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Friendships, Anxiety, and Intergroup Bias: Optimizing the Contact Model for Minority and  
Majority Status Groups

by

Michelle Rattinger

A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

in the College of Arts and Sciences

Georgia State University

2022

## ABSTRACT

The contact hypothesis, or the idea that contact with social outgroup members reduces explicit prejudice, is well established. Evidence suggests that intergroup anxiety mediates this relationship, such that increased intergroup contact lessens anxiety about intergroup interactions, which in turn contributes to decreases in prejudice. Since the contact hypothesis was introduced, it has remained relatively unchanged, despite advances in social and cognitive research, as well as changes in societal norms.

This study aimed, in several key ways, to optimize the contact model. First, this study narrowed the conceptualization of contact, based on current research that highlights the need to capture both frequent and positive/meaningful interactions through the collection of outgroup friendship data. Second, the proposed model included two measures of implicit bias—implicit associations and attentional bias—in addition to an explicit prejudice measure, given recent evidence that reflects declines in more overt expression of bias. Third, social anxiety was included as a covariate in the model, as this construct has demonstrated strong associations with intergroup anxiety and is rarely accounted for in studies of intergroup contact. Finally, the study included participants from both racial majority- and minority-status groups. Contact effects on negative intergroup biases have long been assumed to generalize to members of racial minority groups, even though most intergroup research focuses on majority-White samples.

Multiple group path analysis was used to examine this updated contact model for both Black and White participant groups. Results yielded support for the first hypothesis, in that, for both White and Black participant groups, having more outgroup friendships was associated with having less intergroup anxiety. The second hypothesis, which predicted direct associations between number of outgroup friendships and explicit, implicit, and attentional outgroup bias,

was not supported. Results provided partial support for the third hypothesis, that there would be significant indirect associations via intergroup anxiety between outgroup friendships and each of the three measures of outgroup bias. Although intergroup anxiety did not mediate associations between friendship and either implicit associations or attention bias, it did emerge as a significant mediator for the association between friendship and explicit bias for both groups.

INDEX WORDS: Contact hypothesis, Prejudice, Friendships, Intergroup anxiety, Implicit bias, Explicit bias

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2022

Friendships, Anxiety, and Intergroup Bias: Optimizing the Contact Model for Minority and  
Majority Status Groups

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August 2022

## **DEDICATION**

This dissertation is dedicated to my family, the Rattpack. Thank you for every hug, every phone call answered, every wise word. To my incredible friends, thank you for setting the pace for my journey with your own examples of determination and brilliance. Thank you to my advisor, Erin Tone, who offered more support in the last seven years than most receive in a lifetime. This final milestone of my doctorate is also dedicated to Teddy, who was on his own Ph.D. path and surely would have blown us all away.

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## 1 INTRODUCTION

The contact hypothesis, or the notion that contact with members of social outgroups contributes to reductions in outgroup-targeted prejudice, is well-established (Dixon, 2016). Researchers in the United States first began studying intergroup relationships with a focus on contact as a means for improving the quality of racial and ethnic intergroup interactions (Dovidio Gaertner, & Kawakami, 2003; Vezzali & Stathi, 2016). This work has shown that interactions with members of racial or ethnic outgroups can decrease self-reported prejudice (Pettigrew & Tropp, 2006). Moreover, there is ample evidence that one key mechanism by which contact leads to decreases in negative judgments about outgroup members is reduction of intergroup anxiety, or fear in anticipation of interaction with members of other groups (Pettigrew & Tropp, 2008). In recent decades, studies of the contact hypothesis have expanded to encompass a range of group identities including gender, sexual orientation, nationality, intellectual or physical ability, and religious affiliation and have yielded comparable effects to those obtained in studies focused on race and ethnicity (Pettigrew & Tropp, 2006). In recognition of the broad applicability of and substantive empirical support for the contact hypothesis, Hewstone and Swart (2011) characterized it as a foundational psychological theory.

A notable limitation of the literature on the contact hypothesis is that few studies have focused on associations between contact and reductions in prejudice—or in other negative outcomes—in members of racial and ethnic minority groups (Tropp & Pettigrew, 2005b). Given that racial and ethnic diversity in the U.S. has dramatically increased in recent decades (Craig, Rucker & Richeson, 2018; Pew Research Center, 2015), this limitation is particularly problematic, as it leaves the experiences of the nation’s emerging “minority-status majority” poorly understood. Moreover, cultural norms have also shifted in the decades since Gordon

Allport introduced the contact hypothesis in 1954, such that it has become progressively less acceptable in many circles to explicitly voice negatively biased views of members of other racial and ethnic groups (Aberson & Gaffney, 2008; Dovidio et al., 2000).

It is thus unclear whether it is appropriate to generalize findings from contact studies conducted almost exclusively with participants from a privileged majority racial/ethnic group to the national population as a whole, which is a common and, until recently, surprisingly well-accepted practice. Further, it is not clear that the ways in which researchers have historically defined both contact and intergroup bias accurately capture either construct, particularly for members of racial and ethnic minority groups. Although Allport (1954) originally conceptualized contact as a unitary construct, more recent work suggests that intergroup contact may be better understood as multifaceted (Dixon, Durrheim, & Tredoux, 2005; Prestwich, Kenworthy, Wilson, & Kwan-Tat, 2008). In addition, research in the early 21<sup>st</sup> century has led to the development of innovative tools to measure intergroup biases that are not explicitly endorsed (Dovidio et al., 2000).

Research is thus needed to test the contact hypothesis, including the mediating role of intergroup anxiety, in members of racial minority groups. It is also important that such work be conducted in ways that capitalize on updated and more precise conceptualizations of key constructs such as contact and prejudice. The present study was designed to help fill these gaps by comparing associations among intergroup contact, intergroup anxiety, and negative outgroup biases between racial majority-status (White) and minority-status (Black/African-American) group members. In contrast with much of the prior work in this area, I also defined both the study predictor and outcome variables in ways aimed at optimizing their suitability for both majority- and minority-status group members, based on recent research findings.

In the introduction, I lay a foundation for this study that comprises three sections. First, I review the contact hypothesis model and its elements, as well as the work—primarily with majority group members—that offers support for the model. I then build the case that new research is needed that addresses key limitations in the intergroup literature. I focus in particular on three weaknesses of intergroup studies: their traditional majority-group focus, their reliance on overly vague or expansive definitions of contact, and their tendency to exclude indicators of prejudice or negative bias that extend beyond self-report. Finally, to frame my hypotheses, I propose updates to Allport’s conceptual model that allow for a more comprehensive and generalizable understanding of the relationship between contact and prejudice.

## **1.1 Contact Hypothesis**

The sociopolitical context of the mid-20<sup>th</sup> century proved to be a catalyst for the scientific study of social group processes. Beginning in the 1930s and continuing well into the 1960s, America’s largely White populace faced a changing social landscape on two fronts—the immigration of Jewish refugees during World War II (WWII) and the resolute push for civil rights for Black Americans (Dixon, 2016; Dovidio et al., 2003). As the country began to draft and adopt desegregationist policy, academic and governmental interests often converged around the study of social integration, as well as its promotion and optimization.

In his 1954 book, *The Nature of Prejudice*, Gordon Allport was among the first to identify the significant role intergroup contact can play in reducing intergroup biases. His work has had an enduring impact, and he is widely credited as the originator of the contact hypothesis (Dovidio et al., 2003). Because of the historical context in which the hypothesis arose, it centered initially on dynamics among groups that differed by racial and ethnic identity. As studies have expanded to examine effects of contact on people of differing nationalities, physical abilities, and

sexual orientations, along with other types of identity, (Pettigrew & Tropp, 2006), the literature on intergroup contact has grown exponentially, from just 30 publications prior to 1960 to hundreds by the turn of the 21<sup>st</sup> century (Pettigrew, 2016).

Broadly, tests of the contact hypothesis have found that increased intergroup contact improves outgroup attitudes; in other words, the more exposure a person has to members of a different group, the less overt prejudice that person endorses toward that outgroup. Over several decades, these findings have emerged consistently, in educational, military, and social settings (e.g., Eller & Abrams, 2003; Deutsch & Collins, 1958; Ramiah & Hewstone, 2013; Star, Williams, & Stouffer, 1958; Williams, 1947). A widely cited meta-analysis of work examining the contact hypothesis found that the effect of contact on prejudice reduction, while statistically significant, is generally small (average  $r = -.21$ , range  $r = -.205$  to  $r = -.214$ ; Pettigrew & Tropp, 2006). Subsequent meta-analytic work focused on studies that examined real-world outcomes following contact, such as research that used intergroup contact as an intervention to reduce prejudice, yielded evidence of comparable effects (Lemmer & Wagner, 2015). Additionally, longitudinal findings document the stability of contact effects over weeks, months, and years (Binder et al., 2006; Eller & Abrams, 2004; Sidanius et al., 2008).

Since the contact hypothesis was first articulated, researchers have tried to identify mechanisms by which contact leads to changes in prejudice and other biased attitudes about outgroup members. One variable that has received ample attention is anxiety about interactions with outgroup members, which Stephan and Stephan (1985) termed “intergroup anxiety” and found to be elevated in people who had limited contact with outgroup members. These authors also found that those who endorsed higher levels of intergroup anxiety generated less favorable



evaluations of outgroup members than did less intergroup-anxious peers (Stephan & Stephan, 1985).

Since that seminal study, many other researchers have examined the role of intergroup anxiety in the contact-prejudice relationship for majority group members. Most of these have found intergroup anxiety to play a significant mediational role within the contact model (but see Seger et al., 2017 for conflicting findings), whether ingroup/outgroup membership was based on immigration status (Dhont, Roets, & Van Heil, 2011; Vezzali, Giovannini, & Capozza, 2010; Voci & Hewstone, 2003), religion (Hutchinson & Rosenthal, 2010; Walther et al., 2015), or race/ethnicity (Binder et al., 2009; Hayward et al., 2017; Swart et al., 2011). Pettigrew and Tropp (2008) conducted a meta-analysis of the literature on putative mediators of the contact-prejudice association and found that of three candidate mediators (outgroup knowledge, empathy/perspective taking, and intergroup anxiety), intergroup anxiety had the strongest associations with both the predictor and outcome variables. Specifically, more regular intergroup contact reduced anxiety that typically arises prior to or during intergroup encounters, which led in turn to reductions in outgroup prejudice among majority group members.

## **1.2 Main Components of the Contact Hypothesis**

### ***1.2.1 Contact***

Intergroup contact is commonly defined as face-to-face encounters between individuals from clearly defined groups (Pettigrew & Tropp, 2000). A group that a person belongs to or identifies with is considered their “ingroup”; other groups to which that person does not belong or feel an allegiance constitute their “outgroups” (Dixon, 2016). Groups can vary along any number of dimensions, including size, social power or status, homogeneity, and distinctiveness (Doosje, Ellemers, & Spears, 1995; Jetten, Spears, & Manstead, 1998). Most research on

intergroup contact has focused on groups that differ according to size or status, even though neither is inherently characteristic of ingroups and outgroups (Lücken & Simon, 2005; Žeželj, Ioannou, Franc, Psaltis, & Martinovic, 2017).

More precisely, studies typically characterize group hierarchies on the basis of one of two characteristics that are often intertwined. The most widely used of these characteristics is group size relative to the general population; the larger group is commonly identified as the majority group and the smaller group as the minority group. The second characteristic is social status/power, which is often, but not always, concentrated in the hands of majority group members (Lücken & Simon, 2005).

To measure intergroup contact, researchers most commonly assess contact quantity, or the frequency with which intergroup encounters take place (MacInnis & Page-Gould, 2015). On contact quantity measures, participants estimate the number of intergroup interactions they have had or the number of hours they have spent in these interactions, either across the lifespan (e.g., Voci & Hewstone, 2003) or within a defined period such as the past week (e.g., Barlow et al., 2013). Although such measures are presumably appropriate for members of both majority and minority status groups, most studies have focused on querying majority-status group members (e.g., White Americans) about their past interactions with minority-status group members (e.g., Black Americans; White, Harvey, & Verrelli, 2015).

### ***1.2.2 Prejudice***

The primary outcome variable within the traditional contact hypothesis, prejudice, is commonly defined as preconceived negative feelings toward or unfavorable evaluations of an outgroup and its members that are not grounded in experience or rational thought (MacInnis & Gould, 2015). Research suggests prejudice stems in part from a human tendency to separate

people quickly and efficiently into ingroup and outgroup categories according to visually apparent characteristics, including those that signal gender, age, and race (Cosmides, Tooby, & Kurzban, 2003). Once we assign an individual to an ingroup or outgroup category based on such characteristics, we draw upon stereotypes regarding that group in order to make on-line judgements about the individual without taxing our cognitive resources excessively (Operario & Fiske, 2001).

Particularly salient stereotypes are those regarding threats; indeed, some researchers suggest that reflexive ingroup evaluations tend to be positive and outgroup evaluations to be negative, in part because of an evolutionarily based need to rapidly identify and sort signals of safety and danger (e.g., Manner & Miller, 2013). Unlike natural stimulus classes such as dangerous animals (e.g., snakes), however, that hold putative innate threat value (Öhman & Mineka, 2001), socially constructed stimulus classes, such as human racial or ethnic groups, acquire threat value as a function of early-life social learning (e.g., Telzer et al., 2013). We thus appear to acquire prejudiced beliefs and feelings during childhood and adolescence by observing and learning from those around us to associate outgroup members with negative, and sometimes threatening, stereotypes.

Most studies to date have examined explicit prejudice using self-report measures that prioritize affective (i.e., emotional responses to an outgroup) or cognitive (i.e., perceptions of, judgements of, and beliefs regarding an outgroup) aspects of prejudice (Tropp & Pettigrew, 2005). For example, commonly used affective measures require participants to rate their feelings toward a target outgroup on Likert or Likert-type scales tapping emotionally valenced dimensions (e.g., suspicious/trusting, friendly/hostile; Wright et al., 1997). Other affective prejudice measures incorporate feelings thermometers, which present possible evaluations on a

continuum (e.g., rating feelings toward an outgroup from the least warm to the warmest possible on a 7-point scale; Barlow et al., 2013). Cognitive measures of prejudice, in contrast, target outgroup perceptions and beliefs about a group, such as stereotypes, rather than emotional responses, and may require respondents to rate the degree to which they hold beliefs about members of a group (e.g., the extent to which they believe outgroup members are educated or ignorant or do or do not prioritize education; Tropp & Pettigrew, 2005a). Affective prejudice measures tend to be more widely used than cognitive measures; this pattern of practice may in part reflect a tendency for intergroup contact to show stronger associations with reductions in affective prejudice than cognitive prejudice (Hayward et al., 2017; Tropp & Pettigrew, 2005).

### *1.2.3 Intergroup Anxiety*

As the relationship between intergroup contact and prejudice became well-established, researchers turned their attention to investigating mechanisms that might mediate the association of these two constructs. One possible mediating variable that has received substantive empirical support is intergroup anxiety (Stephan & Stephan, 1985). In the paper that introduced this construct, Stephan and Stephan (1985) measured intergroup anxiety by having study participants rate their anticipated affective responses to an imagined outgroup interaction using a Likert-type scale. Although a few researchers have developed alternate measures of intergroup anxiety (e.g., Britt, Boniecki, Vescio, Biernat, & Brown, 1996), most studies have relied on adaptations of Stephan and Stephan's (1985) measure that vary according to the outgroups that respondents are asked to imagine interacting with (e.g., homeless individuals, Van Zomeren et al., 2007; African immigrants, Voci & Hewstone; Muslims, White & Abu-Raya, 2012).

In their original description of intergroup anxiety, Stephan and Stephan (1985) characterized it as similar to, yet more specific than, social anxiety, which involves apprehension

regarding social interactions in general (Rodebaugh et al., 2017). Individuals who experience intergroup anxiety, like those with social anxiety, endorse fears or worries about interacting with others; however, their concerns are restricted to interactions with members of certain social groups. Empirical evidence to date leaves it unclear whether intergroup anxiety indeed constitutes a subtype of social anxiety; however, findings from two studies suggest that the two constructs are moderately correlated ( $r = .35, p < .01$ , Britt et al., 1996;  $r = .47, p < .001$ , Rattinger and Tone, unpublished data). Moreover, intergroup and social anxiety share many affective, cognitive, and physiological features. These include subjective apprehension and distress; fear of negative evaluations from others; avoidance of social situations; and increases in cortisol, galvanic skin responses, and heart rate (Littleford, Wrights, & Sayoc-Parial, 2005; Stephan, 2014; Trawalter, Adam, Chase-Lansdale, & Richeson, 2012).

The overlap between intergroup anxiety and social anxiety makes it difficult to confidently interpret findings from prior research, as the vast majority of studies that have examined correlates of intergroup anxiety have not taken social anxiety into account in analyses (e.g., Binder et al., 2009; Hayward et al., 2017; Swart, Hewstone, Christ, & Voci, 2011). Therefore, the extent to which general concerns about negative evaluation from others versus specific fears about negative consequences of interacting with members of one's outgroup relate to quantity or quality of social contact remains unclear. It thus seems important that conceptual and statistical models of the contact hypothesis and its mediating variables take both intergroup and social anxiety into account.

### **1.3 Concerns Regarding the Traditional Model**

Considerable evidence supports the traditional contact model, in which outgroup contact predicts reductions in prejudiced outgroup evaluations, and also lends credence to the idea that

intergroup anxiety is a key mediator of this relationship. Consequently, Allport's core premise has been minimally updated over the last 70 years. Recently, however, researchers have begun to raise questions regarding the degree to which findings can be generalized beyond majority-status group members, who have been the primary targets of study.

First, minority-status individuals are commonly excluded from participant samples, creating a majority-focus approach to studying intergroup contact that overlooks more diverse experiences of both contact and prejudice. Second, research on contact tends to focus primarily on quantity of contact, despite evidence that quality of contact (e.g., positive vs. negative) may be equally or more important for anxiety and prejudice reduction. And finally, the majority of studies has relied solely on explicit measures of prejudice, although evidence suggests more subtle or indirect avenues for capturing negative attitudes may be an additional and increasingly informative indicator of intergroup bias and prejudiced outgroup attitudes.

### ***1.3.1 Majority Focus, Minority Exclusion***

Given that the contact hypothesis arose when American social segregation policies were being challenged and dismantled, researchers testing the hypothesis were motivated to understand and mitigate White prejudice toward Black individuals (Dovidio et al., 2003). As a consequence, this area of research has been biased toward efforts to explain and change problematic attitudes and behaviors among majority-status group members (White, Harvey, & Verrelli, 2015), particularly those who are White. From their inception, then, intergroup contact research efforts have largely excluded minority experiences from consideration (Tropp, 2007).

Most studies that have examined the contact hypothesis have reinforced this exclusion in two key ways. The first has been the omission of minority-status individuals from participant samples (Tropp & Pettigrew, 2005b). This practice initially reflected an intentional focus on

characterizing and shifting White individuals' prejudiced views toward Black and other minority-status peers. However, it may have been perpetuated by convenience, as many studies have recruited their participants from universities where the student bodies are largely White (Henry, 2008).

A second way in which minority-status perspectives have been obscured in the intergroup contact literature is that studies commonly treat majority-status individuals as active agents and minority-status individuals as passive players or objects (Shelton, 2000). Researchers have long voiced concerns regarding the objectification or othering of minority group members, particularly those from racial minorities in the U.S. (e.g., Amir, 1969; Jones et al., 1984), but the field has been slow to shift away from a majority-centric perspective. Shelton (2000) pointed to an enduring hesitance among researchers in the U.S.—who are largely White—to acknowledge the Black perspective and suggested that this hesitance may reflect a largely unspoken bias to maintain focus on the betterment of White lives in social and political initiatives. Consequently, Shelton proposed, researchers have persistently relegated Black individuals to an inactive role in models of or theories about intergroup relations. Shelton also speculated that White researchers conducting intergroup studies may fear perpetuating pejorative ideas about Black people, and thus may avoid suggesting that Black individuals hold or act on racially motivated biases against White people. Such avoidance may also stem from efforts to circumvent inappropriately blaming racial tensions on those who suffer most from them or from a desire to avoid suggesting that Black people need to be the arbiters of improvement in race relations.

Minority-status group perspectives have thus been minimally examined in the intergroup contact literature; moreover, they have been considered in a narrow way, with minority-status group members typically conceptualized as targets, rather than as holders, of prejudiced negative

outgroup attitudes. This pattern of obscuring minority experiences is starkly apparent in the intergroup literature; however, it is not isolated to this area of research. Such a “unidirectional imbalance” (White, Harvey, & Verrelli, 2015, p. 421) appears to be reflective of a longstanding and pervasive trend within psychological research considered broadly (Rowley & Camacho, 2015; Shelton 2000).

Crucially, researchers’ failure to focus equivalent attention on majority-status and minority-status group members’ experiences of both contact and prejudice opens the field to challenges. In particular, it leaves open questions regarding the generalizability of findings from this body of work to minority-status group members (Dixon, Durrheim, & Tredoux, 2005). Indeed, when minority-status participants have been included in intergroup studies, the association between contact and outgroup prejudice has been less robust or consistent than it is in studies focused exclusively on majority-status group members.

Tropp and Pettigrew (2005b) examined group-based variability in a meta-analysis of research on contact effects on prejudice. Their findings suggested that contact effects were slightly weaker for minority-status groups in general ( $r = -.18$ ), and for racial and ethnic minority samples specifically ( $r = -.18$ ), than for majority-status samples ( $r = -.24$ ). This pattern appears, at least in part, to reflect heterogeneity of effects in studies that reported findings for minority-status group members. When Black participants reported their experiences with outgroup (White) contact, for example, some studies yielded no evidence of significant relationships between intergroup contact and prejudice (e.g., Barlow et al., 2013), while others found contact to increase, rather than reduce, negative attitudes (e.g., Sigelman & Welch, 1993).

Overall, these findings suggest that the relationship between contact and prejudice may vary as a function of group status, and that the current contact model may obscure or fail to



capture important aspects of minority experiences. An important direction for future work will involve better designing studies to equitably sample both minority-status participants and minority-status group experiences. In particular, in line with recent evidence (e.g., Aberson & Gaffney, 2008; Dovidio et al., 2017), different approaches to the measurement of contact and prejudice may provide increased sensitivity for both majority and minority-status groups and strengthen the fit of the model overall.

### ***1.3.2 The Multifaceted Nature of Contact Overlooked***

A second issue that the intergroup contact literature must contend with is the potentially problematic way in which contact is typically defined. Contact is most often assessed via retrospective self-report, although a few studies have designed laboratory paradigms that allow researchers to directly observe contact (e.g., Binder et al., 2009). Generally, the more frequent and consistent encounters that members of a target ingroup report with outgroup members, the greater the reductions in outgroup prejudice that ingroup members endorse or demonstrate (Tropp & Pettigrew, 2006). In contrast, fewer or more sparsely spread encounters are associated with negative outcomes, including physiological (e.g., increased cortisol reactivity and heart rate, Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Page-Gould, Mendoza-Denton, & Tropp, 2008) and affective responses (e.g., anxiety and avoidance; Littleford et al., 2005; Plant & Devine, 2003).

Over time, when interactions are more closely spaced, the short-term costs of isolated interactions tend to diminish, and the affective quality of outgroup engagement becomes more positively valenced (Knowles & Tropp, 2018; MacInnis & Page-Gould, 2015). This “contact threshold”, as MacInnis and Page-Gould labeled it, appears to occur at least in part due to reduced tendencies to automatically appraise outgroup members as threats (Blascovich et al.,

2001; Harwood, Hewstone, Amichai-Hamburger, & Tausch, 2013). More regular intergroup contact can mitigate ingrained socially learned patterns of association between outgroup members and potential harm (Telzer et al., 2013), and can, in turn, lead to more positive outgroup evaluations.

These findings, however, appear to oversimplify a complicated picture. Although contact quantity is important for improving outgroup attitudes, growing evidence from studies that have required participants to evaluate the positive or negative valence of their past outgroup encounters shows that contact quality also matters (Barlow et al., 2012; Dovidio et al., 2017; Voci & Hewstone, 2003). Whereas positively valenced encounters are associated with more positive explicit attitudes towards the outgroup, negatively valenced encounters show strong associations with poorer outcomes, such as increased prejudice (Barlow et al., 2012; Hayward et al., 2017). Further, contact experiences that are negative have also been shown to contribute not only to negative intergroup biases, but also to increases in intergroup anxiety (Van Zomeren et al., 2008). Thus, although studies of contact commonly overlook contact quality (Hayward et al., 2017), it can modulate the experience of intergroup encounters in critical ways.

One way to disentangle effects of contact quantity and quality is by focusing on intergroup interactions that are either positive or negative in valence. Some research has accomplished this by examining number of outgroup friendships (Dickter et al., 2015; Voci & Hewstone, 2003), which tend to summarize the tendency to have outgroup encounters that are sustained, frequent, and positive. Indeed, outgroup friendships have shown to be particularly powerful predictors in models of contact, such that higher numbers of reported outgroup friendships are associated with reduced affective and cognitive outgroup prejudice (Aberson & Haag, 2007; Tropp & Pettigrew, 2005). Moreover, not only is the friendship/reduced prejudice

relationship strong, it also, much like the association between broadly defined contact and decreased prejudice, appears to be mediated through intergroup anxiety (e.g., Binder et al., 2019).

Using friendships as a predictor in the model, rather than measures that account for contact quantity and quality solely or separately, may be particularly important when minority-status groups are included in research samples. Studies that have examined the contact experiences of Black and White Americans, for example, have revealed differences in the rates of positive and negative contact. While Black and White individuals appear to experience positive contact at similar rates, Black Americans tend to report more frequent and more intense negative outgroup contact, including experiences of racial discrimination, than do White and Latinx/Hispanic Americans (Hayward et al., 2017). This discrepancy is important in light of evidence that negative contact is more strongly associated with increases in outgroup prejudice than positive contact is associated with its reduction (Barlow et al., 2012; Hayward et al., 2017). Crucially, the most commonly used measures of contact do not parse contact into positive or negative experiences; that Black Americans experience more negative contact than White Americans may ultimately contribute to the weaker documented contact-prejudice effects. Specifically capturing friendships, on the other hand, may permit a focus on optimal qualities of contact, as originally intended in the model (Aberson, Shoemaker, & Tomolillo, 2004; Allport, 1954) and ultimately strengthen the contact-prejudice relationship for both groups.

### ***1.3.3 Reliance on Explicit Measures of Prejudice***

A third limitation of the intergroup contact literature revolves around the ways in which prejudice or negative attitudes are measured (Dixon et al., 2012). Dating back to the earliest days of contact research, explicit prejudice, or negative outgroup attitudes that are consciously

available, has been the primary target of study. Recent work, however, suggests that this approach may be inadequate to capture prejudiced views about race, particularly in a cultural context in which such attitudes are increasingly taboo to endorse (Dovidio et al., 2000).

When Allport began conducting research on intergroup contact and prejudice in the 1950's, overt endorsement of racially prejudiced views was normative for many White Americans (Aberson et al., 2004). In the ensuing decades, however, as the country moved to recognize and formally establish protections for civil rights, norms shifted for many people, such that overt statements of racial prejudice became increasingly unacceptable by social and legal standards (Dovidio et al., 2000; Pearson, Dovidio, & Gaertner, 2009). This cultural evolution has continued into the 21<sup>st</sup> century. A large-scale assessment of interpersonal attitudes between 2007 and 2016 found evidence that the number of adults—predominantly, but not exclusively, White—who explicitly endorsed more neutral attitudes about race grew substantively during this period (Charlesworth & Banaji, 2019).

However, this apparent shift in overtly endorsed attitudes about race appears at odds with the experiences that American members of racial minority groups have reported concurrently. A 2016 Pew Research Report showed that up to 71% of Black Americans, who comprise the largest non-white racial/ethnic population within the U.S., endorsed occasional to regular personal experience of racial discrimination (Pew Research, 2016). Thus, although White Americans show a decreasing tendency to voice prejudiced views about racial minority group members, the experiences of a large subset of racial minority group members suggest that such attitudes are nonetheless still present and that racial prejudice has become less public and more subtle, often expressed indirectly and in ways that are outside conscious awareness (Aberson & Gaffney, 2008).

### ***1.3.3.1 Implicit Associations***

Since the emergence of the intergroup contact field decades ago, cognitive science and technological advances have facilitated the development of novel approaches to conceptualizing and measuring intergroup biases that do not rely on overt endorsement of negative attitudes. One such approach involves the examination of implicit associations, or social cognitions that occur automatically and outside of conscious control (Greenwald, McGhee, & Schwartz, 1998).

Implicit associations are less sensitive to social desirability biases and top-down monitoring or suppression than are explicit or overtly expressed attitudes (Gibson et al., 2017). They thus may offer a more accurate index of racial prejudice than does self-report. Moreover, implicit markers of racial bias, like explicitly endorsed attitudes, have real-world implications. For example, they show significant associations with opposition to anti-discriminatory policies, such as those designed to benefit minority-status groups (Jones et al., 2017; Pearson et al., 2009).

The measure used most commonly to assess implicit racial attitudes is the computerized Race Implicit Association Test (IAT; Greenwald, McGhee, & Schwarz, 1998), which requires respondents to rapidly associate Black and White facial stimuli with good or bad connotations. Scores on the measure are distributed from -2 to 2; more negative scores reflect a stronger tendency to associate Black faces with good connotations and White faces with bad connotations (pro-Black associations), while more positive scores reflect more automatic associations of Black faces with bad connotations and White faces with good connotations (pro-White associations). This task allows for inferences about implicit social cognition in the sense that it measures automatic associations—that are outside conscious awareness—between a respondent’s behavioral responses and the measured outcome (Nosek et al., 2011). Research using implicit association tasks has yielded evidence that, in contrast with overt declarations of prejudiced

racial views, which have declined markedly over several decades, implicitly indexed racial prejudice has, on average, shown more modest reductions that date back less than ten years (e.g., Charlesworth & Banaji, 2019). In light of the relative population-level stability of implicitly measured prejudiced attitudes about race, including indices of these subtle indicators of bias along with or in place of explicit measures of prejudice may increase the precision and accuracy of tests of the contact hypothesis.

An additional reason that measures of negative implicit associations about racial outgroups warrant inclusion in tests of the contact hypothesis is that intergroup contact has been shown to help reduce them, much as it has been found to decrease explicit endorsement of racially prejudiced ideas (e.g., Aberson & Gaffney, 2008). Although early conceptions of implicit biases held that, because they are outside of conscious control, they are relatively immutable (Nosek et al., 2011), more recent data suggest that implicit attitudes can in fact shift (Blair, 2002). Research has demonstrated that interventions, such as a prejudice and conflict seminar for students (Rudman et al., 2001), as well as naturally occurring changes in the local environment, such as intergroup encounters in one's daily life (Dasgupta, 2013), can contribute to changes in implicit prejudice. Moreover, these shifts have been shown to endure over periods that range from one day (Dasgupta & Greenwald, 2001) to at least two years (Dennehy & Dasgupta, 2017).

Studies that have examined associations between performance on implicit association tasks and outgroup contact estimated retrospectively have found consistently that those who report more contact also show weaker negative implicit outgroup biases (e.g., Aberson & Gaffney, 2008; Aberson & Haag, 2007; Turner et al., 2007). Similarly, studies that have used lab paradigms to engineer contact experiences that encompass exposure to admired Black exemplars

(Dasgupta, 2013), to a strong female figure (Dennehy & Dasgupta, 2017), or educational/training interventions (Forscher, Mitamura, Dix, Cox, & Devine, 2017) have demonstrated that more numerous and more positively valenced outgroup encounters both predict reduced implicit prejudice.

Contact valence and intimacy levels appear to be particularly important to take into account when examining changes in implicit biases; close, positive relationships such as friendships seem to have an especially potent impact on implicitly held racial attitudes. For example, one study found that White individuals with more reported Black friendships or Hispanic friendships demonstrated weaker implicit biases against Black or Hispanic people, respectively, than did White individuals with fewer outgroup friendships (Aberson, Shoemaker, & Tomolillo, 2004). Early formation of intergroup friendships seems to be particularly influential with regard to biases held in adulthood. In a study that included Black as well as White participants, individuals who reported more interracial friendships during childhood (from before age 6 through age 18) showed less outgroup implicit racial bias in adulthood, even when controlling for current interracial friendships (Kubota et al., 2017). Kubota and colleagues interpreted their findings as suggestive that having positive contact experiences with racial outgroup members provides accessible counterstereotypes that contribute to reduced implicit bias.

Further, the relationship between intergroup contact and implicit biases appears to be bidirectional, as it is for explicit measures of bias, such that negative implicit biases are predictive of low future intergroup contact behaviors (Greenwald et al., 2009). Thus, the relationship between negative implicit biases about race and intergroup friendships is presumably dynamic and reciprocal. People with minimal negative implicit intergroup biases are

more likely to have intergroup friendships, and people with more intergroup friendships are more likely to have implicit biases that are positive or neutral about racial outgroup members.

Additionally, intergroup anxiety has been shown to serve as a mediator of associations between contact and implicit associations, much as it does for associations between contact and more overt racial biases. In a meta-analytic study, for instance, Aberson and Gaffney (2008) found that intergroup anxiety was the strongest mediator of the relationship between intergroup contact and implicit biases regarding Black individuals among White participants in the U.S. In the same year, Prestwich et al. (2008) published similar mediational findings regarding the association between contact with and implicit attitudes about Asian individuals among White participants in the United Kingdom.

It is important to note that other studies have failed to find a significant mediational effect of intergroup anxiety in the contact/implicit bias association (e.g., Aberson & Haag, 2007; Turner et al., 2007). Aberson and Gaffney (2008), however, suggested that small sample sizes and other limitations of these studies weakened their statistical power to detect effects. Thus, there is some evidence to suggest that intergroup contact reduces both explicit and implicit biases through the same pathway—amelioration of intergroup anxiety. Notably, this association has yet to be examined for samples composed of people from minority-status groups.

### ***1.3.3.2 Attentional Bias***

Along with our explicit statements and biased patterns of implicit associations, our attentional patterns may provide indices of how we think and feel about outgroup members. The attentional literature suggests that the way in which certain stimuli capture our attention over others is meaningful, in that it is driven by motivational significance, or the extent to which the stimuli are relevant to our idiosyncratic needs or goals (Barrett, Mesquita, & Gendron, 2011;



Lundqvist, Esteves, & Öhman, 2004). For instance, we tend to show attentional biases for, or direct attention preferentially toward, stimuli that convey threat. Cosmides and colleagues (2003) have hypothesized that this rapid and accurate detection of threat in the environment (e.g., predators such as snakes; Öhman & Mineka, 2001) stems from an evolutionary need to promote safety and avoid potential harm.

One type of threat cue that people commonly show such an attentional bias for is faces that express anger. Indeed, many studies have found evidence that individuals tend to demonstrate attentional biases toward angry faces over happy or neutral ones (e.g., Mogg, McNamara, Powys, Rawlinson, Seiffer, & Bradley, 2000; Yiend, 2010). This attentional bias for facial threat appears to be particularly exaggerated in people with clinical or elevated sub-clinical anxiety (e.g., Mogg, Bradley, Miles, & Dixon, 2004). It is, however, also evident for people without excessive anxiety when stimuli are presented so briefly (e.g., < 100 ms; Cao & Lin, 2017) that they precede full conscious awareness (i.e., “pre-attention” or “early attention”), which suggests that most individuals are primed to rapidly detect cues of potential threat. Researchers have used a variety of approaches to measure attention biases for angry faces; these include behavioral reaction time measures (e.g., MacLeod, Mathews, & Tata, 1986; Donders, Correll, & Wittenbrink, 2008), gaze-tracking procedures (e.g., Bean et al., 2012), and indices of brain activity in regions implicated in attentional processing (e.g., Cunningham et al., 2004; Dickter and Bartholow, 2007).

Importantly, it appears that angry expressions are not the only facial characteristics that tend to capture attention preferentially. Other facial cues function similarly during attention bias tasks; these include averted eye gaze (Roelofs et al., 2010) and male (Becker, Kenrick, Neuberg, Blackwell, & Smith, 2007) or more mature (Zebrowitz, 2017) features. There is also evidence

that people rapidly orient attention toward faces with features that signal racial outgroup status (Dickter & Bartholow, 2007; Donders, Correll, & Wittenbrink, 2008; Otten, 2016; Trawalter et al., 2008). Trawalter, Todd, Baird, and Richeson (2008), for instance, found that White college students displayed attentional biases toward expressively neutral faces that were Black, but not those that were White. Trawalter and colleagues (2008) postulated that their participants may have attentionally prioritized Black faces because they signaled threat, not only because they were outgroup members, but also because they are from an outgroup that cultural messaging has commonly linked with danger (Donders, Correll, & Wittenbrink, 2008; Kleider-Offutt, Bond, Williams, & Bohil, 2018). Limited research has explored attentional biases for outgroup faces among Black participants, but one ERP study yielded evidence that Black individuals may also show early attentional orienting to neutral White faces (Dickter & Barlow, 2008).

These results suggest that cues of outgroup race and anger may compound to magnify the perception of threat on a face. Otten (2016), for instance, found evidence that adults, most of whom were White, were faster to detect angry Black faces than angry White faces in visual arrays. This makes sense, given evidence that indicators of racial group membership (e.g., skin color, size and shape of facial features; e.g., Stepanova & Strube, 2009) are rapidly encoded along with affective cues like anger (Ito, Thompson, & Cacioppo, 2004), and it raises the possibility that facial signals of race may also contribute to the threat value, or motivational relevance, of facial stimuli, and thus that biased attention to faces as a function of these signals is a putative indicator of intergroup bias (e.g., Trawalter, Todd, Baird, and Richeson, 2008).

Few researchers, however, have examined attention bias as a possible index of prejudice or negative outgroup attitudes in the context of studies of the contact hypothesis; however, preliminary evidence suggests intergroup contact is associated with variability in attentional

biases for outgroup faces. Dickter and colleagues (2015), for example, found that White adults who reported fewer Black friendships were more strongly biased to attend to expressively neutral Black faces over similarly neutral White faces. To date, no published research has examined the contact-attention bias association for people with minority-status racial identities. However, there is preliminary evidence that Black participants may show comparable attentional biases for White faces to the biases to attend to Black faces that have been observed in White individuals (e.g., Dickter & Bartholow, 2007).

Attentional bias may be a particularly important index of negative outgroup attitudes to measure because of its well-documented links to anxiety. Many studies have demonstrated that visual attention is preferentially captured by stimuli that reflect a perceiver's personal fears or anxieties; for instance, individuals with social anxiety or post-traumatic stress disorder have been shown to demonstrate greater attentional prioritization for socially threatening and trauma-related stimuli, respectively, than for other threats or more benign cues (e.g., Ashley, Honzel, Larsen, Justus, & Swick, 2013; Mogg, Philippot, & Bradley, 2004). Similarly, individuals with higher levels of intergroup anxiety have been shown to respond preferentially to racial ingroup over outgroup cues. For example, White people with elevated intergroup anxiety, relative to less anxious peers, have demonstrated stronger startle eyeblink responses to Black than White faces (Amodio, Harmon-Jones, & Devine, 2003); larger responses to Black than White faces within the N170 component of recorded event-related potential (ERP), an electrical signal in the brain that occurs in response to facial stimuli (Ofan, Rubin, & Amodio, 2014); and greater attentional biases toward Black than White expressively neutral faces (Bean et al., 2012; Richeson & Trawalter, 2008).

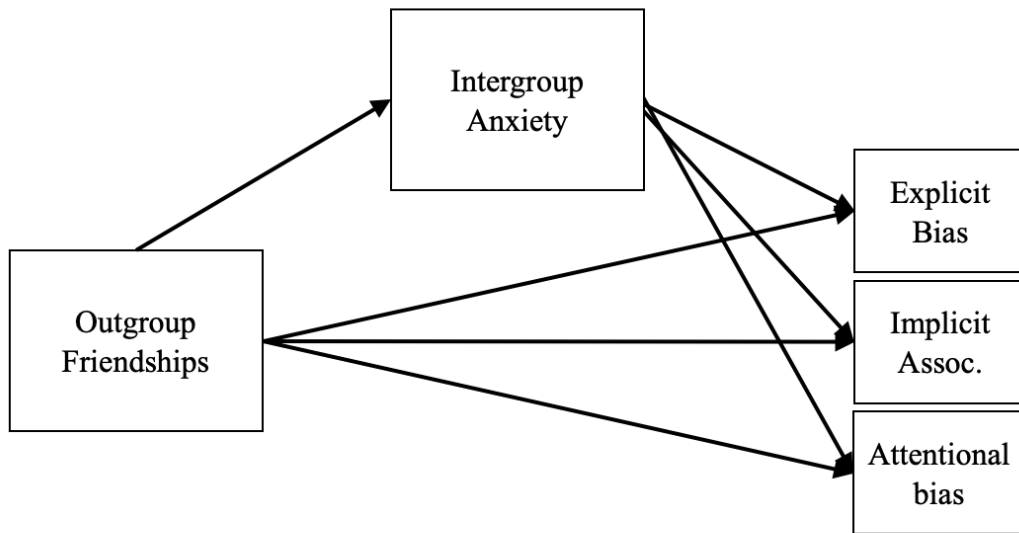
Attentional biases may also serve as a precursor to or foundation for implicit prejudice or explicitly endorsed negative attitudes about members of racial outgroups, possibly as a function of their links to anxiety. Aberson and Haag (2007) postulated, for example, that the relationship between intergroup anxiety and negative outgroup evaluations or prejudices may occur, at least in part, because anxiety, when provoked, commonly narrows visual attention to fear-relevant cues. This narrowed attention, in turn, encourages reliance on outgroup stereotypes (Aberson & Haag, 2007). Inclusion of attentional biases for visual cues of outgroup membership, particularly when combined with visual cues of explicit threat such as angry expressions, in studies of the contact hypothesis may thus allow for a more thorough mechanistic understanding of the relationships among key variables.

#### **1.4 Summary and Introduction of the Current Study**

A large body of research provides support for Allport's (1954) contact hypothesis, indicating that intergroup contact is associated with reductions in negatively prejudiced attitudes about outgroup members. Moreover, there is ample evidence that contact leads to more positive attitudes about outgroup members, at least in part by reducing intergroup anxiety. However, there are several limitations to research conducted to date on intergroup contact, intergroup anxiety, and negative racial attitudes that warrant addressing.

In particular, members of minority-status groups have long been grossly underrepresented in studies of intergroup contact. The few studies that have included minority-status individuals in their samples have found evidence that contact effects may be weaker for members of minority-status groups. This pattern of findings may stem from other limitations of contact research to date, including inconsistent definition and treatment of intergroup contact, as well as reliance solely on explicit measures of intergroup bias.

To provide a step toward addressing these limitations, I used path analysis to examine the fit of a model of associations among outgroup friendship quantity, intergroup anxiety, and outgroup-targeted prejudice, indexed using both explicit and implicit measures, in a sample composed of both majority-status (White) and minority-status (Black) young adults. Specifically, I predicted that, as shown in Figure 1, 1) outgroup friendships will show significant, negative associations with intergroup anxiety; 2) outgroup friendships will show direct, negative associations with explicit prejudice, implicit association, and attentional bias; and 3) outgroup friendships will show indirect associations with each of the three measures of bias via negative associations with intergroup anxiety. I hypothesized that this model, constructed using a clearly defined, positively valenced index of contact, as well as indices that capture multiple facets of intergroup bias, would yield good fit for members of both majority-status and minority-status groups (e.g., Stathi et al., 2020).



*Figure 1 Proposed structural model. Paths depict the direct effects of outgroup friendships on explicit prejudice, implicit associations, and attentional bias, as well as indirect effects through the mediator intergroup anxiety.*

## 2 METHODS

### 2.1 Participants

Participants were recruited from the Georgia State University (GSU) psychology department research pool, as well as via flyers posted on the university's downtown Atlanta campus. The sample comprised 241 participants aged between 18 and 34 years ( $M = 20.35$ ;  $SD = 3.30$ ). Participants were eligible to enroll in the study if they identified primarily as Black/African-American or White, were native English speakers, were between the ages of 18 and 40, and possessed normal or corrected vision. Of the participants, 148 (61.4%) self-identified as primarily Black/African-American and 93 (38.6%) self-identified as primarily White. Most participants reported that they were undergraduate students ( $n = 219$ ; 94.8%), though the sample also included a small number of graduate students ( $n = 11$ ; 4.8%). Participant gender was weighted toward women; 173 (74.9%) participants identified as female, 54 (23.4%) as male, 2 as gender-fluid, 1 as non-binary, and 1 as a transgender man (10 participants chose not to self-disclose gender or academic status).

### 2.2 Procedure

Participants completed all components of the study, which was approved by the Georgia State University (GSU) Institutional Review Board, in a single one-hour testing session conducted in the Psychology Department on the GSU campus. Prior to their arrival for the study, they completed a screening questionnaire posted on the department's online research and testing recruitment website to ensure that they met study inclusion criteria.

At the start of the testing session, trained research staff obtained informed consent and reviewed study procedures. Participants then completed, in counterbalanced order, two blocks of tasks: 1) two behavioral computer tasks and 2) a battery of four self-report questionnaires

presented online in randomized order via the Qualtrics platform (Qualtrics Labs, Inc). Trained research staff members instructed participants on how to complete each measure and remained present in the back of the research space in order to address any questions or concerns that arose while participants completed the study activities. Following study completion, research staff provided verbal and written debriefing and answered participant questions. Participants were compensated for their contributions with either research credit toward their departmental requirements or a \$5 gift card, depending on recruitment source.

## **2.3 Measures**

### ***2.3.1 Questionnaires***

#### **Demographic Survey (adapted from Locke, Bieschke, Castonguay, & Hayes, 2012).**

The demographic questionnaire used in this study was adapted from the Center for Collegiate Mental Health (CCMH) Standardized Data Set (SDS) questionnaire, a 20-item self-report measure developed for use with college students (Locke, Bieschke, Castonguay, & Hayes, 2012) that solicits demographic information, along with information from other domains. Participants in the present study were asked to respond to 18 multiple choice and open response items regarding age, socioeconomic status, and race that were drawn from the CCMH SDS questionnaire (see Appendix A).

**The Intergroup Anxiety Scale (adapted from Stephan & Stephan, 1992).** The Intergroup Anxiety Scale (see Appendix B) is a 15-item self-report measure that yields a unitary intergroup anxiety score based on responses to 15 statements regarding the participant's anticipated emotional reactions to varying intergroup interactions. The measure traces its roots to Stephan and Stephan's (1985) Intercultural Anxiety Scale, which asked respondents to rate their anticipated affective experiences "interacting with people from a different racial or ethnic group." Stephan and Stephan revised their measure in a subsequent



study so that it asked about anticipated responses to specific interactions, such as feeling that your group is being unfairly criticized by members of the other group and being laughed at for a minor mistake you have made (Stephan and Stephan, 1992). Versions of this measure have been widely used in intergroup anxiety research (e.g., Barlow, Louis, & Terry, 2010; Van Zomeren, Fischer, & Spears, 2007; Vezzali & Giovannini, 2012).

In the 1992 scale, “Moroccans” served as the target outgroup; the current study used two adapted versions, one for White participants that portrayed “Black/African Americans” as the target outgroup, and one for Black participants that presented “White/Caucasians” as the target outgroup. Participants were instructed to respond to each statement, indicating the extent to which they would experience a host of affective states (e.g., worried, self-conscious), in anticipation of imagined intergroup scenarios, during which they would be the only Black (or White) person present, among White (or Black) outgroup member(s). Each statement was paired with one affective state (e.g., “anxious”, “nervous”). Participants rated their imagined emotional responses to each statement (e.g., “going to a small party”) using a 10-point Likert-type scale (1 = “not at all self-conscious”, 10 = “extremely self-conscious”).

The Stephan and Stephan (1992) measure demonstrated excellent internal consistency across 16 studies (mean  $\alpha = .91$ ) in a recent review (Stephan, 2014). Preliminary analyses using the current study’s data were comparable, with high internal consistency for both Black ( $\alpha = .912$ ) and White ( $\alpha = .911$ ) participant forms. Other studies have reported that the scale demonstrated moderate test-retest reliability ( $r = .49$ ; Binder et al., 2009) and good discriminant validity, accounting uniquely for a significant amount of variance in explicit prejudice, above and beyond the contributions of highly intercorrelated measures of negative stereotypes and symbolic and realistic threats (Stephan, 2014).

**Liebowitz Social Anxiety Scale-Self Report Version (LSAS-SR; Baker, Heinrichs, Kim, & Hofmann, 2002).** The LSAS-SR (see Appendix C) is a 24-item self-report measure of fear/anxiety and avoidance of social situations over the past week. Of the 24 items, 11 relate to social interaction and 13 relate to public performance. Participants were instructed to rate, using a Likert-type scale, both the degree to which they feared a given social situation (0 = none, 1 = mild, 2 = moderate, 3 = severe) and how often they avoided the situation ((0 = never, 1 = occasionally, 2 = often, 3 = usually). The measure yields Fear/Anxiety, Avoidance, and Total scores, with higher scores reflecting more significant symptom severity. Total scores were used in the analyses. Rytwinski et al. (2009) determined that a total score of 47 on the LSAS-SR provided an effective cutoff for differentiating with maximal sensitivity and specificity between individuals with and without symptoms of a severity consistent with Social Anxiety Disorder. In prior research on nearly 3,000 individuals drawn from the proposed study population, 41% of participants scored above 47 on the LSAS-SR (Tone, unpublished data), which suggests the study sample should include participants who endorse a range of anxiety. The LSAS-SR has been shown to have strong psychometric properties, with excellent internal consistency ( $\alpha = .95$ ), as well as good convergent and discriminant validity (Fresco et. al, 2001; Rytwinski et al., 2009). Internal consistency in the present study was strong ( $\alpha = .96$ ).

**Levin Friendship Survey (Levin, van Laar, & Sidanius, 2003).** This 31-item self-report survey (see Appendix D) was developed to examine associations between ingroup and outgroup friendships and racial/ethnic attitudes in college students. Items are organized into four conceptual clusters: 1) background variables (gender and religion, foreign cultural closeness, socio-economic status, political conservatism, pre-college friendships; 2) college friendship variables; (3) ethnic attitudes (ingroup bias, intergroup anxiety); and 4) college campus climate

variables (one-group representation, institutional support, perceived intergroup conflict on campus, perceived intergroup conflict on campus). Items for each construct have demonstrated strong internal consistency reliability, with  $\alpha$  values ranging from .50 to .87.

In the present study, I combined the pre-college and college friendship items to create a measure of outgroup friendships. Participants were presented with eight items that asked them to rate the number of close friends that they a) had in high school, and b) have at college, who identify primarily as African American, White, Latino, and Asian American, respectively (1 = none, 2 = few, 3 = many, 4 = most, 5 = all). For participants who identified primarily as White, number of African American friends served as the dependent variable in tests of the contact hypothesis model; for participants who identified primarily as Black, number of White friends served as the dependent variable.

I used the ingroup bias items from this measure to index explicit bias. Participants were presented with four items that asked them to rate how positively or negatively they feel toward people who identify as White, African American/Black, Latinx/Hispanic, and Asian/Asian American (1 = very negatively, 7 = very positively). For participants who identified primarily as White, consistent with prior research (Merrilees et al., 2017), I calculated an explicit bias score by subtracting the value endorsed for White people from the value endorsed for African American/Black people. For participants who identified primarily as Black, in line with procedures that Henry and Hardin (2006) and other researchers have used, I calculated an explicit bias score by subtracting the value endorsed for African American/Black people from the value endorsed for White people.

### 2.3.2 *Behavioral Tasks*

**The Race Implicit Association Test (Race IAT;** Greenwald, McGhee, & Schwarz, 1998). The Race IAT is a computerized procedure used to measure implicit racial attitudes as reflected in automatic evaluations. Study participants completed the Race IAT version provided by Project Implicit (Nosek et al., 2005; [www.millisecond.com](http://www.millisecond.com)) and presented using the Inquisit platform (Inquisit, 2015). The task measures the strength of the associations between Black and White racial stimuli and good-bad evaluations.

Participants were asked to assign words and pictures that appear in the center of the computer screen, one by one in randomized order, into “Good” and “Bad” and “Black American” and White American” categories. Task stimuli comprised 28 words and images: eight pleasant (marvelous, superb, pleasure, beautiful, joyful, glorious, lovely, wonderful) and eight unpleasant words (tragic, horrible, agony, painful, terrible, awful, humiliate, nasty), as well as six White face exemplars and six Black face exemplars, with equal numbers of male and female faces, each cropped at the top of the eyebrows and between the lips and chin (Nosek et al., 2007).

A study team member instructed participants to press the “e” key (left response key) if the word belonged to the category presented in the top left of the screen, and the “i” key (right response key) if the word belonged to the category in the top right of the screen. Participants were told to make their responses as quickly and accurately as possible. If they made an error (e.g., assigning “lovely” to the “bad” category), a red X appeared on the screen until participants corrected themselves by pressing the opposite key.

The task consisted of five separate blocks. In the first block, participants were instructed to distinguish Black and White faces via right and left keyboard button presses (i.e., White face = left key; Black face = right key). The second task block consisted of a similar procedure;

however, instead of faces, participants were presented with written words that they categorized as good or bad via button press. The third task block integrated the two initial tasks by having participants alternate between mapping faces and words to two response keys (i.e., White faces and pleasant words = right key; Black faces and unpleasant words = left key). In the fourth task block, only faces were presented (as in block 1), but they were mapped to the opposite response key than they were in block 1 (i.e., White face = right key; Black face = left key). The final task block was similar to the third, combined trial-type block, but responses were once again reversed (i.e., White faces and pleasant words = left key; Black faces and unpleasant words = right key).

The strength of the association between race and good-bad evaluations was determined by calculating the difference (d-score) between average response times for compatible or “hypothesis-consistent” pairings (e.g., Black-Bad) from the average response times for incompatible or “hypothesis-inconsistent” pairings (e.g., Black-Good) (Greenwald, Nosek, & Banaji, 2003). Positive d-scores reflect a stronger association between White-Good and Black-Bad pairings, than for White-Bad and Black-Good pairings. Negative d-scores reflect a stronger association between White-Bad and Black-Good pairings than for the opposite pairs.

The IAT is the most well-validated implicit attitude measure in the literature and the racial attitudes option used in this study is the most commonly implemented version of the test (Xu et al., 2014). The task has demonstrated satisfactory internal consistency (ranging from  $r = .7$  to  $.9$ ), stable test-retest reliability ( $r = .56$ ), and strong convergent and discriminant validity suggesting it is related but distinct from self-report (Nosek et al., 2007). The IAT has also demonstrated greater predictive validity compared to self-reports (Nosek et al., 2007).

**Diverse Dot Probe Task.** The Diverse Dot Probe (DDP) task, a measure of attention bias for threat conveyed via facial expressions, was used to assess patterns of attentional bias

for threat for both Black and White facial stimuli. This task was modeled after a widely used visual probe tasks that MacLeod, Mathews, and Tata (1986) developed to examine attention biases associated with anxiety.

The computerized task comprised 160 trials that were presented using Eprime 2.0 (Psychology Software Tools, Pittsburgh, PA) after a brief, 10-trial practice run designed to ensure understanding. Each trial began with a small cross fixation (500 ms), followed by a face pairing “cue” (100 ms) and an asterisk “probe” (1100 ms), all presented upon a black background. The face pair appeared for 100 ms because this briefer presentation time has been shown to more precisely reflect initial attentional orienting prior to influences of executive control or subsequent eye movements (van Rooijen et al., 2017). As is recommended to protect against possible carry-over effects from previous trials (Compton, Heaton, & Ozer, 2017), the intertrial interval (ITI), or the period after the asterisk probe disappears and before the next cross fixation is presented, varied randomly between 750 ms and 1,250 ms. Participants were instructed to indicate the location of the asterisk probe on the screen via keyboard button press. They pressed “1” if the asterisk appeared on the left side of the screen, and “2” if it was on the right side.

Facial stimuli included grayscale images of 160 Black and White models (50% female) depicting neutral, happy, or angry expressions. The images were chosen from four validated collections including the NimStim set (Tottenham et al., 2009), the Productive Aging Face Database (Minear & Park, 2004), images used by Bradley and colleagues (1997) in a widely used dot-probe task, and the GSU Diverse Faces set (Schmidt, Davis, & Tone, 2012). The selected pictures were then presented to a sample of undergraduate students, who judged the extent to which each image exemplified the intended emotion. Images included in the final facial set were

also judged to be distinct from other emotional expressions, in order to serve as the best exemplars of neutral, happy, and angry faces (Schmidt & Tone, 2014).

Facial stimuli “cues” were presenting in pairs. In total, there were 32 trials of neutral-neutral pairs, 64 angry-neutral pairs, and 64 happy-neutral pairs. Each pair included photographs of a single model; each model appeared during only one trial. For neutral-neutral trials, the same image appeared on both sides of the screen; for the angry-neutral and happy-neutral trials, images of the model posing an emotional and a neutral expression appeared.

Overall threat bias scores for each participant were calculated by subtracting the average response time for probes that replaced angry faces (threat-congruent) from the average response time for probes that replaced neutral faces (threat-incongruent) during angry-neutral trials. Threat bias scores for Black angry faces and for White angry faces were also separately calculated for each participant.

Positive bias scores indicate that participants were faster overall to locate probes that replaced angry faces than probes that replaced neutral faces (stronger attentional bias toward threatening faces). Negative bias scores indicate the opposite tendency, to more quickly locate probes that replaced neutral faces than angry faces (weaker attentional bias toward threatening faces, or a bias away from threatening faces). This aggregated mean index of attention bias is widely used and allows for comparisons to other dot probe studies. This method has been shown to successfully distinguish patterns of early attentional orienting between anxious and non-anxious groups (Bar-Haim et al., 2007).

### **2.3.3 *Analytic Plan***

I used multigroup path analysis, a subset of structural equation modeling (SEM) to test the fit of the proposed model for both Black and White college students. Path analysis is a

statistical method that allows modeling and assessment of the relationships among observed variables through a series of structured linear regression equations. As in traditional linear regression, all variables in path analysis are observed, and the model distinguishes variable associations from covariation. Path analysis has advantages over alternate statistical techniques such as multiple regression or ANOVA. In particular, it allows for simultaneous analysis of relationships among multiple observed variables, testing of both direct and indirect effects of those variables, estimation of the magnitude of those relationships, and consideration of potential measure-specific error (Weston & Gore, 2006). It also allows for examination of associations among predictors and multiple dependent variables. SEM analyses have been widely employed within the contact field (e.g., Knowles & Tropp, 2018, Tuner et al. 2007, Paolini et al., 2004), in part because they permit estimation of variance and relationships among constructs (Weston & Gore, 2006).

### ***2.3.3.1 Preliminary Analyses***

Prior to conducting model analyses, I assessed the extent of missing data. Inspection of key study variables revealed missing data rates that ranged from 0.8 to 7.5% of datapoints across variables. There were no identifiable differences in observed data distributions between participants with missing or complete data, suggesting data were missing completely at random (MCAR). Accordingly, I proceeded on the assumption that the remaining data could be assumed to be a simple random sample of the hypothetical complete dataset.

To account for missing data, I fitted path models using maximum likelihood estimator (ML) for continuous variables. The ML estimator includes all available data; however, covariates are exempt from missingness analyses because they are considered separate from the model



without related distributional assumptions (Muthén & Muthén, 2009). ML uses an iterative process to estimate the most likely values for parameter estimates. (Alison, 2010)

As path analysis involves testing a series of linear regression models, continuous dependent variables are held to similar standards of multivariate normality as those for regression analyses. Preliminary examination of the dataset revealed no violations of key assumptions of linear regression. All variables included in the proposed model displayed acceptable ranges of skewness and kurtosis (i.e., less than  $\pm 1.0$ ). Visual inspection of probability (P-P) and quantile (Q-Q) residual plots revealed no significant deviations from the diagonal line, suggesting the data were normally distributed. In efforts to adhere to updated recommendations regarding mediation analysis (Fritz & MacKinnon, 2007; MacKinnon, Kisbu-Sakarya, & Gottschall, 2013), particularly among more modest sample sizes, bootstrapping procedures were implemented to obtain bootstrapped standard errors and confidence intervals (using 1000 draws) to more accurately examine the indirect effects (Muthén & Muthén, 2009).

### ***2.3.3.2 Path Invariance Testing***

I conducted path analysis invariance testing to assess whether the proposed model was equal (or invariant) between the two groups. For multigroup analysis, it is recommended that invariance, or equality of the path structures between groups, be established before group comparisons are made (Sass & Schmitt, 2013). Invariance analyses involve comparison of unconstrained (freely estimated) and constrained path models with both groups included. Of note, invariance testing compares unstandardized coefficients rather than standardized coefficients, as is common practice in more traditional statistical analyses.

First, I examined model fit for an unconstrained model with the two groups combined. In an unconstrained model, all paths are freely estimated, meaning they are allowed to differ

between the groups (Lefcheck, 2021). The extent to which the model explains the observed data is examined via several indicators of model fit, including chi square, comparative fit index (CFI), Tucker-Lewis Index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) values. A satisfactory fit would be expressed by a nonsignificant chi-square test, CFI and TLI values greater than .95, and RMSEA and SRMR values less than .06 and .08, respectively (e.g., Hu & Bentler, 1999). Unsatisfactory evidence of model fit would suggest the path model is not specified correctly or optimally, and that modification of pathways or variable order may improve fit (Valenzuela & Bachmann, 2017). Satisfactory evidence of model fit across these indices suggests that it is appropriate to take the next step in invariance testing. In both constrained and unconstrained models, the chi square values and additional measures of fit are additive, such that they each reflect fit for the two groups combined.

Second, I tested a constrained model and examined model fit. In a constrained model, paths of interest are constrained, or set to be equal across both groups. The hypothesized model included seven paths of interest: four direct paths from outgroup friendships to intergroup anxiety and the three dependent variables (explicit bias, implicit bias, attentional bias); and three indirect paths from outgroup friendship to each of the three dependent variables through the mediator, intergroup anxiety. Model fit was examined following the guidelines outlined at the previous step.

Path invariance was then examined by computing change in chi square values between the unconstrained and constrained models. A significant change in chi square suggests that at least one of the path coefficients (e.g., beta values) in the model differs between the groups. In other words, the grouping variable (self-identified participant race, in this study) is thought to

moderate the association between at least two variables in the model. When significant chi square differences are evident, paths in the constrained model are successively relaxed until the change in chi square is no longer significant.

A primary method for examining paths that may contribute to variance and thus may need to be relaxed is assessing modification indices. Modification index (MI) values reflect the anticipated drop in chi square if a particular parameter is relaxed, or in other words the expected improvement in model fit if an equality constraint is freely estimated. They are thus useful for finding areas of local misfit in the model. Although there is no defined range for acceptable MI values, they are typically identified as warranting attention when they are notably larger than other values in the model or if they exceed a value of 3.84, often pinpointed as a critical cutoff value for MI (Whittaker, 2011).

A non-significant change in chi square would suggest that the unstandardized path coefficients are equal across groups. In other words, the prediction of one variable from another as hypothesized in the model does not vary depending on the grouping variable (race). In this case, the model is assumed to be invariant, or equal, between the two groups, suggesting additional paths do not need to be relaxed (low modification index values should reflect this) and meaningful group comparisons can be conducted.

### **3 RESULTS**

#### **3.1 Preliminary Analyses**

Descriptive statistics including mean values, ranges, and standard deviations for each variable of interest are displayed in Table 1. Group comparisons of scores on each variable yielded evidence of several significant differences. First, reported numbers of outgroup friends across high school and college differed between groups, with White participants reporting having

more Black friends ( $M = 5.35$ ,  $SD = 1.58$ ) than Black participants reported having White friends ( $M = 3.99$ ,  $SD = 1.44$ ),  $t(218) = -6.57$ ,  $p < .001$ . A significant difference between Black and White groups was also evident for self-reported explicit bias, with White participants on average endorsing more favorable attitudes ( $M = .50$ ,  $SD = 1.15$ ) towards outgroup (Black) than for ingroup (White) people, and with Black participants endorsing more negative attitudes ( $M = -1.35$ ,  $SD = 1.71$ ) towards outgroup (White) than ingroup (Black) individuals,  $t(216) = -8.78$ ,  $p < .001$ . Further, Black and White participants obtained significantly different implicit bias scores,  $t(216) = -6.97$ ,  $p < .001$ , with both groups demonstrating on average an implicit preference for ingroup members. Black participants, on average, demonstrated a pattern of responding that suggested implicit preference for Black individuals over White individuals (i.e., stronger Black-Good and White-Bad associations), ( $M = -.13$ ,  $SD = .40$ ). White participants, in contrast, demonstrated an implicit preference for White individuals over Black individuals, (i.e., stronger White-Good and Black-Bad associations), ( $M = .28$ ,  $SD = .46$ ). Notably White participants' implicit preference for their ingroup was, on average, significantly stronger than Black participants' implicit preference for their ingroup.

On the behavioral task assessing attentional bias both White and Black participants, on average, demonstrated negligible attentional biases towards outgroup threatening faces. Group comparisons did not yield evidence of significant differences in outgroup threat bias scores between White and Black groups,  $t(216) = -.70$ ,  $p = .24$ ; attentional biases for outgroup threat faces were generally small for both White participants ( $M = 4.61$ ,  $SD = 22.57$ ) and Black participants ( $M = 2.58$ ,  $SD = 19.84$ ). Attentional bias scores above 0 are commonly interpreted as reflecting attentional bias *toward* a stimulus, and scores below 0 as attentional bias *away* from a stimulus (Mogg et al., 2000); additionally, scores that are not significantly different from zero

are often interpreted as reflecting no bias (Mogg & Bradley, 2016). Further examination of study results revealed that both the Black and White participant groups did not demonstrate biases for outgroup threat that were significantly different zero,  $t(145) = 1.13$ ,  $p = .26$ , and  $t(92) = 1.88$ ,  $p = .063$ , respectively.

Black individuals reported a higher level of intergroup anxiety on average ( $M = 87.50$ ,  $SD = 29.47$ ), than did White individuals ( $M = 73.16$ ,  $SD = 25.44$ ), and this difference was significant,  $t(207) = 3.62$ ,  $p < .001$ . On the measure of social anxiety that served as a covariate in the model, the opposite pattern emerged, with White individuals reporting slightly, but not significantly, higher levels of social anxiety ( $M = 54.01$ ,  $SD = 28.28$ ) than Black individuals ( $M = 48.94$ ,  $SD = 28.02$ ),  $t(186) = -1.21$ ,  $p = .11$ .

*Table 1 Group-level Means and Differences*

	Black ( $n = 136$ )			White ( $n = 85$ )			$t$	$p$
	Min/Max	Mean	$SD$	Min/Max	Mean	$SD$		
Outgroup Friends	2.0/8.0	3.99	1.44	2/10	5.35	1.58	-6.57*	<.001
Social Anxiety	.00/113	48.94	28.02	.00/133	54.01	28.28	-1.21	.23
Intergroup Anxiety	17/150	87.50	29.47	18/139	73.16	25.44	3.62	<.001
Explicit Bias	-6/2	-1.35	1.71	-3/4	.50	1.15	-8.78*	<.001
Implicit Bias	-1.17/.74	-.13	.40	-1.57/1.18	.28	.46	-6.97*	<.001
Attentional bias	-59.48/52.31	2.58	19.84	-67.50/50.76	4.61	22.57	-.70	.49

*Note.* Outgroup friendship values were calculated by creating a total score for reported high school and college friends from the target outgroup. Quantity of outgroup friendships were rated on Likert-type scale from none (1) to all (5) for high school and the same scale for college (minimum = 2, maximum = 10). Social anxiety reflects a total score of endorsed anxiety/fear and avoidance rated on a Likert-type scale from none (0) to severe (3), minimum = 0, maximum = 144. Intergroup anxiety scores reflect a total score comprised of 15 items rated from 1-10 on a Likert-type scale from not at all (1) extremely (10) (minimum = 15, maximum = 150). Explicit bias scores were obtained by calculating a difference score between ratings (1 = very negatively, 7 = very positively) for ingroup and outgroup. Negative values reflect less favorable attitudes towards outgroup compared with attitudes towards ingroup. Implicit

bias scores are reported in d-scores, with a range from -2 to 2. Negative values reflect stronger association between Black-Good and White-Bad; positive values reflect stronger association between White-Good, Black-Bad than for the opposite pairings. Attention bias was calculated using an aggregated mean score. Positive scores indicate participants were faster overall to locate probes that replaced angry outgroup faces than probes that replaced neutral outgroup faces (i.e., stronger attentional bias toward outgroup threat). Negative bias scores indicate the tendency to locate probes faster that replaced neutral outgroup faces than angry outgroup faces (i.e., weaker attentional bias toward threatening faces, or a bias away from threatening faces). T-values denoted with an asterisk(s) indicate significant group differences.

\*  $p < .001$ .

Zero-order correlations (see Tables 2 and 3) were calculated among outgroup friendships, intergroup anxiety, explicit bias, implicit associations, attentional bias, and social anxiety covariate for each group. Within the Black participant sample, the mediator variable, intergroup anxiety, was negatively and significantly correlated with explicit bias ( $r = -.21, p < .05$ ). Measures of intergroup anxiety and the covariate, social anxiety, were positively and significantly correlated ( $r = .62, p < .01$ ). Additionally, social anxiety was negatively and significantly correlated with explicit bias ( $r = -.18, p < .05$ ). Within the White participant sample, intergroup anxiety was not significantly correlated with explicit bias; however, results appeared to be trending in a similar direction ( $r = -.20, p = .08$ ). Consistent with results for the Black participant group, measures of intergroup anxiety and social anxiety were positively and significantly correlated ( $r = .47, p < .01$ ). In contrast with the Black group, social anxiety and explicit bias were not significantly correlated ( $p > .05$ ).

*Table 2 Zero-order Correlations between Variables- Black Participants*

Variables	1	2	3	4	5	6
1. Outgroup Friendships	---	-.15	-.05	.15	.11	-.03
2. Intergroup Anxiety	---	---	.62**	-.21*	-.03	-.13
3. Social anxiety (LSAS-SR)	---	---	---	-.18*	.07	-.09
4. Explicit Bias	---	---	---	---	.12	-.10
5. Implicit Bias (IAT)	---	---	---	---	---	-.09
6. Attention Bias	---	---	---	---	---	---

*Note.* \*  $p < .05$ ., \*\* $p < .01$ .

*Table 3 Zero-order Correlations between Variables- White Participants*

Variables	1	2	3	4	5	6
1. Outgroup Friendships	---	-.19	-.01	-.04	.06	.01
2. Intergroup Anxiety	---	---	.47**	-.20	.03	.21
3. Social anxiety (LSAS-SR)	---	---	---	.01	-.03	.23*
4. Explicit Bias	---	---	---	---	-.21	-.11
5. Implicit Bias (IAT)	---	---	---	---	---	.09
6. Attention Bias	---	---	---	---	---	---

*Note.* \*  $p < .05$ ., \*\* $p < .01$ .

### 3.2 Multiple Group Analysis

Multiple group analyses involved testing a seven-path mediation model in which all parameters were estimated simultaneously, controlling for the covariate (social anxiety). I first tested the unconstrained model with all parameters relaxed (see Table 4). Fit indices revealed the

model had excellent fit to the data, with  $\chi^2 = .33$  ( $p = .85$ ); CFI = 1.00; TLI = 1.28; SRMR = .009; RMSEA < 0.01. Separate group contributions to model fit are displayed in Table 4.

Next, I tested the constrained model with the seven paths of interest constrained. Fit indices again revealed the model had excellent fit to the data, with  $\chi^2 = 6.77$  ( $p = .66$ ); CFI = 1.00; TLI = 1.08; SRMR = .032; RMSEA < 0.01. Modification indices revealed no values above the critical cutoff, suggesting the model would not experience significant improvement in model fit from relaxation of additional parameters. Thus, the model was retained without further adjustments for subsequent analyses.

As chi-square values were acceptable for both the unconstrained and constrained models, I determined additional path invariance testing could proceed. I compared chi-square values from the unconstrained and constrained models in order to investigate path invariance or equality across the two groups (see Table 5). Results revealed a non-significant chi square difference ( $\chi^2 = 6.45$ ,  $p = .49$ ), suggesting that the overall model fit the data from both of the groups equally well. In other words, the magnitude of the relationships between hypothesized variables did not significantly differ between the White and Black participant groups. Direct and indirect paths for both groups were then examined.



*Table 4 Unconstrained Models for Individual and Multi-group*

<b>Models</b>	<b>Model parameters</b>
Black group (n = 136)	$\chi^2 = .32$ ( $df = 1, p = .57$ ) CFI = 1.00; TLI = 1.15 SRMR = .012 RMSEA = 0.00 (probability = .63)
White Group (n = 85)	$\chi^2 = .005$ ( $df = 1, p = .94$ ) CFI = 1.00; TLI = 1.65 SRMR = .002 RMSEA = 0.00 (probability = .94)
Multigroup (n = 221)	$\chi^2 = .33$ ( $df = 2, p = .85$ ) CFI = 1.00; TLI = 1.28 SRMR = .009 RMSEA = 0.00 (probability = .884)

*Table 5 Chi-square Values in Constrained vs Unconstrained Model*

<b>Models</b>	<b>Model parameters</b>
Constrained- Multigroup	$\chi^2 = 6.77$ ( $df = 9, p = .66$ )
Unconstrained- Multigroup	$\chi^2 = .33$ ( $df = 2, p = .85$ )
Difference	$\chi^2 = 6.45$ ( $df = 7, p = .49$ )

### ***3.2.1 Direct and Indirect Effects- Black Participant Group***

For Black participants, number of outgroup (White) friendships in high school and college was negatively related to intergroup anxiety, or the anxiety experienced related to interactions with White individuals ( $B = -2.66, p < .001$ ). In other words, Black participants who reported having more friendships from the racial outgroup also reported less racial intergroup anxiety toward White individuals (see Figure 2). Level of intergroup anxiety was also negatively

related to explicit bias toward White individuals ( $B = -.009, p < .05$ ), such that Black participants with lower levels of intergroup anxiety endorsed more positive explicit attitudes toward White individuals. No additional direct paths reflected statistically significant relationships among model variables, including the hypothesized relationships between outgroup friendships and explicit bias, implicit bias, or attentional bias. While direct pathways from outgroup friendships to the three outcome measures of intergroup bias did not achieve statistical significance (all  $p$ 's  $> .05$ ), the direction of the relationships was consistent with hypotheses.

Examination of indirect effects revealed that intergroup anxiety significantly mediated the relationship between outgroup friendships and explicit bias ( $B = .025, SE = .012, p < .05$ ). In contrast, no mediation effects were observed for the remaining indicators of bias (see Figure 2). Intergroup anxiety did not significantly mediate the relationship between outgroup friendships and implicit bias ( $B = .003, SE = .004, p > .05$ ) or attentional bias ( $B = .06, SE = .21, p > .05$ ).

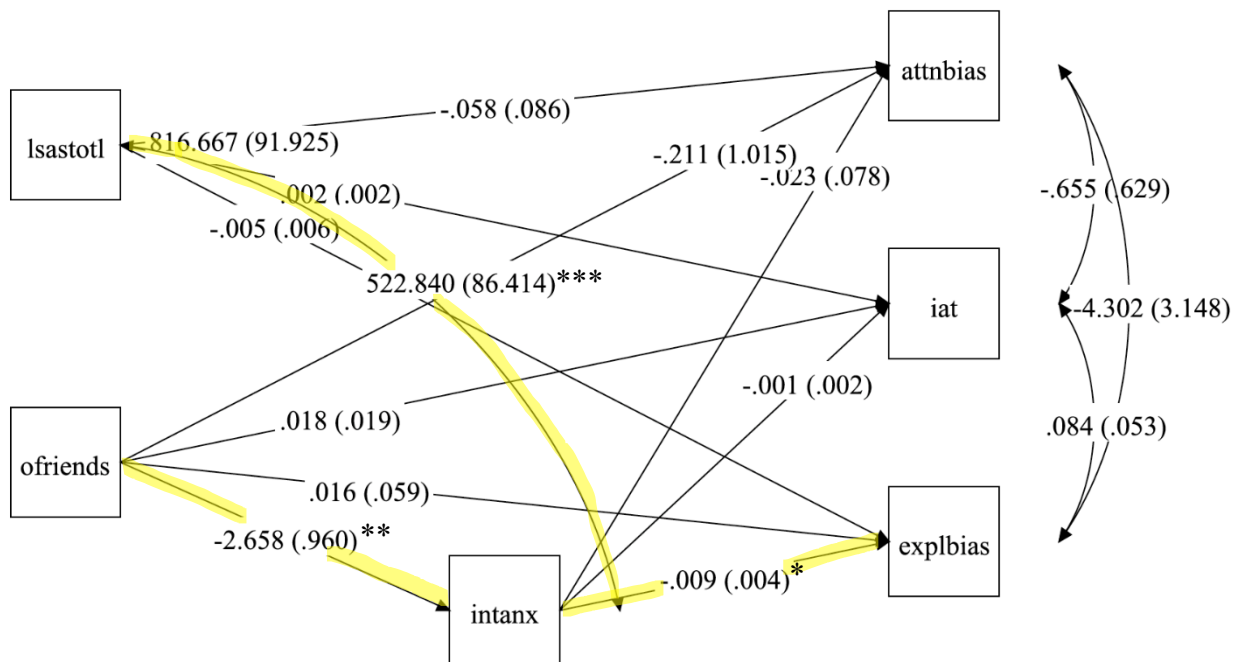


Figure 2 Final constrained path model for Black participant group. Paths depict the relationships among outgroup friendships and explicit prejudice, implicit associations, and

*attentional bias, as well as the paths through the mediator intergroup anxiety. Social anxiety was included as a covariate. Coefficients are unstandardized. OFriends = outgroup friendships; IntAnx = intergroup anxiety; AttnBias = attention bias; IAT = implicit associations test; ExplBias = explicit bias.*

*\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$*

### **3.2.2 Direct and Indirect Effects- White Participant Group**

Analyses revealed a similar pattern of direct effects for White participants to that observed in Black participants (see Figure 3). The number of outgroup (Black) friendships in high school and college was negatively related to intergroup anxiety, or the anxiety experienced related to interactions with Black individuals ( $B = -2.66, p < .05$ ). Level of intergroup anxiety was also negatively related to explicit bias toward Black individuals ( $B = -.009, p < .05$ ), such that White participants with lower levels of intergroup anxiety endorsed more positive explicit attitudes towards Black individuals. Just as in the Black group, no additional direct paths reflected statistically significant relationships among model variables, including the hypothesized relationship between outgroup friendships and explicit bias, implicit bias, or attentional bias suggested in hypothesis 2. For White participants, direct pathways from outgroup friendships to the 3 outcome measures of intergroup bias were in predicted directions but did not achieve a level of statistical significance as hypothesized.

#### **Indirect effects**

Examination of indirect effects revealed intergroup anxiety significantly mediated the relationship between outgroup friendships and explicit bias ( $B = .025, SE = .012, p < .05$ ). In contrast, intergroup anxiety did not significantly mediate the relationship between outgroup friendships and implicit bias ( $B = .003, SE = .004, p > .05$ ), or attentional bias ( $B = .06, SE = .21, p > .05$ ).

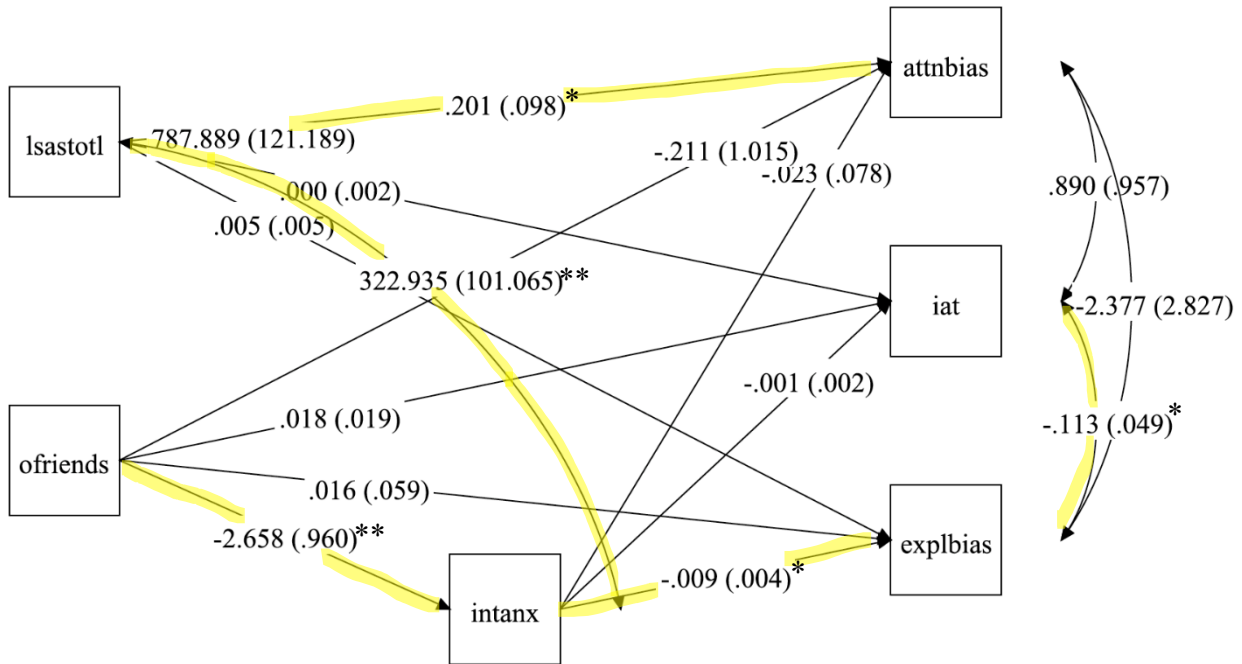


Figure 3 Final constrained path model for White participant group. Paths depict the relationships among outgroup friendships and explicit prejudice, implicit associations, and attentional bias, as well as the paths through the mediator intergroup anxiety. Social anxiety was included as a covariate. Coefficients are unstandardized. *OFriends* = outgroup friendships; *IntAnx* = intergroup anxiety; *AttnBias* = attention bias; *IAT* = implicit associations test; *ExplBias* = explicit bias.

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

## 4 DISCUSSION

The contact hypothesis, or the notion that increased contact with individuals from outside one's own group leads to reductions in bias towards that target outgroup is well-established. Several studies have revealed that one of the strongest mechanisms by which contact reduces bias is through reducing intergroup anxiety, or the anxiety one feels during or in anticipation of interactions with a target outgroup (Aberson and Gaffney, 2008; Binder et al., 2019; Prestwich et al., 2008). In the present study, I sought to expand upon prior tests of associations among contact, intergroup anxiety, and outgroup biases in ways that address key limitations of studies to date. Specifically, I included a contact variable (outgroup friendships) selected on the basis of

theory, I administered multiple measures of outgroup bias, I recruited both Black and White participants, and I included social anxiety as a covariate in analyses.

Results of multiple group path analysis yielded support for my first hypothesis, in that, for both White and Black participant groups, having more outgroup friendships was associated with having less intergroup anxiety. The second hypothesis, which predicted direct associations between contact as indexed by number of outgroup friendships and explicit, implicit, and attentional outgroup bias, was not supported. Although the observed relationships trended in expected directions, path analysis revealed no statistically significant direct relationships between contact and any of the three types of outgroup bias. Results provided partial support for the third hypothesis, that there would be significant indirect associations via intergroup anxiety between outgroup friendships and each of the three measures of outgroup bias. Although intergroup anxiety did not mediate associations between friendship and either implicit bias or attention bias, it did emerge as a significant mediator for the association between friendship and explicit bias. Notably, there was a significant negative association for members of both groups between intergroup anxiety and explicit bias, such that higher levels of intergroup anxiety predicted lower levels of explicit bias. In the following sections, I examine findings for each hypothesis in depth.

#### **4.1 Hypothesis 1**

My findings that both Black and White young adults who reported having more outgroup friends also reported lower levels of intergroup anxiety, are consistent with those from prior studies that have found negative associations between intergroup contact and racial intergroup anxiety for members of racial majority (e.g., Hayward et al., 2017; Pettigrew & Tropp, 2008) and minority groups (e.g., Swart et al., 2011). Importantly, the results of the present study add nuance

to this body of research, which has typically defined contact broadly, as face-to-face encounters between individuals from clearly defined groups (Pettigrew & Tropp, 2000). In line with recent work that has underscored the importance of regular and explicitly positive intergroup interactions (e.g., Dickter et al., 2015; Voci & Hewstone, 2003), I defined contact more narrowly as friendship, which implies both high quality and high quantity intergroup contact (Aberson & Haag, 2007; Tropp & Pettigrew, 2005). My findings thus provide clear evidence that having outgroup contact that is presumably pleasurable and frequent is linked to experiencing less anticipatory distress regarding future outgroup interactions.

This focus on positive contact has advantages, given evidence that, at least in the U.S., Black and White individuals, on average, report experiencing positive outgroup interactions at similar rates (Hayward et al., 2017). Thus, using indices of positive contact, such as friendship, may facilitate “apples to apples” comparisons of associations between actual contact and thoughts and feelings about anticipated intergroup contact. However, in the present study, Black participants reported significantly fewer outgroup friendships ( $M = 3.99$ ), than White participants ( $M = 5.35$ ), which suggests that positive contact levels in this sample might not be equivalent, at least in terms of quantity. Perhaps quality, rather than quantity, of friendships matters—one deep and intimate outgroup relationship may be as important as or more important than numerous, more superficial interpersonal connections in preventing intergroup anxiety, particularly for members of marginalized groups. It will be helpful in future research to more thoroughly define friendships in ways that capture both quality and quantity in order to address such questions.

Limiting focus to presumably positive indices of contact also has putative disadvantages, given that Black Americans also report more regular and more severe negative outgroup contact (Hayward et al., 2017). Focusing narrowly on positive contacts, such as friendships may obscure

the impact of concurrent negative contact. As Pettigrew and Tropp (2006) noted, “the effectiveness of interracial contact may be diluted to the extent that members of racial minority groups perceive considerable discrimination against them.” Recent findings regarding predictors of prejudice support this assertion. In one study, for example, quality of contact more consistently predicted changes in both explicit and implicit prejudice than did contact quantity (Kanamori, Xu, Harrell-Williams, & Lightsey Jr., 2022). It may thus be valuable, in future research on contact and intergroup anxiety, to include measures of quantity and quality of both positive and negative contact to help clarify the ways in which they might interact to influence feelings and beliefs about outgroup members and whether positive contact might buffer the impact of negative encounters or negative contact might dampen the impact of positive interactions.

There is evidence that negative contact more strongly increases some problematic outcomes, such as prejudice, than positive contact reduces them (Barlow et al., 2012). Patterns of association may differ, however, as a function of one’s group status. Árnadóttir, Lolliot, Brown, and Hewstone (2018), for example, found that positive contact buffered the effects of negative contact on prejudiced attitudes, but that this buffering effect was more powerful for members of a privileged majority group than for members of a marginalized minority group. It remains unclear whether a similar pattern of associations would be evident for other negative outcomes, such as intergroup anxiety, but given that members of marginalized groups, such as Black and African American individuals, are at heightened risk for negative interactions with outgroup members, including regular experiences of racial discrimination (Pew Research, 2016), it will be an essential next step for research aimed at understanding paths to intergroup anxiety for members of different racial groups to take both positive and negative contact into account.

## 4.2 Hypothesis 2

My findings that friendship did not show significant associations with outgroup biases, measured in multiple ways (explicit, implicit, and attentional outgroup), was unexpected. Prior research has found strong and consistent associations between contact and both explicit bias (Binder et al, 2009; Tropp & Pettigrew, 2005) and implicit bias (Aberson & Gaffney, 2008; Aberson & Haag, 2007; Turner et al., 2007), and it is surprising that the present study did not yield similar findings. The observed relationships did trend in expected directions, but effects were small and statistically non-significant. I discuss implicit and explicit biases separately in the following sections.

### 4.2.1 *Implicit Associations*

Although several studies have found evidence of a relationship between intergroup contact and implicit associations (Aberson & Gaffney, 2008; Kubota et al., 2017; Prestwich et al., 2008; Vezzali & Giovanni, 2010), others, in line with the present study, have yielded weak or null results (e.g., Aberson & Vazire, 2019; Turner, Hewstone, & Voci, 2007). I had anticipated that limiting the focus of my intergroup contact measure to a positively valenced construct—friendship—and separately examining patterns of association for members of marginalized and privileged groups would help to resolve the ongoing debate within the field of intergroup contact regarding contact/implicit bias associations. The present findings align best with those that, in privileged-group samples and using broad measures of contact, have yielded nonsignificant findings. However, more research will be needed to provide a more definitive understanding of when, for whom, and under what conditions contact may modulate implicit biases.

One of the most recent publications that has explored the outgroup contact-implicit bias relationship highlighted the lack of current evidence to support the role of implicit associations



within the contact model (Aberson, Ferguson, & Allen, 2021). Results from their study which examined intergroup contact and explicit/implicit biases among White participants towards Black (study 1) and Hispanic (study 2) individuals revealed neither positive nor negative contact had significant relationships with implicit associations measured through the Race IAT. The researchers suggested that due to weak observed relationships between contact and implicit preferences in their study and others (e.g., Aberson & Vazire, 2019; Turner et al., 2007), efforts to examine contact effects on implicit associations without extraordinarily large study samples may be less fruitful.

#### ***4.2.2 Attention Bias***

The model also yielded no evidence for either participant group of significant direct or indirect associations between contact and another type of implicit bias, attentional bias for outgroup threat. Attentional bias for racial outgroup faces has long been hypothesized to reflect underlying negative associations with the target outgroup (Trawalter, Todd, Baird, & Richeson, 2008). Indeed, in the only published study that has examined the relationship between intergroup contact and attentional bias, Dickter and colleagues (2015) found that for White participants, having fewer Black friendships was associated with having a stronger attentional bias for emotionally neutral Black faces than for emotionally neutral White faces. It is unclear, however, whether this pattern of findings reflects perceptions of Black individuals as threatening, or whether it reflects a tendency for novel or less familiar stimuli to capture attention over more familiar stimuli (e.g., Oakes & Turner, 1986).

In the present study, participants completed a measure of attention bias that differed from Dickter and colleagues' (2015) measure in that it paired angry and neutral faces of the same other-race individual rather than pictures of two people selected to represent two different racial

identities. Thus, it was designed to allow examination of the degree to which adding an ostensible marker of explicit threat to an outgroup face might lead to modulation of attention. For both Black and White participant groups, biases to attend to angry outgroup faces not only showed non-significant associations with quantity of friendships but were also of negligible magnitude. It thus may be that this attention bias measure was not an optimal index of outgroup attitudes in the present sample. Attentional bias, like implicit association, reflects an implicit process outside of conscious control, and may therefore be less malleable or influenced to a significant extent by the variables chosen in this study. Also, like implicit associations, attentional biases for threats such as social outgroups appear to develop early and to solidify across the lifetime (Pérez-Edgar et al., 2010; Telzer et al., 2013). There is evidence that attention biases are grounded in hard-wired pre-attentive processes that have evolved to help humans to detect potential threats in their environment quickly (Öhman, Flykt, & Esteves, 2001; Zajonc, 1984). They thus may be relatively impervious to the effects of social contexts, including the experience of positive intergroup interactions.

#### ***4.2.3 Explicit Bias***

Since the earliest days of research on contact and biased thoughts and feelings about outgroup members, explicit bias measures have been a key focus of attention. During the seven decades since Allport began conducting research on intergroup contact and prejudice, however, social norms regarding expression of explicit, negative perceptions and feelings towards outgroups have shifted dramatically (Dovidio et al., 2000; Pearson, Dovidio, & Gaertner, 2009). Indeed, Charlesworth and Banaji (2021), in a study that examined changes over 10 years in explicitly endorsed racial in- and out-group attitudes among 2.5 million respondents in the U.S.,

found that although both White and Black participants demonstrated pro-ingroup/anti-outgroup explicit biases, endorsed bias levels for both groups changed in the direction of neutrality.

In the present study, Black, but not White, participants endorsed explicit attitudes that aligned with typically observed patterns. Black participants demonstrated, on average, a pro-*ingroup* bias, such that they endorsed more positive explicit attitudes towards Black people ( $M = 6.01$ ) than White people ( $M = 4.68$ ), resulting in negative bias difference score indicating ingroup preference ( $M = -1.35$ ). In contrast, White participants demonstrated, on average, a pro-*outgroup* bias, such that they endorsed slightly more positive explicit attitudes towards Black people ( $M = 5.59$ ) than they did for White people ( $M = 5.08$ ), resulting in positive bias difference score indicating outgroup preference ( $M = .50$ ).

#### ***4.2.3.1 Exploring Implicit vs Explicit Bias Discrepancy***

It is possible that my finding of an explicit pro-outgroup bias among White participants reflects actual beliefs about Black people. It is also possible, however, as others have suggested, that White participants' more positive explicit outgroup attitudes may have been influenced by social desirability (Gibson et al., 2017), in line with a shift in social norms over recent years toward prohibition of openly endorsing racially prejudiced views (e.g., Stark, van Maaren, Krosnick, & Sood, 2022). Indeed, as Nosek, Hawkins, and Frazier (2011) found, individuals can hold negative implicit associations for outgroups in the absence of explicitly endorsed attitudes. In the present sample, White participants appeared to demonstrate this pattern, with slight implicit preferences for ingroup (White individuals) than outgroup (Black individuals) evidenced through stronger White-Good and Black-Bad associations. Thus, it is possible the discrepancy in explicit and implicit results indeed reflects a pattern of explicit responding as a function of social desirability as others have hypothesized.

Several researchers have reflected on the potential for discrepancies between explicit and implicit biases, noting that individuals have conscious control over more “overt and deliberate” behaviors, such as selecting a rating on a survey, but not over “less monitorable” behaviors such as expression of implicit attitudes, which are rooted in overlearned and less malleable associations (Dovidio et al., 2017; Sawyer & Gampa, 2018). These discrepancies may be particularly likely to arise when people want to avoid appearing aligned with beliefs that are taboo; thus, White participants may have been vigilant about avoiding expression of negative beliefs about Black people. Others have conceptualized implicit biases as reflective of the community or collective culture in which one resides, rather than an embodiment of beliefs of the individual person (Payne et al., 2017). Whereas explicit attitudes have been found to be more susceptible to “mezzo” level influences such as intergroup contact, implicit attitudes appear to be more strongly shaped through “macro” level factors, such as events and experiences within society/culture more broadly (Charlesworth & Banaji, 2021). It is possible that the participants in this study are demonstrating conscious, individualized shifts towards attitude neutrality through positive outgroup contact and reduced intergroup anxiety, but that implicit biases, which form from broader societal trends/phenomena, continue to reflect a more collective pattern of association/ingroup preference that is slower and harder to change.

#### ***4.2.3.2 Contact-Explicit Bias: No Significant Direct Effect***

One might expect that vigilance to guard against appearing prejudiced would be particularly high among people who have a history of positive interactions with outgroup members. Interestingly, however, quantity of outgroup friendships did not show a significant direct relationship with explicit bias, regardless of participants’ racial group membership. Results

revealed full mediation through intergroup anxiety, meaning contact only contributed to reductions in outgroup bias through reduction of intergroup anxiety.

It may be that for both groups, the endorsed quantity of outgroup contact via friendships did not meet a threshold necessary for bias reduction (MacInnis & Page-Gould, 2015). The outgroup friendships variable was a composite score of reported high school and college friendships from the respective racial outgroup. Both high school and college friendships were rated on a Likert-type scale with a range from none (1), few (2), many (3), most (4) to all (5). Black participants on average rated their number of White friends in high school as a 2.2, reflecting “few” White friendships. When asked to rate average number of White friends in college, the value was even lower at 1.76, between “none” and “few.” In comparison, White participants endorsed significantly more outgroup friendships though the overall values also appear rather small. White participants endorsed an average rating of 2.59 for Black friendships in high school, and an average rating of 2.78 in college, both values between “few” and “many” on the scale. Researchers have posited that intergroup contact is most effective in contributing to reductions in prejudice when it is both frequent and consistent (Tropp & Pettigrew, 2006). It is possible that the average number of outgroup friendships each group reported were too few and too infrequent to observe a significant influence on endorsed explicit bias.

#### ***4.2.4 Potential Influence of Recent vs. Childhood Friendships***

Another element of intergroup contact that may have impacted study results regarding associations between friendships and outgroup biases, whether explicit or implicit, is the timeframe during which friendships were formed or maintained. In this study, I asked my college-aged participants to report about racial ingroup and outgroup friendships during high school and college, consistent with other published work in this field (e.g., Levin et al., 2003). I

thus directed their attention to current or very recent relationships. Current friendships have been shown to contribute to reductions in manifestations of outgroup bias such as prejudice (Gomez, Tropp, Fernandez, 2011; Swart et al., 2011). However, friendships formed earlier in childhood appear to have even stronger relationships with outgroup biases expressed explicitly or implicitly later in life (Turner, Hewstone, & Voci, 2007), and may contribute to expression of racial bias more powerfully than do friendships formed in early adulthood (Kubota et al., 2017). Indeed, research on bias development suggests that outgroup biases develop long before late adolescence; rather, they emerge and strengthen throughout childhood (Burkholder, D'Esterre, & Killen, 2019; Henry & Sears, 2009; Raabe & Beelman, 2011).

### **4.3 Hypothesis 3**

Findings yielded mixed support for my third hypothesis, that intergroup anxiety would mediate associations between outgroup friendships and outgroup bias. I did not find evidence that intergroup anxiety mediated associations between friendship and either implicit bias or attention bias. Previous studies that have tested for a mediating role of intergroup anxiety in the contact/implicit bias association have been variable, suggesting alternative mechanisms may underlie any contact/implicit bias relationship that might exist (e.g., Turner & Hewstone, 2007). This study is the first that I am aware of to examine intergroup anxiety as a mediator of the relationship between contact and attention bias, so it would warrant replication. However, the present findings suggest that if there is a relationship between contact and attention bias, it is also supported by mechanisms distinct from intergroup anxiety.

Notably, intergroup anxiety did emerge as a significant mediator for the association between friendship and explicit bias. For both White and Black participants, having more reported outgroup friendships predicted lower levels of intergroup anxiety, and lower intergroup

anxiety in turn predicted lower levels of explicit bias. These results are consistent with those from prior studies that have demonstrated a similar mediated contact model for members of majority status groups (Pettigrew & Tropp, 2006). The significant mediation results within the Black participant sample are especially notable, as meta-analyses have revealed generally weaker or nonexistent effects for minority status group members (Tropp & Pettigrew, 2005a).

Several aspects of the current study's methodology and study design were included to allow for more precise estimation of the contact model for both groups. One factor that may have facilitated fitting the model for the Black participant group was the use of a theoretically strong indicator of contact—outgroup friendships. Across the small pool of studies that have examined the contact hypothesis within minority status samples and found weaker results, many if not most include a measure of contact that reflected simple quantity of cross-group interactions, whether positively or negatively valenced (e.g., Binder et al., 2009; Hayward et al., 2017; Seger et al., 2017). Because Black Americans tend to experience more negative intergroup contact than do White Americans, it may be that these prior studies were capturing sub-optimal contact experiences as opposed to more positive, productive contact the original contact model intended. In contrast, those that have assessed for quality of contact (e.g., through outgroup friendships), appear to have more consistently found significant mediational effects through intergroup anxiety (e.g., Gomez, Tropp, & Fernandez, 2011; Swart et al., 2011).

#### **4.4 Results in Context: Sample Diversity**

A key objective of this study was to examine relationships among intergroup contact, anxiety, and bias in a more diverse participant sample than those recruited for most prior studies in this area, which have typically comprised mostly or exclusively White participants in the United States (Shelton, 2000). The small literature that has included marginalized or minority

group samples have yielded equivocal findings, leading to suggestions that intergroup contact contributes to much weaker reductions in outgroup bias (Binder et al., 2009; Hayward et al., 2017), or even increases in bias (Barlow et al., 2013; Sigelman & Welch, 1993), for minority versus majority group members. Thus, this study sought to assess the strength of an expanded contact model for both Black and White participant groups, rather than applying the results from one group to the other. Notably, although groups differed in the nature or degree or direction of some biases, such that White participants endorsed more favorable explicit attitudes towards outgroup while Black participants revealed explicit preference for ingroup, and White participants revealed a significantly stronger implicit preference for ingroup than Black participants, patterns of association among bias scores and other measures were nearly identical between groups.

This pattern of similar findings for both groups, with comparable patterns of association among friendship, intergroup anxiety, and outgroup bias was somewhat unexpected, in light of prior studies that revealed considerably weaker model strength for minority-status group members than for majority status group members. It is possible that results from studies focused on majority status groups may be more readily generalizable to minority status groups than expected. Meta-analytic summaries of prior research may have failed to find evidence that the contact model holds for minority-status group members for a host of reasons including many studies' small sample sizes, inconsistent methodology across studies, and inappropriate combinations of results across studies that examine very different types of group identities (e.g., race, sexuality, nationality). It is also possible, however, that I failed in the present study to conceptualize majority and minority racial groups in a way that accurately captured the distinctive interpersonal experiences of the populations from which I sampled.



Consistent with similar studies conducted within the U.S. in recent years (e.g., Hayward et al., 2017; Tropp, 2007), I considered White participants to be part of a racial majority group and Black participants to be members of a racial minority group. However, I collected data at a university where Black students constitute the largest racial group (37.7%), with White, non-Hispanic (25.7%) individuals composing a substantive minority of the student body. One could, in this context, consider White individuals to be more accurately classified as a minority racial group on the basis of group size, even though they hold majority-group status at a national level. This reality introduces a layer of nuance into this study worthy of additional exploration.

In particular, it seems important that studies that recruit diverse samples better describe the contexts from which participants were recruited. Black participants in the present study might have, as a function of their distinctive mix of numerical majority and status minority, had intergroup interactions that differ in consequential ways from that of, say, Black students at a majority White university. Similarly, the intergroup experiences of White students in this sample may have differed meaningfully from those of White students attending majority-White schools. It may no longer be adequate for researchers to assume that racial identity can be equated with majority or minority status and it will be valuable for future studies to more precisely define the populations from which they draw their samples.

#### **4.5 Limitations and Future Directions**

The present study had a number of limitations. First, this study was cross-sectional in design, as were many of the prior studies of similar questions. This approach limited my ability to make inferences about causal associations among study variables that a longitudinal study design would more readily allow. Using path analysis, I was limited to interpreting the data with

a focus on direct, indirect, and total associations rather than causal modeling (Valenzuela & Bachmann, 2017).

Future studies of the contact model would benefit from use of longitudinal study designs that would facilitate elucidating causality. For example, data on outgroup friendships collected over a period of time ranging from months to years could permit observation of the stability or instability of prejudice or mediating factors such as intergroup anxiety. In the present study, it is unclear if self-reported level of current intergroup anxiety reflected a stable affective experience; characterizing whether or how it changed in association with the formation of cross-race friendships might be more informative.

A longitudinal study design would also be helpful for examining directionality and causality in patterns of association between contact and outgroup biases. For example, several researchers have obtained findings suggesting that the relationship between contact and prejudice may be bidirectional, with similar strength of effect of prejudice on intergroup contact behaviors as vice versa (see Binder et al., 2009). Further longitudinal exploration of causal relationships in this model could allow for a more accurate conceptualization of the influences of contact and prejudice and could point to more targeted avenues for intervention to improve intergroup relationships (e.g., Forscher, Mitamura, Dix, Cox, & Devine, 2017; Lemmer & Wagner, 2015).

Second, this study examined a sole hypothesized mediator of the contact-prejudice relationship. Indeed, a primary goal of this study was to expand one of the most well-supported contact models by including intergroup anxiety as a putative mediator of the contact-prejudice relationship. Findings yielded partial support for a mediating role of intergroup anxiety. There are other putative mediators, however, that enjoy empirical support but were not a focus of the

present study. Inclusion of such variables in future models might improve model fit and help better explain how contact might relate to outgroup biases.

In a 2007 study of associations between contact and both implicit and explicit bias, for example, Turner and colleagues examined both intergroup anxiety and a second variable, self-disclosure, defined as the voluntary sharing of intimate or personal information to another person, as potential mediators. They found that although intergroup anxiety mediated the relationship between contact and explicit bias, it did not mediate the relationship between contact and implicit bias. In contrast, when the researchers examined self-disclosure as a mediator in the contact model, they found it not only served as a stronger mediator in the contact model for explicit bias, but also for *implicit* bias. These results suggest outgroup friendships may lead to reductions in explicit and implicit bias through the disclosure of personal information. It is possible that self-disclosure may better explain the relationship between contact and multiple indicators of bias because self-disclosure has been shown to be an integral component of the development and maintenance of close friendships (Reis & Shaver, 1988). There may be additional variables that, if included in models of associations between contact and bias, prove to be meaningful moderators and it would be worthwhile to continue to search for theoretically viable candidates.

Another limitation of this study, and of intergroup research more broadly, is that I treated group identity as a binary construct. For example, for the purposes of studying intergroup contact, one group, however it is defined, inherently must be categorized as “ingroup”, while another must be seen as “outgroup” based on a selected salient marker. These identities are often conceptualized to be mutually exclusive. However, individuals typically hold numerous intersecting social, cultural, and personal identities (Dovidio, Love, Schellhaas, & Hewstone,

2017). For example, study participants may vary according to one dimension (i.e., race) but share experiences across others (e.g., gender, religion, nationality), or endorse multiple identities along one dimension (e.g., identify with both Black and White racial identities). This is an especially important consideration in light of evidence that individuals who identify as members of more than one racial group constitute the fastest growing group in the U.S. (The Pew Research Center, 2015).

Simple in/out group delineations can thus obscure the extent to which race is a salient aspect of individual people's identities. For example, studies that consider race as a key variable, are often grounded in inherent assumptions that participants strongly identify with their racial identities and that these identities are more important than other personal identities including gender, personal interests, and political or religious affiliation. In fact, there is evidence that individuals vary notably in the degree to which they consider racial group membership to be important to their identities (e.g., Constantine, Donnelly, & Myers, 2002). It is possible that the extent to which a person considers their racial group membership to be a key part of their self-concept impacts subsequent ratings/endorsements of intergroup anxiety and experiences or expressions of prejudice. Clearly, there is a need for nuanced work that considers the meaning and implications of group membership more carefully and precisely than has been typical in research on contact and intergroup biases.

#### **4.6 Conclusions**

The current study extended research on the contact hypothesis in several ways. First, it helps to address concerns that an exclusive focus on explicit measures of outgroup bias, despite the development of more subtle, implicit bias indices, limits the relevance of the contact model. This study included two measures of implicit bias—implicit associations and attentional bias—

along with a measure of explicit bias. I chose to treat the three measures of bias as distinct rather than as elements of an underlying latent variable, as there appears to be considerable consensus within the field for a dual-process approach to explicit and implicit bias processes (Gawronski & Bodenhausen, 2006).

While no significant direct or indirect effects of intergroup contact were observed with these implicit measures included in the model, noteworthy patterns of bias emerged. Consistent with more recent research, Black participants endorsed more favorable explicit attitudes for Black than White individuals; however, White participants endorsed more favorable explicit attitudes for Black than White individuals. The latter reflects and exceeds observed trends towards neutrality in explicit bias towards racial outgroups and may represent increased hesitancy toward endorsing negative attitudes related to racial identity. Notably, implicit measures of bias from the IAT revealed strong implicit preferences for White people (i.e., racial ingroup), suggesting attitudes more impervious to conscious control still revealed pro-White, anti-Black implicit associations, as the literature suggests. Black participants showed a weak but present implicit pro-Black, anti-White pattern of associations on average, consistent with prior research. When attentional biases for outgroup threat were examined, results revealed both groups demonstrated small attentional biases for respective outgroup threat.

The intergroup contact literature has also faced criticism for the variation in definition and measurement of contact itself. Indeed, across numerous studies, contact has been studied as face to face, imagined, extended, or virtual interactions; there is also little consistency in the type of contact assessed, from self-reported vs observed/experimental paradigms, to measures prioritizing contact quantity vs quality. This study aimed to narrow the conceptualization of contact, based on current research that highlights the need to capture both frequent and

positive/meaningful interactions through the collection of outgroup friendship data. Path analysis revealed that for both groups, intergroup anxiety mediated the relationship between intergroup contact and explicit prejudice. Intergroup contact contributed to reductions in intergroup anxiety, such that more reported friendships was associated with lower levels of anxiety regarding interactions with racial outgroup members. Additionally, across both groups, intergroup anxiety contributed to significant reductions in explicit bias, such that lower intergroup anxiety predicted more positive explicit evaluations of the racial outgroup.

An additional element that is unique to this study is the inclusion of social anxiety as a covariate in the path analysis model. Emerging research has suggested social anxiety and intergroup anxiety are highly correlated yet distinct constructs, which results from this study supported. Moreover, there is evidence of associations between social anxiety and outgroup biases, particularly implicit associations and attentional bias (e.g., Mogg, Philippot, & Bradley, 2004). It is thus surprising that social anxiety has not been taken into account in prior studies focused on intergroup anxiety, contact, and negative attitudes about outgroups, and further research is needed to help elucidate its role, if any.

Importantly, I sought in this study to conduct more inclusive research than has historically been typical by recruiting a diverse participant sample. For years, research studies focusing on the contact hypothesis have excluded minority-status people from participant pools and centered aims on understanding key cognitive and social processes from the majority perspective. This study made an important advance by including both White and Black participants and using path analysis, which allowed for the simultaneous examination of a proposed extended contact model in members of both racial groups. Findings provide evidence that contact effects on different measures of bias, as well as mediation effects of intergroup

anxiety, are similar for both groups. Further work in this direction will advance efforts to ensure equitable and appropriate research within a field that has long excluded others for the empowerment and benefit of some.

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## **APPENDICES**

### **Appendix A. Demographic Questionnaire**

What is your Age (in years)?

What is your gender identity?

1. Woman
2. Man
3. Transgender

4. Self-identify (please specify)
5. Prefer not to respond

What was your sex at birth?

1. Female
2. Male
3. Intersex
4. Prefer not to respond

Do you consider yourself to be:

1. Heterosexual
2. Lesbian
3. Gay
4. Bisexual
5. Questioning
6. Self-identify (please specify)
7. Prefer not to respond

People are different in their sexual attraction to other people. Which best describes your current feelings? Are you:

1. Only attracted to women
2. Mostly attracted to women
3. Equally attracted to women and men
4. Mostly attracted to men
5. Only attracted to men
6. Not sure
7. Prefer not to respond

What is your race/ethnicity?

1. African American / Black
2. American Indian or Alaskan Native
3. Asian American / Asian
4. Hispanic / Latino/a
5. Native Hawaiian or Pacific Islander
6. Multi-racial
7. White
8. Self-identify (please specify)

If African American or Black is selected: Please select the option(s) that best reflect you, if applicable:

1. African-American
2. Black
3. Afro-Caribbean
4. Afro-Latino

If you would like to, please further describe your racial, cultural, ethnic, or regional identity:

What is your country of birth?

What country do you consider to be your home?

Are you an international student?

1. Yes
2. No
3. Prefer not to respond

Relationship status:

1. Single
2. Serious dating or committed relationship
3. Civil union, domestic partnership, or equivalent
4. Married
5. Separated
6. Divorced
7. Widowed
8. Prefer not to respond

Religious or spiritual preference:

1. Agnostic
2. Atheist
3. Buddhist
4. Catholic
5. Christian
6. Hindu
7. Jewish
8. Muslim
9. No preference
10. Self-identify (please specify)
11. Other religious or spiritual preference:
12. Prefer not to respond

To what extent does your religious or spiritual preference play an important role in your life?

1. Very Important
2. Important
3. Neutral
4. Unimportant
5. Very unimportant
6. Prefer not to respond

Current academic status:

1. Freshman / First-year
2. Sophomore
3. Junior

4. Senior
5. Graduate / professional degree student
6. Non-student
7. High-school student taking college classes
8. Non-degree student
9. Faculty or staff
10. Other (please specify)
11. Prefer not to respond

With whom do you live? (check all that apply)

1. Alone
2. Spouse, partner, or significant other
3. Roommate(s)
4. Children
5. Parent(s) or guardian(s)
6. Family other
7. Other (please specify)
8. Prefer not to respond

Did you transfer from another campus/institution to this school?

1. Yes
2. No
3. Prefer not to respond

What is the average number of hours you work per week during the school year (paid employment only)?

Are you the first generation in your family to attend college?

1. Yes
2. No
3. I do not know
4. Prefer not to respond

How would you describe your financial situation right now?:

1. Always stressful
2. Often stressful
3. Sometimes stressful
4. Rarely stressful
5. Never stressful
6. Prefer not to respond

How would you describe your financial situation while growing up?:

1. Always stressful
2. Often stressful
3. Sometimes stressful
4. Rarely stressful

5. Never stressful
6. Prefer not to respond

## Appendix B. The Intergroup Anxiety Scale

### *Appendix B.1 For self-identified Black/African-American participants:*

Instructions: The following set of questions concerns situations you could find yourself in when interacting with White/Caucasian individuals. Please indicate how you would react to these situations. In each situation you would be the only Black/African-American individual present. The other people would be White/Caucasian.

1. Going to a small party (less than 15 people)  
1 2 3 4 5 6 7 8 9 10  
Not at all self-conscious ---Extremely self-conscious
2. Spending time with a member of the opposite sex  
1 2 3 4 5 6 7 8 9 10  
Not at all anxious -----Extremely anxious
3. Meeting strangers and introducing yourself  
1 2 3 4 5 6 7 8 9 10  
Not at all nervous -----Extremely nervous
4. Being caught up in a large crowd (for instance, a demonstration)  
1 2 3 4 5 6 7 8 9 10  
Not at all tense -----Extremely tense
5. People staring at you and talking about you among themselves  
1 2 3 4 5 6 7 8 9 10  
Not at all uncomfortable ----Extremely uncomfortable
6. Giving a speech to members of this group (50 people or so)  
1 2 3 4 5 6 7 8 9 10  
Not at all worried -----Extremely worried
7. Dealing with several members of this group who seem threatening  
1 2 3 4 5 6 7 8 9 10  
Not at all afraid -----Extremely afraid
8. Being criticized unjustly for something you did  
1 2 3 4 5 6 7 8 9 10  
Not at all upset -----Extremely upset
9. Being unable to make yourself understood when it is important  
1 2 3 4 5 6 7 8 9 10  
Not at all frustrated -----Extremely frustrated
10. Being laughed at for a minor mistake you have made  
1 2 3 4 5 6 7 8 9 10  
Not at all embarrassed ---Extremely embarrassed
11. Being taken advantage of (for instance, by a merchant)  
1 2 3 4 5 6 7 8 9 10  
Not at all angry -----Extremely angry

12. Being totally ignored by the people at a social gathering

1 2 3 4 5 6 7 8 9 10

Not at all rejected -----Extremely rejected

13. Unintentionally offending a member of the other group by making a small social error

1 2 3 4 5 6 7 8 9 10

Not at all guilty -----Extremely guilty

14. People refusing to talk to you because they dislike your group

1 2 3 4 5 6 7 8 9 10

Not at all offended -----Extremely offended

15. Feeling that your group is being unfairly criticized by members of the other group

1 2 3 4 5 6 7 8 9 10

Not at all defensive -----Extremely defensive

*Appendix B.2 For self-identified White participants:*

Instructions: The following set of questions concerns situations you could find yourself in when interacting with Black/African-American individuals. Please indicate how you would react to these situations. In each situation you would be the only White/Caucasian individual present. The other people would be Black/African-American.

1. Going to a small party (less than 15 people)

1 2 3 4 5 6 7 8 9 10

Not at all self-conscious ---Extremely self-conscious

2. Spending time with a member of the opposite sex

1 2 3 4 5 6 7 8 9 10

Not at all anxious -----Extremely anxious

3. Meeting strangers and introducing yourself

1 2 3 4 5 6 7 8 9 10

Not at all nervous -----Extremely nervous

4. Being caught up in a large crowd (for instance, a demonstration)

1 2 3 4 5 6 7 8 9 10

Not at all tense -----Extremely tense

5. People staring at you and talking about you among themselves

1 2 3 4 5 6 7 8 9 10

Not at all uncomfortable ----Extremely uncomfortable

6. Giving a speech to members of this group (50 people or so)

1 2 3 4 5 6 7 8 9 10

Not at all worried -----Extremely worried

7. Dealing with several members of this group who seem threatening

1 2 3 4 5 6 7 8 9 10

Not at all afraid -----Extremely afraid

8. Being criticized unjustly for something you did

1 2 3 4 5 6 7 8 9 10

Not at all upset -----Extremely upset

9. Being unable to make yourself understood when it is important

1 2 3 4 5 6 7 8 9 10



Not at all frustrated -----Extremely frustrated

10. Being laughed at for a minor mistake you have made

1 2 3 4 5 6 7 8 9 10

Not at all embarrassed ---Extremely embarrassed

11. Being taken advantage of (for instance, by a merchant)

1 2 3 4 5 6 7 8 9 10

Not at all angry -----Extremely angry

12. Being totally ignored by the people at a social gathering

1 2 3 4 5 6 7 8 9 10

Not at all rejected -----Extremely rejected

13. Unintentionally offending a member of the other group by making a small social error

1 2 3 4 5 6 7 8 9 10

Not at all guilty -----Extremely guilty

14. People refusing to talk to you because they dislike your group

1 2 3 4 5 6 7 8 9 10

Not at all offended -----Extremely offended

15. Feeling that your group is being unfairly criticized by members of the other group

1 2 3 4 5 6 7 8 9 10

Not at all defensive -----Extremely defensive

## Appendix C. Liebowitz Social Anxiety Scale-Self Report Version

### LSAS - SR

**INSTRUCTIONS:** This measure assesses the way that social phobia plays a role in your life across a variety of situations. Read each situation carefully and answer two questions about that situation. The first question asks how anxious or fearful you feel in the situation. The second question asks how often you avoid the situation. If you come across a situation that you ordinarily do not experience, we ask that you imagine "what if you were faced with that situation," and then, rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it. Please base your ratings on the way that the situations have affected you **IN THE LAST WEEK**. Please complete the following scale with the most suitable answer.

		Fear or Anxiety 0 = None 1 = Mild 2 = Moderate 3 = Severe	Avoidance 0 = Never (0%) 1 = Occasionally (1-33%) 2 = Often (33-67%) 3 = Usually (67-100%)
1.	Telephoning in public (P)		
2.	Participating in small groups (P)		
3.	Eating in public places (P)		

4.	Drinking with others in public places (P)		
5.	Talking to people in authority (S)		
6.	Acting, performing or giving a talk in front of an audience (P)		
7.	Going to a party (S)		
8.	Working while being observed (P)		
9.	Writing while being observed (P)		
10.	Calling someone you don't know very well (S)		
11.	Talking with people you don't know very well (S)		
12.	Meeting strangers (S)		
13.	Urinating in a public bathroom (P)		
14.	Entering a room when others are already seated (P)		
15.	Being the center of attention (S)		
16.	Speaking up at a meeting (P)		
17.	Taking a test (P)		
18.	Expressing a disagreement or disapproval to people you don't know very well (S)		
19.	Looking at people you don't know very well in the eyes (S)		
20.	Giving a report to a group (P)		
21.	Trying to pick up someone (P)		
22.	Returning goods to a store (S)		
23.	Giving a party (S)		
24.	Resisting a high pressure salesperson (S)		
25.	Reading a passage from a book in front of an audience		
26.	Acting, performing or giving a talk in front of a video camera (no audience)		
27.	Reading a passage from a book in front of a video camera (no audience)		

## Appendix D. Levin College Friendships Survey

- 1) What is your gender identity?
- 2) What is your religious affiliation?
  - Protestant
  - Catholic
  - Jewish
  - Muslim
  - Buddhist
  - Other
  - None
- 3) Were you born in the US?
- 4) How many of your parents were born in the US?
- 5) How many of your grandparents were born in the US?
- 6) What language is spoken by your family at home? (1 = English only, 2 = primarily English, but another language also, 3 = primarily a language other than English, 4 = only a language other than English).
- 7) How would you describe your family's social class position? (1 = poor, 2 = working class, 3 = lower middle class, 4 = middle class, 5 = upper middle class, 6 = lower upper class, 7 = upper class)
- 8) What is the highest level of education your father completed? (1 = elementary school, 2 = some high school, 3 = completed high school, 4 = trade school, 5 = some college, 6 = completed degree (BA/BS degree), 7 = some graduate or professional school, 8 = completed graduate or professional degree)
- 9) What is the highest level of education your mother completed? (1 = elementary school, 2 = some high school, 3 = completed high school, 4 = trade school, 5 = some college, 6 = completed degree (BA/BS degree), 7 = some graduate or professional school, 8 = completed graduate or professional degree)
- 10) How would you describe your own political party preference? (1 = strong Democrat, 2 = weak Democrat, 3 = Independent, leaning more Democrat, 4 = Independent, 5 = Independent, leaning more Republican, 6 = weak Republican, 7 = strong Republican)
- 11) How would you describe your general political outlook? (1 = very liberal, 7 = very conservative)
- In high school, how many of your closest friends were . . . (1 = none, 2 = few, 3 = many, 4 = most, 5 = all).
- 12) Asian American
- 13) African American
- 14) Latino
- 15) Caucasian
- At GSU, how many of your closest friends are . . . (1 = none, 2 = few, 3 = many, 4 = most, 5 = all).
- 16) Asian American
- 17) African American?
- 18) Latino
- 19) Caucasian

How positively or negatively do you feel toward the following groups? (1 = very negatively, 7 = very positively).

20) Caucasians/Whites

21) Latinos/Hispanics

22) Asians/Asian Americans

23) African Americans/Blacks

24) I feel competent interacting with people from different ethnic groups (1 = strongly disagree, 7 = strongly agree).

25) I feel uneasy being around people of different ethnicities (1 = strongly disagree, 7 = strongly agree).

26) Despite the different groups at GSU, there is frequently the sense that we are all just one group (1 = strongly disagree, 7 = strongly agree)

27) At GSU, it usually feels as though we belong to different groups (1 = strongly disagree, 7 = strongly agree).

28) GSU promotes positive interaction between individual students of different ethnic groups (1 = strongly disagree, 7 = strongly agree)

29) There is conflict between different ethnic groups on campus (1 = strongly disagree, 7 = strongly agree)

30) I experience discrimination at GSU because of my ethnicity (1 = strongly disagree, 7 = strongly agree)

31) Other members of my ethnic group experience discrimination on campus (1 = strongly disagree, 7 = strongly agree)