraints and the exclusion of all nonsignificant paths; Model 4d in Table 2) described the data significantly better than the best autoregressive model (Model 1c in Table 2), the best unidirectional “forward” model (Model 2b in Table 2), and the best unidirectional “reverse” model (Model 3b in Table 2). The significant paths of this bidirectional longitudinal model are illustrated in Figure 1.⁸ These results support our prediction that a bidirec-

⁸ We tested a bidirectional model that included all previously excluded paths (i.e., paths that were not a part of our original hypotheses, including direct paths from Time 1 variables to Time 3 variables; see Models 4b and 4c in Table 2). Adding these additional paths did not result in significantly better model fit (compared to Model 4a in Table 2). As none of these additional paths were significant, they were excluded from the final, most parsimonious bidirectional model (Model 4d in Table 2). Figure 1, therefore, does not show any direct paths between variables at Time 1 and variables at Time 3, as none of these paths were significant in this model.

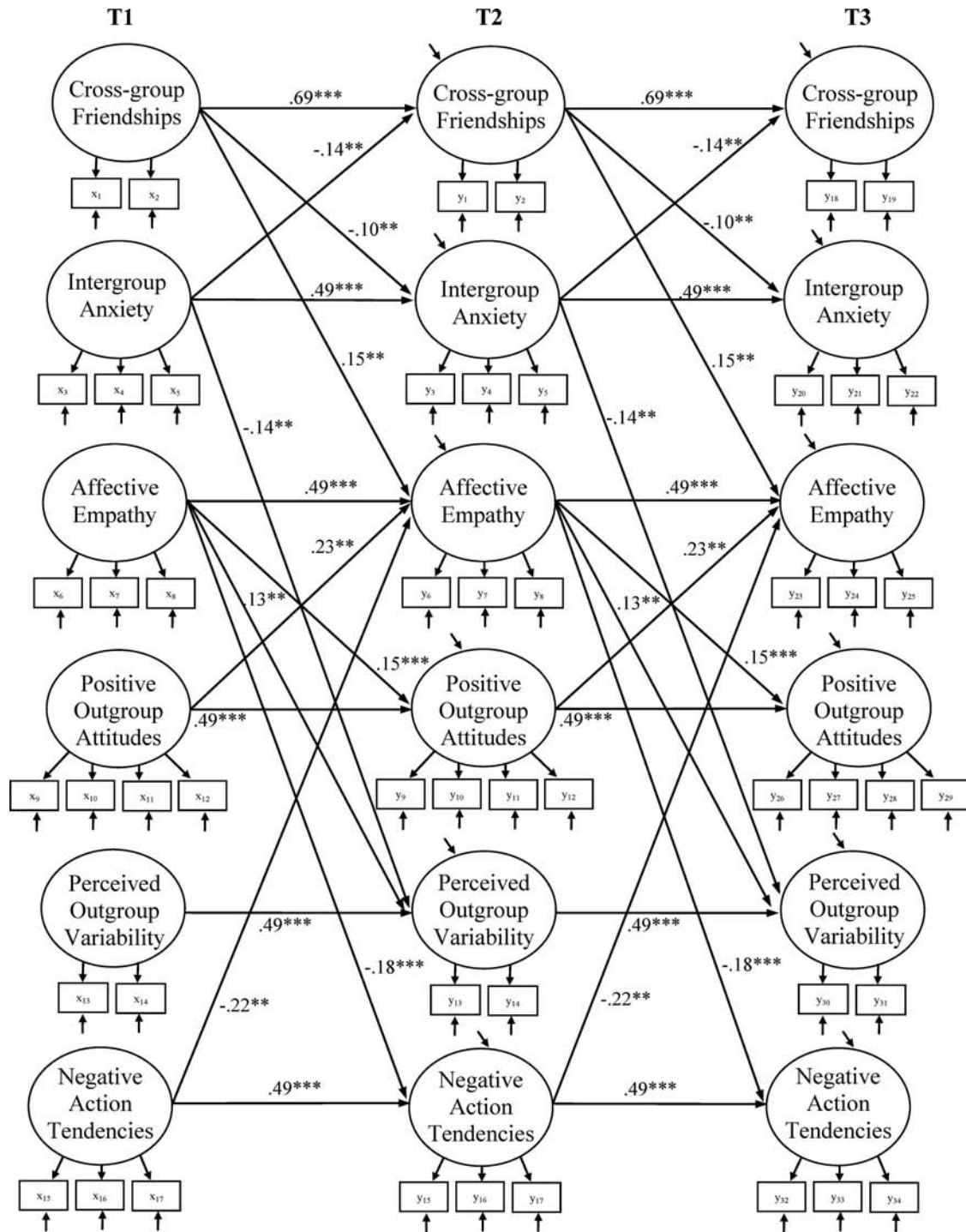


Figure 1. A bidirectional model showing the mediation of the relationship between cross-group friendship and three forms of prejudice over time via intergroup anxiety and affective empathy (Model 4d in Table 2). Colored South African sample ($N = 465$): $\chi^2(1186) = 1,526.16$, $p < .001$, $\chi^2/df = 1.29$, comparative fit index = .94, root-mean-square error of approximation = .025, standardized root-mean-square residual = .059. Unstandardized coefficients; only significant paths are reported. T1 = Time 1; T2 = Time 2; T3 = Time 3. ** $p < .01$. *** $p < .001$.

tional longitudinal model would describe the data significantly better than alternative longitudinal models, including autoregressive longitudinal models and either "forward" or "reverse" longitudinal models. We now turn our attention to the significant direct and indirect cross-lagged relationships that were found (shown in Figure 1). Keep in mind that each of these significant effects is a partial effect unique to the independent variable because prior levels of each of the respective dependent variables have been controlled for.

"Forward" cross-lagged relationships. Cross-group friendships at Time 1 had an indirect effect on the outcome measures of positive outgroup attitudes, perceived outgroup variability, and negative action tendencies at Time 3 via the mediators of intergroup anxiety (in the case of perceived outgroup variability only) and affective empathy at Time 2. Specifically, Time 1 cross-group friendships had a significant negative association with Time 2 intergroup anxiety ($b = -.10, p < .01, 95\% \text{ CI } [-.17, -.03]$) that, in turn, had a significant negative association with Time 3 perceived outgroup variability ($b = -.14, p < .01, 95\% \text{ CI } [-.23, -.05]$). Moreover, Time 1 cross-group friendships had a significant positive association with Time 2 affective empathy ($b = .15, p < .01, 95\% \text{ CI } [.05, .25]$) that, in turn, had a significant positive association with Time 3 positive outgroup attitudes ($b = .15, p < .001, 95\% \text{ CI } [.07, .23]$) and Time 3 perceived outgroup variability ($b = .13, p < .01, 95\% \text{ CI } [.05, .21]$), and a significant negative association with Time 3 negative action tendencies ($b = -.18, p < .001, 95\% \text{ CI } [-.26, -.10]$). The indirect effects of cross-group friendships at Time 1 were not limited to the Time 3 outcome measures alone. Cross-group friendships at Time 1 were negatively associated with Time 2 intergroup anxiety (as reported earlier) that, in turn, was negatively associated with Time 3 cross-group friendships ($b = -.14, p < .001, 95\% \text{ CI } [-.21, -.06]$). Sobel tests (Baron & Kenny, 1986) confirmed the significance of each of the indirect mediation effects (see Table 4).⁹

Over-and-above being an important mediator of cross-group friendship effects, affective empathy at Time 1 had an indirect effect on affective empathy at Time 3 via positive outgroup attitudes and negative action tendencies at Time 2. Time 1 affective empathy was significantly positively associated with positive outgroup attitudes at Time 2 ($b = .15, p < .001, 95\% \text{ CI } [.07, .23]$) and was significantly negatively associated with negative action tendencies at Time 2 ($b = -.18, p < .001, 95\% \text{ CI } [-.26, -.10]$). Positive outgroup attitudes at Time 2 were, in turn, significantly positively associated with affective empathy at Time 3 ($b = .23, p < .01, 95\% \text{ CI } [.04, .42]$), whereas negative action tendencies at Time 2 were significantly negatively associated with affective empathy at Time 3 ($b = -.22, p < .01, 95\% \text{ CI } [-.37, -.07]$). Sobel tests showed each of these indirect effects to be significant (see Table 4).

"Reverse" cross-lagged relationships. Where the effects of the "forward" paths from Time 1 cross-group friendships extended to the outcomes measures of prejudice at Time 3, the same is not evident with the "reverse" paths from "outcomes" (measures of prejudice) at Time 1 to cross-group friendships at Time 3. The hypothesis of a reverse relationship between prejudice and contact over time (i.e., self-selection bias) could be considered to receive limited support, however, if one regards intergroup anxiety as a measure of prejudice against the outgroup. Time 1 intergroup anxiety had a significant indirect effect on intergroup anxiety and

affective empathy at Time 3 via cross-group friendships at Time 2. Time 1 intergroup anxiety was negatively associated with Time 2 cross-group friendships ($b = -.14, p < .01, 95\% \text{ CI } [-.21, -.06]$), which, in turn, were negatively associated with Time 3 intergroup anxiety ($b = -.10, p < .01, 95\% \text{ CI } [-.17, -.03]$), and were positively associated with Time 3 affective empathy ($b = .15, p < .01, 95\% \text{ CI } [.05, .25]$). In other words, lower reported intergroup anxiety at Time 1 was significantly associated with more cross-group friendships at Time 2, which, in turn, were associated with lower intergroup anxiety and greater affective empathy at Time 3. These indirect (mediation) effects were significant (see Table 4).

The indirect effects of the outcome measures at Time 1 were restricted to the outcome variables at Time 3. There was, therefore, no support for the mediated relationship between measures of prejudice at Time 1 and cross-group friendships at Time 3 (via mediators at Time 2). Positive outgroup attitudes and negative action tendencies at Time 1 both had an indirect effect (over and above their autoregressive effects) on all three outcome measures at Time 3 via affective empathy at Time 2. Specifically, positive outgroup attitudes at Time 1 were significantly positively associated with affective empathy at Time 2 ($b = .23, p < .01, 95\% \text{ CI } [.04, .42]$), whereas negative action tendencies at Time 1 were significantly negatively associated with affective empathy at Time 2 ($b = -.22, p < .01, 95\% \text{ CI } [-.37, -.07]$). As described previously, affective empathy at Time 2 was, in turn, significantly positively associated with positive outgroup attitudes and perceived outgroup variability at Time 3, and was significantly negatively associated with negative action tendencies at Time 3. A Sobel test of these indirect effects showed them each to be significant (see Table 4).

The bidirectional longitudinal model in Figure 1 explains a substantial portion of the variance (R^2) in cross-group friendships (Time 2: $R^2 = 46\%$, Time 3: $R^2 = 65\%$), intergroup anxiety (Time 2: $R^2 = 24\%$, Time 3: $R^2 = 29\%$), affective empathy (Time 2: $R^2 = 35\%$, Time 3: $R^2 = 49\%$), positive outgroup attitudes (Time 2: $R^2 = 27\%$, Time 3: $R^2 = 39\%$), perceived outgroup variability (Time 2: $R^2 = 27\%$, Time 3: $R^2 = 32\%$), and negative action tendencies (Time 2: $R^2 = 28\%$, Time 3: $R^2 = 49\%$). This is to be expected in a longitudinal study where the constructs are reasonably stable over time. Under conditions of good construct stability, each construct becomes a strong predictor of itself at subsequent time points.

In terms of the original predictions made, the first prediction received partial support; although a bidirectional model fit the data better than either of the two unidirectional models, the "reverse" paths of this bidirectional model did not extend all the way from prejudice at Time 1 to cross-group friendships at Time 3 (via mediators at Time 2). In contrast, the "forward" paths extended all the way from cross-group friendships to outcomes (via affective mediators) over time. Thus, whereas a mediated relationship between contact at Time 1 and prejudice at Time 3 (via mediators at

⁹ We were unable to achieve model convergence when we attempted to estimate corrected Bootstrap estimates. We therefore ran Sobel tests to determine the significance of the indirect effects. Our sample size appears to be sufficiently large so as to provide the necessary power for detecting any significant indirect effects in these data (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Table 4

Sobel Tests of the Significance of the Mediation Effects for "Forward" and "Reverse" Paths in Bidirectional Model 4d (See Table 2 and Figure 1)

Time 1 variable	Time 2 variable	Time 3 variable	Size of indirect effect (<i>b</i>)	95% confidence interval		Sobel test of mediation effects (<i>z</i>)
				Lower limit	Upper limit	
“Forward” paths (Time 1 contact to Time 2 mediators to Time 3 prejudice)						
Friendships	Anxiety	Friendships	.014	.001	.027	2.20*
		Variability	.014	.000	.028	2.05*
	Empathy	Attitudes	.022	.003	.041	2.33*
		Variability	.014	.003	.035	2.18*
		Action tendencies	−.027	−.048	−.007	−2.54*
Empathy	Attitudes	Empathy	.034	.028	.119	1.98*
	Action tendencies	Empathy	.039	.007	.072	2.45*
“Reverse” paths (Time 1 prejudice to Time 2 mediators to Time 3 contact)						
Anxiety	Friendships	Anxiety	.014	.001	.027	2.20*
		Empathy	−.020	−.036	−.005	−2.30*
Attitudes	Empathy	Attitudes	.034	−.004	.071	1.98*
		Variability	.029	−.003	.061	1.98*
		Action tendencies	−.042	−.084	.001	−2.10*
Action tendencies	Empathy	Attitudes	−.032	−.058	−.006	−2.26*
		Variability	−.028	−.053	−.002	−2.12*
		Action tendencies	.039	.007	.072	2.45*

* $p < .05$.

Time 2) was found in the bidirectional model, a similar mediated relationship between prejudice at Time 1 and contact at Time 3 (via mediators at Time 2) was not found. The second prediction received strong support. Cross-group friendships were associated with more positive outgroup attitudes (an effect significantly mediated by affective empathy), a greater perception of outgroup variability (an effect significantly mediated by intergroup anxiety and affective empathy), and less negative action tendencies toward the outgroup over time (an effect significantly mediated by affective empathy). The third prediction, of an inverse relationship between intergroup anxiety and affective empathy over time, did not receive unequivocal support because this prediction specified a *direct* inverse relationship between these variables. However, intergroup anxiety at Time 1 did exert a significant *indirect* effect on affective empathy at Time 3 (via cross-group friendships at Time 2), whereas affective empathy did not exert any effects (direct or indirect) on intergroup anxiety.

Discussion

The present study tested three predictions using SEM in a three-wave longitudinal study among a relatively large sample of minority-status respondents. First, we predicted that a bidirectional longitudinal model of the relationships between contact, mediators, and prejudice would describe the data better than either a "forward" (i.e., Time 1 contact to Time 2 mediators to Time 3 prejudice) or a "reverse" (i.e., Time 1 prejudice to Time 2 mediators to Time 3 contact) unidirectional model alone. Second, we predicted that cross-group friendships at Time 1 would be negatively associated with outgroup prejudice at Time 3 via the mediation of intergroup anxiety and affective empathy at Time 2. Finally, we predicted that there would be an inverse relationship between intergroup anxiety and affective empathy over time. In so

doing, the present research aimed, via longitudinal analyses, to address various gaps in the contact literature, specifically by exploring (a) the effects of self-reported cross-group friendships on multiple measures of prejudice, (b) the simultaneous role of intergroup anxiety and affective empathy as mediators in this contact-prejudice relationship, (c) the relationship between intergroup anxiety and affective empathy over time, and (d) the full longitudinal mediation of contact effects. Having found support for all three predictions, we turn now to a discussion of the bidirectional longitudinal relationship between contact and prejudice, before taking a closer look at the full longitudinal mediation of the contact-prejudice relationship by intergroup anxiety and affective empathy. We then discuss the longitudinal relationship between intergroup anxiety and affective empathy before considering the potential influence of group status on our results and some limitations of this study. We conclude with ideas for future research.

The Bidirectional Longitudinal Relationship Between Contact and Prejudice

The results support the bidirectional nature of the contact-prejudice relationship, emphasizing that this relationship constitutes a dynamic, reciprocal process (Eller & Abrams, 2003). Nevertheless, the results unequivocally confirm the underlying tenet of the contact hypothesis because the fully mediated relationship between Time 1 and Time 3 variables (via Time 2 variables) was only witnessed in the "forward" direction (i.e., Time 1 contact to Time 2 mediators to Time 3 prejudice; as predicted by contact theory) and not in the "reverse" direction (Time 1 prejudice to Time 2 mediators to Time 3 contact; arguing against the operation of self-selection bias among these participants). The obtained results confirm and extend previous cross-sectional (e.g., Pettigrew, 1997; van Dick et al., 2004; Wagner et al., 2003), meta-

analytic (e.g., Pettigrew & Tropp, 2006), and longitudinal (e.g., Levin et al., 2003) findings, that positive intergroup encounters can reduce prejudice.

Our results are, however, at odds with those of the two-wave study reported by Binder et al. (2009), where the path from prejudice to contact was equivalent to (if not stronger than) that from contact to prejudice. It is difficult to gauge to what extent this discrepancy in findings could be attributed to the many differences in the methodologies between the two studies (including the measures of contact and prejudice used and the number of waves of data that were collected). Furthermore, we explored the bidirectional relationships between contact and prejudice over a significantly longer period of time (12 months) than did Binder et al. (6 months). It may be that over longer periods of time the effects of positive contact on prejudice exceed the effects of prejudice on contact. Our findings are nevertheless encouraging insofar as we found strong support for the mediated impact of intergroup contact on outgroup prejudice over time under conditions of very strict statistical constraints.

The Full Longitudinal Mediation of Cross-Group Friendship Effects

This study is the first to consider the simultaneous full longitudinal mediation of contact effects over time by intergroup anxiety and affective empathy. With respect to the mediating role of intergroup anxiety, cross-group friendships at Time 1 were negatively associated with intergroup anxiety at Time 2, which, in turn, was negatively associated with cross-group friendships and perceived outgroup variability at Time 3. Heightened intergroup anxiety at Time 1 was negatively associated with cross-group friendships at Time 2, which, in turn, was negatively associated with intergroup anxiety at Time 3. These findings not only replicate those reported by Levin et al. (2003) but expand on them as well. In their longitudinal study, having cross-group friendships at the end of the first year of college was associated with the development of more cross-group friendships over time. Our findings suggest that one of the mechanisms underlying this process is the reduction of intergroup anxiety over time. Importantly, beyond merely replicating previous longitudinal findings (e.g., Binder et al., 2009; Eller & Abrams, 2003, 2004; Levin et al., 2003), these results are the first to confirm the full longitudinal mediation of contact effects via intergroup anxiety (Cole & Maxwell, 2003).

Our results support the model of intergroup anxiety proposed by Stephan and Stephan (1985), whereby intergroup anxiety discourages intergroup contact and is associated with increased prejudice. Intergroup anxiety was negatively associated with perceived outgroup variability over time. As a more cognitive manifestation of prejudice, perceptions of outgroup homogeneity may result in the ignoring of counter-stereotypical information when new outgroup members are encountered, may encourage the interpretation of ambiguous information about outgroup members as consistent with the outgroup stereotype, and may allow for inconsistent (or counter-stereotypical) outgroup exemplars to be considered as "exceptions to rule" (Park, Judd, & Ryan, 1991). The reported findings suggest that, over time, having cross-group friendships can increase perceived outgroup variability via the generation of affective ties (Pettigrew, 1998)—specifically, the reduction of

intergroup anxiety and also the increase in affective empathy felt toward the outgroup.

No previous longitudinal studies of intergroup contact have explored the role played by empathy on the contact–prejudice relationship. Furthermore, there exists very little contact research in general (and no longitudinal research, specifically) that has explored the mediation of contact effects via intergroup anxiety and empathy simultaneously. Affective empathy was a significant longitudinal mediator of the relationship between cross-group friendship and each of the three measures of prejudice. Cross-group friendships at Time 1 were positively associated with affective empathy at Time 2, which, in turn, was positively associated with positive outgroup attitudes and perceived outgroup variability at Time 3, and was negatively associated with negative action tendencies at Time 3. These findings are consistent with results of cross-sectional studies, combined meta-analytically by Pettigrew and Tropp (2008), showing that empathy is a significant mediator of contact effects.

When comparing the relative longitudinal mediation effects of intergroup anxiety and affective empathy, affective empathy showed greater longitudinal mediation of the contact–prejudice relationship than did intergroup anxiety. This is contrary to Pettigrew and Tropp's (2008) meta-analysis of mediators, which found that intergroup anxiety was the stronger mediator. In our study, whereas intergroup anxiety only mediated the relationship between contact and one of the measures of prejudice (perceived outgroup variability), affective empathy mediated the relationship between contact and all three measures of prejudice. However, the present longitudinal results replicate our recent cross-sectional findings among White and Colored South African senior high school students ($N = 191$ Colored South African participants; Swart et al., 2010, Study 2). In that study, affective empathy (but not intergroup anxiety) was a significant mediator of each of the relationships between contact and prejudice for the minority-status Colored sample. Given the longitudinal replication of these cross-sectional results, the present findings suggest that the operation of the underlying mediators, such as intergroup anxiety and affective empathy, may operate in subtly different ways in different contexts of intergroup relations.

The present study is unique in providing the first test of full longitudinal mediation of contact effects by two affective mediators simultaneously (and on multiple measures of prejudice). The contact hypothesis and the putative mediators it identifies imply the passage of time, and cross-sectional designs are not ideal for exploring these temporal mediation effects (Cole & Maxwell, 2003). Further longitudinal contact research is now needed to test other well-established cross-sectional mediation effects in the contact literature.

As we noted above, Cole and Maxwell (2003) suggested that the minimum requirement for testing full longitudinal mediation is the implementation of a three-wave longitudinal design, where the mediation is tested between the predictor at Time 1, the putative mediator(s) at Time 2, and the outcome(s) at Time 3. Moreover, recall that the mediation effects we have reported are in fact *partial* effects, as prior levels of each of the outcome measures were controlled for. As such, the findings constitute more than a simple replication of prior cross-sectional and two-wave longitudinal results. In fact, this study represents the most rigorous investigation yet into the longitudinal mediation of contact effects, and it illus-

trates the range of complex, interdependent processes operating simultaneously over time between intergroup contact experiences, positive and negative affect, and affective, cognitive, and quasi-behavioral dimensions of prejudice.

The Longitudinal Relationship Between Intergroup Anxiety and Affective Empathy

We were able to test longitudinally the two competing predictions proposed in the literature concerning the relationship between intergroup anxiety and affective empathy. On the one hand, it has been predicted that greater perspective-taking (the cognitive component of empathy) would encourage reduced intergroup anxiety (Aberson & Haag, 2007; Stephan & Finlay, 1999), whereas on the other hand, it has been argued that intergroup anxiety may first need to be reduced before increased empathic responding may contribute to reduced prejudice (Pettigrew & Tropp, 2008). Intergroup anxiety was negatively associated with affective empathy, via the mediation of cross-group friendships; lower intergroup anxiety at Time 1 predicted more cross-group friendships at Time 2 that, in turn, predicted greater affective empathy for the outgroup at Time 3. Thus, when considering the relationship between intergroup anxiety and affective empathy over time, intergroup anxiety served as a *predictor* of cross-group friendships, cross-group friendships served as a *mediator*, and affective empathy was the *outcome*. This is a good illustration of Eller and Abrams's (2003) point, that variables traditionally defined as predictors, mediators, and outcomes are not static over time, and that (for example) a predictor at one point in time might be a mediator or an outcome at subsequent points in time.

Our results concerning the sequencing between intergroup anxiety and affective empathy support Pettigrew and Tropp's (2008) prediction rather than the cross-sectional results obtained by Aberson and Haag (2007; see also Stephan & Finlay, 1999), that reduced intergroup anxiety promotes greater empathy. However, it is important to keep in mind that we included an affective measure of empathy, rather than perspective-taking, and future research might include both aspects of empathy in the same design.

The Influence of Group Status

Tropp (2006) has shown that contact effects differ substantially between minority- and majority-status groups, with such effects generally being significantly stronger for majority- than for minority-status groups (Binder et al., 2009; Tropp & Pettigrew, 2005). Viewed in this light, our findings are all the more encouraging as the robust, significant longitudinal contact effects were reported here for a minority-status group. If anything, it may have been more reasonable to expect fewer (or weaker) significant relationships among the variables for this minority-status sample, as found in the longitudinal study undertaken by Binder et al. (2009). Unfortunately, we were unable to collect similar longitudinal data among a comparative majority-status sample. However, findings from a previous cross-sectional multigroup comparison among majority-status White and minority-status Colored South African senior high school students, using the same variables considered in this longitudinal study (see Swart et al., 2010), suggest that the longitudinal relationships found in the present

study could be even stronger among a majority-status White sample.

These speculations about potential contact effects as a function of group status are, however, problematic within the South African context where the nature of one's group status can shift substantially as a function of the context (e.g., political, economic, demographic) within which the labels of "majority" and "minority" are assigned (as described earlier in the introduction). An implication of this complexity is that our (a priori defined) minority-status Colored participants may consider themselves as more of a majority-status group within their school, community, and the town of Stellenbosch as a whole (where they are in a substantial numerical majority over White and Black South Africans) than their national minority-status would suggest (in both numerical and economic terms). Similar (and not necessarily significantly larger) longitudinal contact effects could therefore be evidenced should comparable research be undertaken among White South African students from largely homogenous White schools and communities. There may be important contextual factors that moderate the experience of intergroup contact among loosely defined minority-status groups. Future research should explore the existence of potential contextual moderators, and how these contextually driven conceptualizations of status may be manipulated to improve the impact of contact interventions, especially among minorities.

These important questions notwithstanding, we believe that the strongest support for the overall validity of our longitudinal results among this sample of respondents is possibly found within the design of the three-wave longitudinal study itself. The bidirectional model depicted in Figure 1 can also be conceptualized as comprising two panels; the first panel from Time 1 to Time 2, and the second panel from Time 2 to Time 3. Given the equivalent parameter constraints that were successfully imposed on the respective within- and between-construct paths in each panel (as evidenced by the good model fit), the relationships described in the second panel (Time 2 to Time 3) can be seen to replicate (and therefore validate) the relationships described in the first panel (Time 1 to Time 2), increasing the confidence in the results of the three-wave longitudinal model as a whole.

Limitations of the Present Research

Notwithstanding our confidence in these findings, our results should, of course, only be generalized beyond this particular research setting with caution. First, although longitudinal studies provide a stronger test of causality than do cross-sectional studies, only experimental studies can truly establish the causal relationship between intergroup contact and prejudice. Second, we used an opportunity sample within an educational setting, albeit one involving quite a large sample. Third, although repeated measures over time from the same participants allow for the undertaking of longitudinal analyses, there exists the risk of shared (common) method variance among the data (Podsakoff et al., 2003). This limitation might be mitigated in future studies by the use of observer reports of intergroup contact, in addition to the usual reliance on self-reports (e.g., Dhont, Van Hiel, De Bolle, & Roets, in press; Hewstone, Judd, & Sharp, 2011). Finally, it is likely that some of the unexplained variance in the outcome measures at Time 2 and Time

3 may be explained by other important variables not included in this study. New variables should be considered for inclusion in future longitudinal studies (e.g., perspective-taking, self-disclosure, intergroup trust), but the overall number of variables should be constrained because longitudinal models are difficult to fit when they become too complex.

Directions for Future Research

More rigorous longitudinal research is needed to better understand the relationships between contact, mediators, and prejudice, with multiple studies varying conditions of measurement, increments of time, sample characteristics, and perceiver–target combinations. Because cross-sectional mediation effects do not always translate into equivalent longitudinal mediation effects (Cole & Maxwell, 2003), further longitudinal research is needed to explore the longitudinal nature of other relationships that have thus far been explored only cross-sectionally. Such research is also required to better understand the comparative relationship between contact and prejudice across minority- and majority-status groups. Binder et al. (2009) found that longitudinal contact effects were nonsignificant for minority-status respondents, whereas we reported very robust longitudinal contact effects among a minority-status sample. As we did in this study, future researchers should consider the full longitudinal mediation effects of multiple mediators simultaneously along a range of different outcome measures (Brown & Hewstone, 2005). Finally, there is a need for longitudinal research on the temporal relationships between the mediators of contact (e.g., Pettigrew & Tropp, 2008). We explored the relationship between intergroup anxiety and affective empathy, and our findings warrant replication. It would also be interesting to see how cognitive and affective empathic responding are associated with one another within the context of intergroup contact over time (see Stephan & Finlay, 1999). In this article, our affective empathy items related to the empathic response toward a negative emotion, but future research could include positive emotions too.

To conclude, the present research makes an important contribution toward contact theory, specifically to our understanding of the complex underlying processes driving the longitudinal relationship between contact and prejudice, and among relatively understudied minority groups. The use of SEM to analyze the data allowed us to compare alternative models to one another to rule out rival hypotheses. This study provides the first test of the full longitudinal mediation of the relationship between contact and affective, cognitive, and quasi-behavioral measures of prejudice, by positive and negative affective mediators simultaneously. Moreover, our data are the first in the contact literature to show evidence of a longitudinal relationship between intergroup anxiety and affective empathy. Further establishing a more differentiated view of intergroup contact and the temporal relationships between the various variables involved would assist not only in our understanding of how intergroup contact influences outgroup prejudice over time (and how this might differ as a function of group status) but also in the development of effective contact strategies and optimal interventions aimed at improving intergroup relations.

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