

Dyadic Interracial Interactions: A Meta-Analysis

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This meta-analysis examined over 40 years of research on interracial interactions by exploring 4 types of outcomes: explicit attitudes toward interaction partners, participants' self-reports of their own emotional state, nonverbal or observed behavior, and objective measures of performance. Data were collected from 108 samples ($N = 12,463$) comparing dyadic interracial and same-race interactions, predominantly featuring Black and White Americans. Effect sizes were small: Participants in same-race dyads tended to express marginally more positive attitudes about their partners ($r = .07$), reported feeling less negative affect ($r = .10$), showed more friendly nonverbal behavior ($r = .09$), and scored higher on performance measures ($r = .07$) than those in interracial dyads. Effect sizes also showed substantial heterogeneity, and further analyses indicated that intersectional, contextual, and relational factors moderated these outcomes. For example, when members of a dyad were the same sex, differences between interracial and same-race dyads in negative affect were reduced. Structured interactions led to more egalitarian performance outcomes than did free-form interactions, but the effects of interaction structure on nonverbal behavior depended on participant gender. Furthermore, benefits of intergroup contact were apparent: Differences in emotional state across dyadic racial composition disappeared in longer term interactions, and racial minorities, who often have greater experience with intergroup contact, experienced less negative affect in interracial interactions than did majority group members. Finally, there was a significant historical trend toward more egalitarian outcomes across dyadic racial composition for explicit attitudes and for nonverbal behavior; however, participants' emotional responses and performance have remained consistent.

Keywords: interracial interactions, racial attitudes, intergroup relations, meta-analysis

Contemporary society grows more diverse by the day. With the ease of modern travel and migration, demographic shifts render interracial and interethnic encounters increasingly common for many people (UNESCO Institute for Statistics, 2009). Explicit social norms have correspondingly become more inclusive and egalitarian in recent years; however, the dynamics of interracial

interactions remain complicated (Dovidio & Gaertner, 2000; Gaertner & Dovidio, 1986; McConahay, 1986; Sears, 1988; Sears, Henry, & Kosterman, 2000). Racial minorities must regularly contend with group stereotypes, individual prejudice, and discrimination (Crocker, Major, & Steele, 1998; Major, Quinton, & McCoy, 2002), and majority group members may harbor stereotypes that lead them to mistrust out-group members (e.g., Eberhardt, Goff, Purdie, & Davies, 2004; Niemann, Jennings, Rozelle, Baxter, & Sullivan, 1994) as well as concerns regarding being seen as prejudiced (Crandall & Eshleman, 2003; Monin & Miller, 2001; Monteith, Sherman, & Devine, 1998; Plant & Devine, 1998; Richeson & Shelton, 2003). Thus, in racially diverse settings, individuals from both minority and majority groups often seem to experience forms of social identity threat—that is, contextually triggered concerns about being judged negatively because of their identity (Steele, 2003; Steele, Spencer, & Aronson, 2002)—which potentially undermine intergroup relations.

As demonstrated by recent research, however, several factors can shift the outcomes of interracial interactions in more positive or negative directions. These include individuals' implicit and explicit biases (Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997), amount of prior intergroup contact (Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001), levels of concern about the interaction (e.g., Shelton, 2003; Shelton & Richeson, 2006a; Vorauer & Turpie, 2004),

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motivation to appear unbiased (Plant & Devine, 1998), impression management strategies (Apfelbaum, Sommers, & Norton, 2008), framing of interaction goals (Trawalter & Richeson, 2006), and ways of coping with the stress of the situation (Trawalter, Richeson, & Shelton, 2009). Despite the profound gains in knowledge these findings represent, the psychological study of interracial interactions remains a relatively young field, spanning only a few decades. In the last several years, there has been a dramatic increase in attention paid to the internal and cognitive processes underlying interracial interactions, as new techniques for measuring these processes have become more commonplace. There have been excellent reviews on interracial interactions (Crosby, Bromley, & Saxe, 1980; Shelton & Richeson, 2006b; Shelton, Richeson, & Vorauer, 2006; Trawalter et al., 2009; Vorauer, 2006) and a meta-analytic examination of the effects of intergroup contact on improving attitudes toward out-groups (Pettigrew & Tropp, 2000, 2006), as well as one on interracial helping behavior (Saucier, Miller, & Doucet, 2005). But the time is ripe for a quantitative analysis of interracial interactions more broadly—one that takes stock of the field and examines elements that have not yet been systematically studied but may nevertheless shape the outcomes of interracial interactions.

In order to identify effects unique to interracial contexts, we examined interracial interactions in comparison to same-race interactions. Our approach was characterized by three main themes. First, our analysis was *intersectional*, in that it looked at race in conjunction with other social identities. Every individual has an array of social identities, including race, age, gender, socioeconomic status, and others. These identities do not exist in isolation but rather influence each other in a number of ways—in terms of perception and of experience, as gathering evidence attests (Bodenhausen, 2010; Cole, 2009; Goff, Thomas, & Jackson, 2008; Purdie-Vaughns & Eibach, 2008). Although most studies on interracial interactions tend to focus solely on race, we examined intersectional influences by assessing effects of gender on interaction outcomes.

Second, our approach was *relational*. As noted by Shelton and Richeson (2006b), interracial interactions involve more than one party, yet studies typically report data from only one member of the interaction. This is due to a number of factors. For example, limitations in participant pool racial diversity may lead researchers to use confederates or research assistants as interaction partners or to use prerecorded video or audio stimuli to create the illusion of an interaction. Though the methodological appeal of such studies is apparent, this strategy provides a view of interracial interactions that does not reflect the dynamics of naturalistic interchange. It also contributes to a research literature that disproportionately reflects the experience of majority group members. Instead, it is important to ensure that the experiences of both racial minority and majority individuals are examined.

Third, our approach took *contextual* features into account. Generally speaking, social psychology emphasizes the power of the situation. Of course, in the typical experiment, most elements of a situation are kept constant across conditions as only one or two main variables of interest are manipulated. Although elements that are held constant—such as the structure, frequency, and location of the interaction—are usually considered incidental aspects of the design of any one study, across the literature as a whole these elements may impact the context of interactions and, accordingly,

their outcomes. Other potentially important factors cannot be manipulated, such as historical context, as indicated by the year in which the study took place. As social norms about race change, so too might the outcomes of interracial interactions relative to same-race interactions. Thus, we also considered the effects of context in this meta-analysis.

We chose these three themes because they reflect aspects not just of interracial interactions but of social interactions overall. Our interactions with others are dynamic: Our expectations and behavior are continuously shaped by others' expectations and behavior as the interaction unfolds. These interactions always take place within a given context, which influences the roles we assume and the social scripts we utilize. And every social interaction occurs between individuals with multiple identities—not just race and ethnicity but gender, age, class, and religion. We propose that to understand interracial interactions, it is necessary to use a comprehensive approach that takes into account not just the race of the interaction partners but many other factors as well. This intersectional, relational, and contextual approach to interracial interactions led us to pose a number of questions that would be difficult or unfeasible to examine via experimental studies but that a meta-analysis is uniquely well suited to answer. In addition to deriving important new conclusions from past work, we hope, this examination of the field will suggest directions for future research.

To obtain a multifaceted view of how interracial interaction outcomes differ from same-race interaction outcomes, we examined four variables of theoretical and practical interest. To explore how the individuals in an interaction felt about each other, we utilized participant-reported ratings of their interaction partners and measures of nonverbal behavior toward partners. While the former may reflect explicit attitudes expressed in verbal and controlled behavior, the latter can be indicative of more implicit and uncontrolled racial attitudes—those that people are not aware of or are not willing to acknowledge (Crosby et al., 1980; Dovidio, Kawakami, & Gaertner, 2002; Dovidio et al., 1997; Fazio, Jackson, Dunton, & Williams, 1995). To examine how participants themselves felt during the interaction, we also examined participant reports of personal affective states. This was of interest because interracial interactions can evoke negative affect on the part of the individuals involved (e.g., Amodio, 2009; Britt, Boniecki, Vescio, Biernat, & Brown, 1996; Ickes, 1984; Stephan & Stephan, 1985), sometimes due to concerns about prejudice (Plant & Devine, 2003; Shelton, 2003). Finally, we assessed performance in interactions by including results from studies where participants undertook tasks with objective and measurable outcomes (e.g., Dovidio, 2001; Dovidio, Gaertner, Kawakami, & Hodson, 2002). Some research has indicated that interracial interactions can hinder task performance depending on participants' levels of racial bias (e.g., Danso & Esses, 2001; Dovidio, 2001; Richeson & Shelton, 2003); other research, typically focusing on group dynamics, has demonstrated many potential benefits of diversity on performance (e.g., Phillips, Northcraft, & Neale, 2006; Sommers, 2006, 2008). These four outcomes were investigated generally and in relation to the following potential moderators, loosely grouped by category.

Intersectional Moderators

In taking an intersectional approach to the study of interracial interactions, we sought to examine the role of gender, both in

terms of participant gender and of dyadic gender composition. The list of identities that could influence interaction outcomes in conjunction with race is large; we chose to focus on gender because gender and race are two identities that tend to be processed immediately and automatically and that profoundly influence our perceptions and expectations of others (Brewer, 1988; Fiske & Neuberg, 1990; Ito & Urland, 2003; Stangor, Lynch, Duan, & Glass, 1992). Furthermore, relative to other categories such as socioeconomic status, gender is a category for which researchers provide participant data most consistently.

Participant Gender

In general, women report more positive race-related attitudes than do men (Eagly, Diekmann, Johannesen-Schmidt, & Koenig, 2004; Hausmann & Ryan, 2004; Johnson & Marini, 1998; Sidanius & Pratto, 1999; Sidanius, Pratto, & Bobo, 1994). These differences in attitudes may be due to gender stereotypes and socialization patterns, which suggest that women should have more nurturing and amiable personalities (Berger, Rosenholtz, & Zelditch, 1980; Eagly, 1987). Consistent with these stereotypes, women are more likely to describe themselves as warm and nurturing (Costa, Terracciano, & McCrae, 2001; Feingold, 1994), and women's endorsement of these typically feminine qualities is linked to greater internal motivation to avoid prejudice (Ratcliff, Lassiter, Markman, & Snyder, 2006) and support for equality of social groups (Foels & Pappas, 2004; Wilson & Liu, 2003). Another possible moderator of this relationship between gender and racial attitudes is attributional complexity: Women tend to prefer complex explanations of human behavior, and this attributional style in turn predicts more positive racial attitudes (Foels & Reid, 2010; Tam, Au, & Leung, 2008).

There may also be differences in men and women's responses to interracial encounters, with women being more likely than men to respond to the stress of an interracial interaction with positive engaged behavior (Taylor et al., 2000). For example, when experiencing intergroup anxiety, White women responded by acting friendlier toward an other-race partner, but White men acted less friendly (Littleford, Wright, & Sayoc-Parial, 2005). Interestingly, minority group members also feel that women respond to them more positively. A national survey study found that Black individuals expect White women to be easier to get along with than White men (Timberlake & Estes, 2007).

Gender also influences the stereotypes directed at group members (Eagly & Kite, 1987). Negative racial attitudes toward out-group members tend to be disproportionately directed at men (Purdie-Vaughns & Eibach, 2008; Sidanius & Pratto, 1999). For example, stereotypes of Blacks are more likely to apply to Black men than Black women (Goff, Thomas, & Jackson, 2008; Niemann et al., 1994). Meanwhile, racial minority women may have to contend with the relative invisibility that comes from being the less prototypical members of an already marginalized group (Purdie-Vaughns & Eibach, 2008). This invisibility may mean that Black women are less likely to be the targets of prejudice, but it also means that Black women are less memorable to Whites (i.e., their faces and their contributions to discussions are more likely to be forgotten; Sesko & Biernat, 2010).

Dyadic Gender Composition

The gender composition of a dyad also seems to be a critical element of interracial interactions. In many cases, individuals who are out-group members in one sense (e.g., a different race) but share another group identity (e.g., the same gender) are evaluated more positively than individuals who are out-group members across both identities (Crisp & Hewstone, 2007). Therefore, cross-sex interracial dyads may have worse outcomes than same-sex interracial dyads, because neither race nor gender is shared by the members of the dyad. Some have argued from an evolutionary perspective that because men have historically been dominant and have competed with each other for resources, the greatest interracial tension will be between men (Sidanius & Pratto, 1999; Van Vugt, De Cremer, & Janssen, 2007; Yuki & Yokota, 2009). The research cited above indicating that White men tend to have more negative racial attitudes, coupled with findings that racial minority men report experiencing more discrimination (for a review, see Sidanius & Pratto, 1999), suggests that an interracial interaction between two men might have more potential for tension than an interracial interaction with at least one female partner. Another evolutionary perspective argues that men and women both show greater bias against out-group men than against out-group women but for different reasons. In particular, this research suggests that men's racial bias is linked to aggression and social dominance motives but that women's racial bias is linked to fear of sexual coercion (Navarrete, McDonald, Molina, & Sidanius, 2010). Whereas that work has taken an evolutionary perspective, other research has described cultural and historical factors that could underlie gender differences in racial bias (e.g., long-standing portrayals of Black men as savage, sexually aggressive, and a threat to White women; Jahoda, 1998; Pieterse, 1995). Both the evolutionary and cultural-historical approaches suggest that the gender of both members of an interracial interaction should be taken into account, however. Thus, both participant gender and the gender composition of the dyad should be considered in interracial interactions.

Relational Moderators

In taking a relational approach, we examined in particular those elements of natural interactions that are often sacrificed due to constraints on experimental design, such as participant pool demographics. We first compared outcomes for racial majority participants to those for racial minority participants; more research has examined the experiences of racial majorities, but these findings cannot necessarily be generalized to the experiences of racial minorities (Shelton & Richeson, 2006b). We also looked at the effects of two common methods to address the relative scarcity of racial minority participants: use of study personnel versus naive participants as interaction partners and use of technology, such as video and audio, to mediate interactions versus face-to-face interactions.

Majority or Minority Status of Participants

Minority group members by definition are in the numerical minority across many social contexts. Accordingly, relative to racial majorities, racial minorities are likely to have more oppor-

tunities for interracial encounters. Their outcomes in these encounters may reflect this additional experience. For example, an interracial interaction may provoke less anxiety in minority group members than in majority group members. White individuals in interracial interactions are more likely than their Black partners to report that the interaction was uncomfortable, awkward, forced, and strained (Ickes, 1984) and to express more nonverbal anxiety than their Black partners in race-related or race-neutral interactions (Trawalter & Richeson, 2008). This is not to say that minority group members do not feel anxiety or concerns about interracial contact. Concerns about being a target of prejudice have grave consequences, not just for emotional well-being but also for physical health and academic performance (Clark, Anderson, Clark, & Williams, 1999; Mays, Cochran, & Barnes, 2007; Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Steele & Aronson, 1995). However, members of stigmatized racial minority groups may have developed compensatory strategies to buffer some of the effects of being a target of prejudice (Branscombe, Schmitt, & Harvey, 1999; Crocker & Major, 1989; Miller & Kaiser, 2001) and, in particular, strategies for engaging in interactions with potentially prejudiced majority group members. For example, one study found that ethnic minority members who expected to interact with a prejudiced individual behaved in a more engaging and involved manner with their partners, although they enjoyed the interaction less than participants who were not given that expectation (Shelton, Richeson, & Salvatore, 2005).

Yet another way in which interracial outcomes may differ for racial majorities and minorities is through out-group-favoring attitudes held by minority members. Internalization of negative attitudes about one's own racial group may affect outcomes of interactions with other racial groups. Research on implicit racial attitudes has shown that in the United States, for example, Black individuals do not consistently show an in-group bias (Ashburn-Nardo, Knowles, & Monteith, 2003; Livingston, 2002; Nosek, Banaji, & Greenwald, 2002; Richeson, Trawalter, & Shelton, 2005). Thus, the extent to which participants' racial group status may be a moderator of interracial interaction outcomes was also investigated in this meta-analysis.

Study Personnel Versus Naive Partners

Because racial minority students are a numerical minority on many campuses and because the use of trained confederates provides greater control over the interaction (Guerrero & Poire, 2005; Martin, 1970), many interracial interaction studies use confederates or experimenters as interaction partners. Others use naive partners, such as other participants, mentors, employers, or roommates, in order to study the relational dynamics of these interactions (Shelton & Richeson, 2006b). Individuals' expectations of the interaction may alter their behavior; therefore, the use of naive partners can lead to different dynamics than use of study personnel (Miller & Turnbull, 1986). For example, naive partners who are expecting to be treated with prejudice may engage in positive compensatory behaviors to try to counter that likelihood (e.g., Shelton, Richeson, & Salvatore, 2005), and those who are expecting to be viewed as prejudiced may try to allay that impression through their behavior (e.g., Apfelbaum et al., 2008; Shelton, Richeson, Salvatore, & Trawalter, 2005). On the other hand, if during the course of the interaction naive partners feel misjudged,

they may naturally react more negatively than trained confederates, who may dampen their natural response because of instructions to remain neutral toward the participant. Thus, although the use of confederates can provide a clearer picture of race-related differences on the level of the individual participant, the use of naive partners may more closely mirror the relational dynamics that occur in real-world dyadic interactions. One important question, therefore, is whether the use of naive partners instead of study personnel tends to have a specific directional influence on interaction outcomes. Accordingly, we compared studies that used confederates or other study personnel to those that used naive partners, to examine whether partner identity would affect outcomes.

Mode of Interaction

Interactions may occur when people encounter each other not only in person but also through other media, such as e-mail, audio, or video. We examined the difference between studies with face-to-face interactions and those with interactions mediated through technology, as these two types of interactions may involve different relational dynamics. Previous research has indicated differences between face-to-face and other forms of interaction—particularly computer-mediated interactions (Bordia, 1997; Hancock & Dunham, 2001; Kiesler, Siegel, & McGuire, 1984; Short, 1974)—due to the decreased social cues in mediated interactions. However, certain stereotypes and status differentials seem to persist regardless of the format of the interaction (Heilman, Caleo, & Halim, 2010; Postmes & Spears, 2002; Weisband, Schneider, & Connolly, 1995), especially when cues to the identity of the interaction partner are revealed (Pittinsky, Shih, & Trahan, 2006).

Contextual Moderators

In examining the role that context plays in interracial interaction outcomes, we focused primarily on the role of the structure of the interaction—the type of activity the participants were engaged in during the interaction. To examine this in depth, we found it useful to take an intersectional approach here as well and look at the role of gender in relation to interaction structure. We also investigated other contextual elements: whether the study was conducted in the field or a laboratory setting, whether participants interacted only once or met several times over a longer period, and whether the interaction made race salient to participants. Furthermore, we looked at context in the broader, historical sense, to see the effects of time and changing social norms on interaction outcomes.

Interaction Structure

Over decades of research on interracial interactions, experimenters have asked participants to engage in a wide range of types of interactions, from getting-acquainted conversations (e.g., Holloway, Waldrup, & Ickes, 2009, Study 3a; Mallett, Wilson, & Gilbert, 2008, Study 2; Vorauer & Kumhyr, 2001) to being interviewed on a sensitive topic (e.g., Amodio, 2009; Richeson & Shelton, 2003; Richeson & Trawalter, 2005) to performing cognitive tasks (e.g., Danso & Esses, 2001; Hofmann, Gschwendner, Castelli, & Schmitt, 2008). The structure of the interracial inter-

action (i.e., the activity participants engage in) is rarely considered as a factor in the outcome of that interaction but may in fact be an influential variable.

Several studies suggest that interactions in which the participants' focus is on task performance may have better outcomes than interactions with more uniformly social goals. When interactions are unstructured and social concerns are paramount, both of the individuals in an interracial interaction may be concerned about prejudice. Racial minority individuals may be working to ensure that the interaction goes smoothly, guarding against any potential prejudice on behalf of their partner (Shelton, Richeson, & Salvatore, 2005). Meanwhile, majority group members may be monitoring their speech and behavior to avoid appearing biased; ironically, this effort may lead them to appear less friendly (Apfelbaum & Sommers, 2009; Apfelbaum et al., 2008). However, when an interaction is structured, such as when it is framed in terms of task performance, these social concerns can be allayed as participants' attention is redirected to the task at hand. This shift in focus can attenuate the apprehensions provoked by interracial interactions by providing clearer guidelines about how to behave, which should in turn lead to outcomes more similar to those of same-race interactions (Avery, Richeson, Hebl, & Ambady, 2009; Babbitt & Sommers, 2011; Richeson & Trawalter, 2005).

Understanding how the structure of an interaction impacts outcomes is vital to understanding an increasingly diverse society. For example, in the United States, legislative and institutional efforts to combat discrimination have led to much greater racial diversity in workplaces and universities since the 1960s; however, residential and religious segregation has remained largely unchecked (Ellis, 2004; U.S. Department of Education, National Center for Education Statistics, 2010). Thus, interracial interactions may be more common in work and school contexts than in more intimate social settings, making it important to understand how task-focused interactions may be experienced differently than social-focused interactions.

Interaction Structure and Gender

We also examined interaction structure in relationship to gender. Previous findings have indicated that men and women's behavior depends in part on the content of the interaction. In initially leaderless groups, men tend to emerge as leaders when the interaction is more task oriented and structured, whereas women take more leadership roles in socially complex interactions (Carli & Eagly, 1999; Eagly & Karau, 1991). Furthermore, women generally engage in more social behaviors in interactions, whereas men engage in more task-oriented behaviors (Dovidio, Heltman, Brown, Ellyson, & Keating, 1988; Wood & Karten, 1986). We were interested in how the interaction of these factors may play out in an interracial versus same-race context.

Field Versus Lab Studies

Do studies conducted in the controlled setting of the laboratory provide an accurate view of participants' honest responses, particularly in terms of socially sensitive issues like race? Studies conducted in the field were compared with those conducted in the laboratory to see if a naturalistic setting would result in stronger effects, particularly on explicit measures. To the extent that par-

ticipants feel they are being observed in the environment of the lab, they may respond in line with perceived expectations, monitoring and adjusting their responses to align more closely with expected social norms (Devine, Evett, & Vasquez-Suson, 1996; Reis & Gosling, 2010; Shulman & Berman, 1975).

Frequency of the Interaction

Do longer term interactions lead to a reduction of some of the potential negative outcomes of interracial interactions in relation to same-race interactions? Long-term interactions may allow for greater individuation of interaction partners and less reliance on group stereotypes (Shelton & Richeson, 2006b). Although many studies involved a one-time-only encounter, a few studies have examined outcomes for longer term encounters such as roommate pairings, mentoring relationships, or multisession meetings in the laboratory. Comparing these two types of studies allowed us to examine whether outcomes for interracial interactions would change in long-term compared to one-time-only interactions, relative to those for same-race interactions.

Salience of Race

We also investigated the effect of making race salient in the interaction, for example, by priming participants with the potential for racial bias before the interaction (e.g., Amodio, 2009; Dutton & Lake, 1973); having participants discuss race-related topics, such as affirmative action or racial profiling (e.g., Richeson et al., 2003); or having a confederate partner mention race in some way (e.g., Czopp, Monteith, & Mark, 2006). Compared to the discussion of neutral topics, making race salient may activate normative racial attitudes for members of racial majority groups (Sommers & Ellsworth, 2001), thus leading to heightened self-presentational concerns and greater self-monitoring behavior. For example, the White participants in studies by Goff, Steele, and Davies (2008) showed greater concern about being seen as racist when they anticipated discussing a race-related versus race-neutral topic with Black individuals (see also Sommers, Warp, & Mahoney, 2008). However, the prospect of an interracial interaction alone—without mention of a race-relevant topic—may be sufficient to provoke that concern (e.g., Trawalter & Richeson, 2008; Vorauer, Main, & O'Connell, 1998). For racial minorities, on the other hand, there may be situations in which race is already implicitly salient, and thus explicitly making race salient may either have no effect (Sommers & Ellsworth, 2000) or actually relieve anxiety that would otherwise be felt in such situations (Trawalter & Richeson, 2008). Therefore, making race salient may influence outcomes across a range of studies.

Historical Trends

In considering outcomes of interracial compared to same-race interactions, one must take into account the effects of societal change. With the emergence of more inclusive social norms, explicit expressions of racial attitudes have gradually become less biased; however, people often harbor more racially prejudiced views than they are willing to report (e.g., Dovidio & Gaertner, 2000; McConahay, 1986; Sears et al., 2000). We examined whether there has been a trend toward more egalitarian outcomes

over the past four decades or whether the differences between interracial and same-race interactions have been consistent over time. Have self-reported, explicit attitudes toward other-race partners become significantly more egalitarian? Have implicit attitudes toward other-race partners shown similar progress? Furthermore, have the social changes of the past few decades been accompanied by any improvement in how interracial dyads perform compared to same-race dyads or how the individuals in the interactions feel during the course of the interaction?

Other Considerations

Two final issues were taken into consideration in the analyses. We explored possible effects of race and sex of first authors on study outcomes. Previous meta-analyses of gender research have shown sex-of-author effects on study outcomes (e.g., Anderson & Leaper, 1998; Eagly & Carli, 1981; Wood, 1987); thus, it is possible that in a meta-analysis of interracial interaction research, we may find race-of-author effects. Given our interest in intersectionality, we included sex of first authors as another potential influence on outcomes.

We also explored the potential distinction between different types of performance measures. These measures could be broadly grouped into two categories: those that capture aspects of behavior toward others, such as helping, cooperation, and mentoring, and those that are based on an individual's cognitive experience, such as memory tasks, Stroop (1935) tests, and mathematical problem solving. Discrimination in behavioral outcomes is more closely linked to conscious patterns of prejudicial responses: A person who wants to appear unprejudiced in a helping-behavior study has a relatively straightforward way of doing so (Saucier et al., 2005). On the other hand, cognitive performance measures tend to capture relatively automatic outcomes of prejudice: Individuals who attempt to appear unprejudiced by monitoring their behavior toward an other-race partner would be cognitively depleted following the interaction and thus perform relatively worse on a cognitive performance measure. Examining these two subcategories of performance outcomes in this meta-analysis allowed us to note whether there was a distinction based on the type of measure used.

With all these questions in mind, we performed a quantitative analysis of the literature. Our first goal was to investigate four outcomes of interracial interactions compared to same-race interactions: self-reported attitudes toward partners, participants' emotional state, nonverbal or observed behavior, and performance, generally. Our second goal was to examine how these outcomes may be impacted by the contextual, relational, and intersectional considerations outlined above.

Method

Literature Search

We started with bibliographic lists from several reviews on related topics. Using combinations of the keywords *intergroup*, *interpersonal*, *cross-race*, *interracial*, *contact*, *interactions*, *anxiety*, *relations*, *dyads*, *pairs*, and *race relations*, we searched electronic databases of articles (PsycINFO, ERIC, Sociological Abstracts, Current Contents, Web of Science, JSTOR, Dissertations Abstracts International, and GenderWatch). We also performed

forward and backward citation checks for the articles that fit our criteria to see if they would lead us to any others. We looked through the table of contents of the following journals, as far back as we could access using print and electronic resources, to search for additional articles that had evaded our other search methods: *Journal of Personality and Social Psychology*, *Journal of Experimental Social Psychology*, *Psychological Science*, *Group Processes & Intergroup Relations*, *Personality and Social Psychology Bulletin*, *Personality and Social Psychology Review*, *Social Psychology Quarterly*, *Journal of Organizational Behavior*, *Child Development*, *Journal of Applied Psychology*, *Journal of Applied Social Psychology*, *International Journal of Intercultural Relations*, *Cultural Diversity and Ethnic Minority Psychology*, *Basic and Applied Social Psychology*, *Social Cognition*, *Emotion*, *Ethnic and Racial Studies*, *Journal of Black Psychology*, *Journal of Black Studies*, *Asian American Journal of Psychology*, *Hispanic Journal of Behavioral Sciences*, *Sex Roles*, and *Psychology of Men and Masculinity*. Finally, we sent out a general appeal to the Society for Personality and Social Psychology and Society for the Psychological Study of Social Issues e-mail lists, supplemented by personal contact with several researchers, to request any file-drawer, in-press, or in-preparation manuscripts that they would be willing to contribute for inclusion in this meta-analysis. These methods combined provided us with about 4,000 articles marked for closer inspection to identify those which met our inclusion criteria.

To be included, a study had to involve interracial interactions via face-to-face interactions, video, audio, Internet, or other means. As long as participants believed they had interacted with someone else, the study was included. We excluded studies that involved anticipated interactions (i.e., where the study was stopped before the interaction would have begun) or where participants were exposed only to images of out-group members without the suggestion of an interaction. We included only studies that had two people in an interaction, because we were interested in understanding the dynamics of this most basic form of interaction, without introducing the more complicated dynamics of multiple-person groups. In order to calculate effect sizes, we were constrained to studies that featured both an interracial interaction condition and a same-race control condition. Finally, we included only those studies whose dependent variables fell into at least one of our designated categories:

(a) Attitudes toward partner. This category included all participant-reported data on positive and negative attitudes toward the partner. These data most frequently took the form of participants' ratings of liking of their partner or ratings of their partner on a list of positive and negative personality traits. Other measures included ratings of relationship satisfaction or desire to be friends or become romantically involved with the partner. No single measure was used in a majority of studies; rather, researchers typically developed their own scales of between two and 12 items and reported Cronbach's alphas (ranging from .57 to .95).

(b) Participants' emotional state. This category included all participant-reported data on their own emotional states. The most common measure included in this category was anxiety, followed by composite measures of internally-directed positive and negative emotions and self-esteem. As in the case of attitudes toward partner, there was no standardized approach to measuring participants' emotional state. Researchers developed scales of three to

10 emotion-related items and reported Cronbach's alphas (ranging from .68 to .96).

(c) Nonverbal or observer-rated behavior. This category was composed primarily of ratings of the participants' nonverbal behavior on attributes such as friendliness or discomfort by interaction partners or third-party observers. In some cases observers viewed videotapes with sound, meaning that the behavior coded was not strictly nonverbal, but we decided to include these data because they still provided information on nonverbal leakage—or expression of attitudes not readily apparent through the self-report measures (Ambady, Bernieri, & Richeson, 2000). Reported interrater reliabilities for observers' ratings were between .64 and .98.

(d) Performance on task. This category included tasks that had a preferred and objectively determinable outcome. Effect sizes included were from a wide variety of measures, including helping behavior in various settings, cooperative behavior in economic games, memory retention for word lists, word search performance, math questions correctly answered, successful mentorship, quality of health care offered to patients, and performance on Stroop (1935) tests of cognitive interference. Reliability data were typically not reported for these measures.

To preserve independence assumptions as we calculated effect sizes, we combined measures from each sample that fell into the same dependent variable category. For example, if a sample included separate measures of self-reported anxiety and discomfort, we combined those measures into one effect size for participants' emotional state. In this way, we ensured that each group of participants contributed only one effect size to each analysis. In several cases we found multiple publications, or a dissertation and resulting publications, based on the same data set; these were considered one sample to preserve independence. There were some studies that did not have sufficient data to calculate effect sizes. We attempted to contact the authors in these cases, but if no answer was received or the data were nonrecoverable, we excluded these studies ($k = 5$).

Study Characteristics

The final data set consisted of 81 articles with 108 samples comprising a total of 12,463 participants. The sample sizes ranged from 14 participants to 1,248 participants, with a median of 72 ($M = 115.40$, $SD = 157.91$; see Table 1). The years of publication (or submission for theses and dissertations and contribution for unpublished manuscripts) for the samples we gathered ranged from 1964 to 2010 (the median year was 2001, and the mean year was 1994). The distribution of publication years shows a bimodal tendency, with a peak in the 1970s, followed by a lull in the 1980s and 1990s, and then another peak across the last decade. Figure 1 presents a stem-and-leaf plot of the publication years for our collected samples. We noticed differences between the studies in each peak, which may reflect changing trends in the study of psychological phenomena more generally. The articles in the 1970s tended to focus more on explicit, behavioral measures that were often measured in field settings, whereas those in the last decade reflected a burgeoning interest in social cognition and implicit processes, often inside the laboratory.

These differences can be illustrated with examples of representative studies from each time period. In an article published in 1971, participants were shoppers exiting a supermarket. A Black

or White confederate stood in front of the market with a bag full of groceries, while an accomplice watched for shoppers leaving the store alone and relatively unencumbered. When such a shopper approached, the accomplice would signal to the confederate, who would surreptitiously rip the bottom of the bag, spilling its contents and giving the shopper an opportunity to offer assistance. The dependent variable was whether the shopper helped the confederate (Wispe & Freshley, 1971). Another method commonly used in this time frame was the wrong-number technique, first employed by Gaertner and Bickman (1971). Participants were selected from the phone book and called by a Black or White confederate pretending to be a stranded motorist. In the phone call, the motorist indicated that he or she had been trying to reach a garage to request assistance and had no more dimes to make another phone call to the correct number. The participant then had the opportunity to help the motorist by calling the provided number. The outcome variable was the participant's helping behavior, depending on the race of the confederate as conveyed through vocal cues (e.g., Franklin, 1974; Gaertner, 1973; Gaertner & Bickman, 1971).

An example of a study from the past decade is Apfelbaum et al. (2008, Study 2), in which White participants came to the lab and interacted with a Black or White confederate in a structured task, which involved asking questions about an array of pictures. After the interaction, participants completed self-report measures of anxiety and a computer task measuring cognitive depletion. Participants were also videotaped, and their nonverbal behavior was later coded by naive raters. Another example of a recent study design is one focused on college roommate interactions. For example, in a study by Shelton and Richeson (2006a, Study 2), ethnic minority participants who had either White or minority roommates completed a series of daily questionnaires about the quality of their contact with that roommate, their sense of closeness, and their own affective state. A few studies from this time period also included physiological and neurological measures (e.g., Amodio, 2009; Littleford et al., 2005; Mendes, Major, McCoy, & Blascovich, 2008). Because of the limited number of studies of this type, we thought it was premature to include these measures as a fifth outcome variable in this meta-analysis, but they provide evidence of another emerging trend in the study of intergroup relations.

Coding Procedure

One of the first two authors and between one and five trained research assistants independently coded each article. All kappas were above .78, with a median kappa of .95. Discrepancies were resolved through discussion between the first and second authors. For each study, we recorded the authors, title, year, study number, publication type, and journal name if applicable. The sex and race of first authors were identified and noted, to the extent possible through online and personal resources. We coded information on participants: total number of participants for the experimental (interracial) and control (same-race) groups, race, and percentage of female participants. We also coded information on partners' race and whether the partner was study personnel (confederate partners, experimenters, and research assistants who portrayed stranded motorists and others in need of help) or a naive partner (other participants, roommates, mentors, and employees). Finally, we noted whether the study design was between-participants, within-participants, or a mixed-model.

Table 1
Information on Samples Included in the Meta-Analysis

Reference	Study	Design	Pub status	Total N	Partic race	% fem	Gender comp	Mode	Lab or field	Partner ID	Freq	Struct	Race salient	Effect size			
														Att r	Emot r	NVB r	Perf r
Amodio (2009)	1	B	P	35	majW	72.0	MS	f2f	L	Extr	once	0	Y	.42			
Apfelbaum et al. (2008)	1	B	P	101	majW	67.3	MS	f2f	L	ConfP	once	1	N		.26	.19	
Apfelbaum et al. (2008)	2	B	P	47	majW	45.8	MS	f2f	L	ConfP	once	1	N		.20	.00	.28
Avery et al. (2009)	1	B	P	46	majW	100.0	SS	vid	L	ConfP	once	0	N	.00	.19		
Avery et al. (2009)	2	B	P	56	majW	67.0	SS	f2f	L	NaiveP	once	0	N		.12		
Babbitt & Sommers (2011)	1	B	U	176	majW	64.8	SS	f2f	L	NaiveP	once	1	Y	-.22	.12	.02	.16
Bair (2007); Bair & Steele (2010)	1	B	P	69/72	minB	80.1	SS	vid	L	ConfP	once	0	B	.31		.32	
Baron (1979)	1	B	P	64	majW	0.0	SS	other	L	ConfP	once	1	N		.26		
Baxter (1973)	1	B	P	90	majW	100.0	SS	other	L	ConfP	once	1	N	.20		.19	
Bickman & Kamzan (1973)	1	B	P	100	majW	100.0	SS	f2f	F	ConfO	once	0	N		.10		
Bishop (1979)	1	B	P	63	majW	100.0	SS	f2f	L	ConfP	once	0	N	.27	.00		
Brigham & Richardson (1979)	1	B	P	91	majW	59.3	MS	f2f	F	ConfO	once	0	N			.21	
Britt & Crandall (2000)	1	B	P	135	all	50.4	MS	txt	L	ConfO	once	1	Y	.00	.00		.09
Clark (1974)	1	B	P	685	majW		MS	aud	F	ConfO	once	0	N				
Coates (1972)	1	B	P	48	majW	50.0	MS	f2f	L	ConfO	once	1	N	.40			
Coleman et al. (1991)	1	B	P	89	minB	73.3	MS	f2f	L	ConfO	once	1	N		.00		
Coleman et al. (2001)	1	M	P	114	minB		MS	f2f	F	ConfO	once	1	N		.05	-.05	
Colliver et al. (2001)	1	M	P	1,248	majW		MS	f2f	F	ConfO	once	1	N		.07	.05	
Conley et al. (2010)	1	B	U	61/92	all	66.0	MS	f2f	L	NaiveP	once	1	N	-.30	.01	-.07	
Conley et al.(2010)	2	W	U	21	minB	71.4	MS	f2f	L	ConfP	once	1	N	.09			
Czopp et al. (2006)	2	B	P	187	majW	51.9	MS	int	L	ConfP	once	1	Y	.00	.12		-.28
Danso & Esses (2001)	1	B	P	100	majW	79.0	MS	f2f	L	Extr	once	1	N				
Dew & Ward (1993)	1	B	P	64	majW	100.0	SS	f2f	L	ConfP	once	0	N	.17			
Dolderman (2003)	1	B	U	62	majW	51.6	MS	f2f	L	ConfP	once	1	N	.00			
Dolderman (2003)	2	B	U	40	majW		MS	f2f	L	NaiveP	once	0	N	-.21			.00
Dolderman (2003)	3	B	U	70	majW	100.0	MS	f2f	L	NaiveP	once	0	N	-.11			-.24
Dovidio & Gaertner (1981)	1	B	P	96	majW	0.0	SS	f2f	L	ConfP	once	1	N	.27			
Dovidio et al. (1997)	3	W	P	33	majW	57.6	MS	f2f	L	ConfP	once	0	N	-.09	.16		
Duronto et al. (2005)	1	M	P	233	majA	50.2	MS	f2f	F	NaiveP	once	0	N				
Dutton & Lake (1973)	1	B	P	80	majW	50.0	MS	f2f	F	ConfO	once	0	N				-.14
Dutton & Lennox (1974)	1	B	P	50	majW	50.0	MS	f2f	F	ConfO	once	0	Y				-.34
Eastwick et al. (2009)	1	W	P	54	majW	0.0	XS	f2f	L	ConfP	once	1	N	-.04			.23
Ensher & Murphy (1997)	1	B	P	76	minG	58.7	SS	f2f	F	Other	mult	1	N	.13			
Feldman & Donohoe (1978)	1	B	P	36	majW	100.0	SS	f2f	L	ConfP	once	1	N		.61		.25
Feldman & Donohoe (1978)	2	B	P	20	minB	100.0	SS	f2f	L	ConfP	once	1	N		.06		.22
Feldman & Donohoe (1978)	2	B	P	20	majW	100.0	SS	f2f	L	ConfO	once	1	N		.49		-.07
Franklin (1974)	1	B	P	89	majW	77.5	MS	aud	F	ConfO	once	0	N				.12
Gaertner (1973)	1	B	P	457	majW	60.0	MS	aud	F	ConfO	once	0	N				-.19
Gaertner & Bickman (1971)	1	B	P	486	minB		MS	aud	F	ConfO	once	0	N				.11
Gaertner & Bickman (1971)	1	B	P	487	majW		MS	aud	F	ConfO	once	0	N				
Gaertner & Dovidio (1977)	1	B	P	32	majW	100.0	SS	aud	L	ConfO	once	1	N				
Gaertner & Dovidio (1977)	2	B	P	160	majW	100.0	SS	aud	L	ConfP	once	1	N				
Gonsalkorale et al. (2009)	1	W	P	41	majW	68.9	MS	f2f	L	ConfP	once	0	N	.39			
Grossman (1996)	1	B	U	120	majW	0.0	SS	vid	L	ConfP	once	1	N	-.14	.00		
Gudykunst & Shapiro (1996)	1	W	P	165	all	80.0	MS	f2f	F	Other	once	0	N	-.31			
Gudykunst & Shapiro (1996)	2	W	P	364	all	67.7	MS	f2f	F	Other	once	0	N	.29			.26

Table 1 (*continued*)

Reference	Study	Design	Pub status	Total N	Partic race	% fem	Gender comp	Mode	Lab or field	Partner ID	Freq	Struct	Race salient	Effect size			
														Att <i>r</i>	Emot <i>r</i>	NVB <i>r</i>	Perf <i>r</i>
Stephan & Stephan (1989)	1	B	P	68	majW	0.0	SS	f2f	L	ConfP	once	1	N	.00	.00	.08	
Thayer (1973)	1	B	P	80	minB	50.0	MS	f2f	F	ConfO	once	0	N	.08	-.21	-.03	
Thayer (1973)	1	B	P	80	majW	50.0	MS	f2f	F	ConfO	once	0	N	.24	.13	.41	
Thomas (1990)	1	M	P	452	all	56.3	MS	f2f	F	Other	mult	1	N	.08	.00	.00	
Towles-Schwen & Fazio (2006)	1	B	P	115	majW		SS	f2f	F	Room	mult	0	N	.49	.00	.22	
Townsend et al. (2010)	1	B	U	135	minL	100.0	SS	f2f	L	ConfO	once	0	N	.08	-.21	-.03	
Trail et al. (2009)	1	B	P	68	majW	57.0	SS	f2f	F	Room	mult	0	N	.24	.13	.41	
Trawalter & Richeson (2008)	1	B	P	36	majW	66.0	SS	f2f	L	NaiveP	once	0	Y	.33	.13	.41	
Vorauer & Kumhlyr (2001)	1	B	P	54	majW	67.9	SS	f2f	L	NaiveP	once	0	N	.33	.13	.41	
Vorauer et al. (1998)	3	B	P	60	majW	56.7	SS	vid	L	NaiveP	once	0	N	.00	.00	.22	
Vorauer & Turpie (2004)	1	B	P	84	majW	52.7	SS	vid	L	ConfP	once	0	N	.00	.00	.22	
Wegner & Crano (1975)	1	B	P	72	minB	50.0	MS	f2f	F	ConfO	once	0	N	.00	.00	.31	
Wegner & Crano (1975)	1	B	P	72	majW	50.0	MS	f2f	F	ConfO	once	0	N	.00	.00	.30	
Winslow (1998)	1	B	U	80	majW	50.0	MS	f2f	L	ConfP	once	0	Y	.00	.00	.25	
Wispe & Freshley (1971)	1	B	P	88	minB	50.0	MS	f2f	F	ConfO	once	0	N	.00	.00	.02	
Wispe & Freshley (1971)	1	B	P	88	majW	50.0	MS	f2f	F	ConfO	once	0	N	.00	.00	-.02	
Word et al. (1974)	1	W	P	14	majW	0.0	MS	f2f	L	ConfO	once	0	N	.00	.00	.61	

Note. Reference column provides the authors and publication/submission year. Study designates which study in the article is featured, one-study articles are marked as 1; Design is study design: B = between participants, W = within participants, M = mixed-model; Pub status: P = published, U = unpublished at the time of analysis; Total N: total number of participants; Partic race is Participant race: maj = majority, min = minority, all = all racial groups combined; maj and min followed by letters to signify ancestry: A = Asian, B = African, L = Latin American, W = European, and G = general (minority only); % fem: female percentage of participant sample; Gender comp is gender composition: SS = same-sex dyads, XS = cross-sex dyads only, MS = mixed-sex dyads; Mode: f2f = face-to-face, vid = video, txt = text, aud = audio, int = Internet or networked computers, other = other; Lab or field: L = lab; F = field; Partner ID: NaiveP = naive partner, Room = roommate, ConfP = confederate-partner, ConfO = confederate-other, Exptr = experimenter; Other: Freq: frequency of interaction, once = one time, mult = multiple meetings; Struct: 1 = structured task, 0 = free-form task; Race salient: Y = yes, N = no; B = by condition; Effect sizes: Att *r* = attitudes toward partner; Emot *r* = participants' emotional state; NVB *r* = nonverbal behavior; Perf *r* = performance. Higher *r* values indicate bias favoring same-race partners, and values equal to zero indicate no difference in outcomes for interracial or same-race dyads.

Publication Year Stem-and-Leaf Plot

Frequency	Stem &	Leaf
1.00	196 .	4
1.00	196 .	8
17.00	197 .	11112223333334444
11.00	197 .	55778889999
5.00	198 .	00133
2.00	198 .	99
3.00	199 .	013
8.00	199 .	66677888
16.00	200 .	0111111111333344
35.00	200 .	55555556666777888888888888899999999
9.00	201 .	000000000

Stem width: 10.00
Each leaf: 1 case(s)

Figure 1. Stem-and-leaf plot showing publication years for samples used in the meta-analysis.

Data were also collected on the nature of the interaction: whether it was face-to-face or via video, audio, Internet, paper-based, or other means; whether it was in the lab or field (workplace, classroom, or other); if race was made salient; if it was a one-time-only or a repeated interaction; and whether the study featured only same-sex dyads or included cross-sex interactions. Because the latter category of studies typically featured both types of gender compositions but did not report data separately for the same- and cross-sex dyads, these are referred to as “mixed-sex” samples. We noted the nature of the task that the dyads engaged in, dividing the samples into two sets: those in which participants completed structured tasks and those in which participants completed more free-form tasks. Structured tasks included those where the appropriate behavior was clear and where participants were more likely to focus their attention on the task at hand instead of social concerns. This category comprised activities such as puzzle solving, structured discussions with a particular end goal, and helping-behavior tasks. All other tasks were considered more free-form types in which social concerns would be more prominent, as in get-acquainted tasks, interviews, speeches, assigned topics of discussion, and free interactions. Finally, we coded each dependent variable, the source of the data (participant, partner, or observer), and the direction of the findings.

Effect Size Calculation

We calculated effect sizes using the *r* statistic, as recommended by Rosenthal (1991), through one of several methods. If the study reported an *F* value with one degree of freedom in the numerator, a *t* value, a chi-square value with one degree of freedom, or a *Z* value that directly compared the outcomes for the same-race and interracial dyads, we were able to calculate the *r* value using formulas provided in Rosenthal (1991). Studies that reported a beta value were included as well, using the approximation suggested by Peterson and Brown (2005). Alternatively, if studies did not directly provide these statistics we often were able to obtain the means, standard deviations, and sample sizes so that a two-sample *t* test comparing the same-race and interracial dyads could be calculated (Rosenthal & Rosnow, 1991). When multiple values for the same category of dependent measures could be calculated from a single participant sample, the effect sizes were averaged into a single value, using an unweighted Fisher’s *Z*-to-*r* transformation.

This allowed us to maintain statistical independence of studies. On the basis of the 108 samples that fit the criteria for this meta-analysis, we were able to calculate 165 effect sizes.

When results indicated the presence of bias in favor of same-race partners over other-race partners, the effect sizes were considered congruent with expectations of prejudice in interracial interactions and were assigned a positive sign. When results showed a bias in favor of other-race partners over same-race partners, the effect sizes were assigned a negative sign. When authors reported no significant differences between interracial and same-race dyads and sufficient data could not be obtained to calculate an exact value or direction, those effect sizes (*k* = 19) were set equal to zero. We performed calculations both with and without these zero values and found that this had a minimal impact on effect sizes. We chose to include the null results in all our reported statistics as a more conservative approach.

Meta-Analytic Procedures

Effect sizes. Random-effects models were used to calculate the overall effect sizes. Random-effects models are more conservative than fixed-effect models and allow for generalization beyond the set of studies included in the meta-analysis (Borenstein, Hedges, Higgins, & Rothstein, 2009; Fink, 2005; Hedges & Vevea, 1998; Overton, 1998). For random-effects models, study effect sizes are weighted by the inverse of the variance and combined, incorporating an estimate of between-study variance. To calculate mean effect sizes, we used the Comprehensive Meta-Analysis software package (Version 2; Borenstein, Hedges, Higgins, & Rothstein, 2005).

Addressing the potential for selection bias. The term *selection bias* refers to the possibility that some effect sizes may be systematically missing from the overall data set, thus affecting meta-analytic results. A major form of selection bias is publication bias, or the file-drawer problem. That is, most published articles present significant findings, and thus a meta-analysis of published works could lead to an overestimation of effect sizes if there were a substantial number of unpublished studies with null results languishing, as it were, in researchers’ file drawers (Rosenthal, 1979). We attempted to decrease this potential threat to validity by contacting researchers directly, as noted above, to request any unpublished data that fit our criteria. We also examined differences between published and unpublished samples in our final data set; if they differed significantly, this could be seen as evidence of publication bias in the field in general. Egger’s regression asymmetry test (Egger, Smith, Schneider, & Minder, 1997) was next used to detect asymmetry in our collected data set, followed where appropriate by Duval and Tweedie’s (2000) trim-and-fill procedure, which estimates the number of missing studies and imputes an overall effect size that takes these missing studies into account.

Moderator analyses. To test the heterogeneity of effect sizes and the potential presence of moderators, we used both Cochran’s *Q* test (Cochran, 1954) and the *I*² value (Higgins, Thompson, Deeks, & Altman, 2003). To examine likely moderators, we ran a series of subgroup and regression analyses. Continuous factors were assessed with random-effects meta-regressions, and factors with two levels were assessed with separate mixed-effects subgroup analyses. Mixed-effects models combine studies within each subgroup separately using the random-effects method before com-

paring them. When factors were correlated with each other, as was the case for several of the study-design elements, a random-effects multiple meta-regression was employed with the method of maximum likelihood for each moderator and its correlated factors. Comprehensive Meta-Analysis (Version 2; Borenstein et al., 2005) was used to perform subgroup analyses, and Stata (Version 10; Harbord & Higgins, 2008) was used to calculate meta-regression analyses.

Results

We began by exploring the overall means for each of our four main categories of interest. Table 2 contains the descriptive statistics, reported as r values. Remember that higher values for the effect sizes indicate more bias in favor of same-race dyads, zero values indicate no difference between same-race and interracial dyads, and negative values indicate a bias favoring interracial dyads.

Overall Mean Effect Sizes

The first outcome measure included all participant-reported data on attitudes toward partners. Forty-one samples included this measure as a dependent variable, with an average effect size of $r = .07$. The lower bound for the 95% confidence interval was zero. Although this did not quite attain statistical significance, the direction of the findings were consistent with other results and indicated that participants showed a marginal tendency to express more negative attitudes toward other-race partners than toward same-race partners. The second outcome measure, participants' emotional state, had an average effect size of $r = .10$ based on 32 samples. The confidence intervals did not include zero, indicating that participants felt more negative affect in interracial dyads than in same-race dyads. The third outcome measure, nonverbal or observed behavior toward partners, was provided as a dependent variable for 37 samples. One outlier, which exceeded three standard deviations from the mean, was replaced with the next highest value (Lipsey & Wilson, 2001). The average effect size was $r = .09$, and an examination of confidence intervals indicated that participants were more likely to show negative behavior toward other-race partners than toward same-race partners. The final outcome mea-

sure, performance, was featured in a total of 55 samples, with an average effect size of $r = .07$. Here again, an examination of confidence intervals indicated members of same-race dyads had slightly better performance outcomes than members of interracial dyads.

Addressing the Potential for Selection Bias

When comparing effect sizes for published and unpublished samples, we found no differences for participants' emotional state or for performance. However, for nonverbal or observed behavior, unpublished samples, $k = 8$, $r = -.06$, 95% CI $[-.21, .09]$, tended to show lower effect sizes than published samples, $k = 29$, $r = .13$, 95% CI $[.06, .20]$, $Q_b(1) = 5.26$, $p = .022$. Also, for measures of attitudes toward partner, average effect sizes for unpublished samples, $k = 9$, $r = -.15$, 95% CI $[-.30, .19]$, were lower than those for published samples, $k = 32$, $r = .13$, 95% CI $[.07, .19]$, $Q_b(1) = 9.59$, $p = .002$. These results point toward the possibility of publication bias in the field as a whole. However, in our data sets for these two outcome variables, Egger's regression asymmetry test (Egger et al., 1997) did not detect the presence of asymmetry in the distribution of studies around the mean effect size, which would have been a potential sign of selection bias in our data set. The data also showed no asymmetry for measures of performance. In the case of participants' emotional state, Egger's test suggested asymmetry not on the left side, which might be seen in the case of publication bias, but on the right side, suggesting the possibility of missing studies with higher effect sizes. We used Duval and Tweedie's (2000) trim-and-fill procedure to calculate an adjusted value for participants' emotional state of $r = .15$, 95% CI $[.09, .21]$, with six data points imputed. This adjusted effect size can serve to provide a sense of the potential impact of selection bias, but because it is based partly on imputed, not real, data points, we carried out all subsequent analyses with our original data set. Furthermore, caution is necessary in interpreting these tests. Selection bias is only one of many potential causes of asymmetry in the distribution of effect sizes and is particularly difficult to ascertain in the case of heterogeneous samples (Egger et al., 1997; Ioannidis & Trikalinos, 2007; Sterne, Gavaghan, & Egger, 2000; Terrin, Schmid, Lau, & Olkin, 2003).

Table 2
Effect Size, Significance, and Heterogeneity Statistics for Interracial Interaction Outcome Variables

Outcome variable	k	Effect size and confidence intervals		Heterogeneity	
		Mean r	95% CI	$Q_w(k - 1)$	I^2
Attitudes toward partner	41	.07	[.00, .14]	172.42***	76.80
Participants' emotional state	32	.10	[.05, .16]	77.45***	59.97
Nonverbal or observed behavior	37	.09	[.02, .15]	108.19***	66.73
Performance	55	.07	[.03, .11]	165.06***	67.29

Note. k indicates number of samples; r is the point estimate for mean effect size calculated using random effects models, with higher values indicating more bias favoring same-race dyads over interracial dyads; 95% CI provides the lower and upper bounds of the confidence interval for the point estimate; $Q_w(k - 1)$ provides Cochran's test of heterogeneity; I^2 measures the percentage of variation across samples due to heterogeneity rather than chance.

*** $p \leq .001$.

Tests of Heterogeneity

The results for Cochran’s Q test (Cochran, 1954) and the I^2 values (Higgins et al., 2003), included in Table 2, showed that without exception, the effect sizes for all variables of interest were significantly heterogeneous. Moderator analyses were therefore warranted for practical reasons in addition to prior theoretical reasons.

Intersectional Moderator Analyses

Percentage female. We examined the relationship between the overall effect size and the percentage of female participants in each sample reporting gender composition using a meta-regression. We did not find significant results for participants’ self-reported attitudes toward partner, $Q_b(1, 35) = 0.77, p = .38$, participants’ emotional state, $Q_b(1, 30) = 0.14, p = .71$, or measures of nonverbal or observed behavior, $Q_b(1, 31) = 0.47, p = .49$. There was a marginal effect for performance outcomes, such that as the percentage of female participants increased, effect sizes tended to increase as well; this trend approached but did not attain significance, $Q_b(1, 43) = 3.04, p = .08$. See Table 3 for results.

Gender composition of dyads. To investigate the effects of gender composition, we compared samples featuring same-sex and mixed-sex dyads. Because the latter category of studies included both same- and cross-sex dyads but did not typically report those data separately, this comparison between same-sex-only samples and mixed-sex samples resulted in a conservative test of the effects of gender composition. Results showed that gender composition had a significant effect on participants’ emotional state: There was

more bias favoring same-race over interracial dyads when dyads were mixed sex ($r = .22$) as opposed to same sex ($r = .04$; see Table 3 for additional results). In other words, interacting with someone of the same sex minimized the difference in negative affect between interracial and same-race interactions. To follow up on this finding, we compared male–male dyads with female–female dyads. For our gathered articles, we were able to obtain separate data for 25 studies featuring male–male and female–female dyads (21 of these were studies that used only male or only female participants). No significant difference was found on any of the outcome measures between same-sex male or female dyads.

Relational Moderator Analyses

Majority or minority status of participant. To examine the role of racial group status, we compared the experiences of racial majority and minority participants (excluding samples that did not report data separately for these groups). Results showed a significant difference in participants’ self-reported emotional state. Majority group members who interacted with other-race partners reported more negative affect than those who interacted with same-race partners ($r = .12$); minority group members showed roughly equivalent outcomes regardless of the race of their partner ($r = -.03$). There were no significant differences between the samples featuring participants from racial majority and minority groups for other outcome measures (see Table 4 for results).

Study personnel versus naive partners. We examined the effect of using study personnel compared to naive individuals as interaction partners. When controlling for the correlated study

Table 3
Average Correlations and Tests of Significance for Intersectional Moderator Variables

Variable	<i>k</i>	Mean <i>r</i>	95% CI	$Q_b(df)$	Test statistic
Attitudes toward partner					
Gender composition of dyads				$Q_b(1, 35)$	0.52
Mixed sex	11	.11	[.01, .22]		
Same sex	24	.06	[−.04, .16]		
% female	37	$\beta = .14$		$Q_b(1, 35)$	0.77
Participants’ emotional state					
Gender composition of dyads				$Q_b(1, 30)$	11.75***
Mixed sex	11	.22	[.14, .29]		
Same sex	19	.04	[−.03, .10]		
% female	32	$\beta = -.07$		$Q_b(1, 30)$	0.14
Nonverbal or observed behavior					
Gender composition of dyads				$Q_b(1, 32)$	1.36
Mixed sex	15	.10	[.03, .18]		
Same sex	17	.02	[−.09, .14]		
% female	33	$\beta = -.12$		$Q_b(1, 31)$	0.47
Performance					
Gender composition of dyads				$Q_b(1, 50)$	<.00
Mixed sex	32	.06	[.01, .11]		
Same sex	18	.06	[−.02, .14]		
% female	45	$\beta = .23$		$Q_b(1, 43)$	3.04 ^a

Note. *k* indicates number of samples; Mean *r* is the point estimate for mean effect size; 95% CI provides lower and upper bounds of the confidence interval for the point estimate; Q_b indicates the degrees of freedom for the regression; Test statistic is the value of Q_b .

^a $p \leq .09$.

*** $p \leq .001$.

Table 4
Average Correlations and Tests of Significance for Relational Moderator Variables

Variable	<i>k</i>	Mean <i>r</i>	95% CI	Q_b or <i>t</i> (<i>df</i>)	Test statistic
Attitudes toward partner					
Racial status of participant				$Q_b(1, 33)$	0.02
Minority	6	.06	[−.08, .20]		
Majority	27	.07	[−.02, .17]		
Identity of partner				<i>t</i> (39)	0.51
Study personnel	23	.06	[−.03, .15]		
Naive partner	18	.07	[−.03, .18]		
Mode of interaction				$Q_b(1, 41)$	0.34
Face-to-face	30	.07	[−.01, .16]		
Other media	11	.04	[−.04, .12]		
Participants' emotional state					
Racial status of participant				$Q_b(1, 28)$	7.10**
Minority	8	−.03	[−.11, .06]		
Majority	20	.12	[.06, .19]		
Identity of partner				<i>t</i> (30)	1.75
Study personnel	18	.11	[.05, .16]		
Naive partner	14	.09	[−.02, .19]		
Mode of interaction				$Q_b(1, 32)$	0.84
Face-to-face	24	.11	[.04, .19]		
Other media	8	.07	[−.01, .14]		
Nonverbal or observed behavior					
Racial status of participant				$Q_b(1, 34)$	0.64
Minority	5	.02	[−.18, .22]		
Majority	29	.11	[.03, .19]		
Identity of partner				<i>t</i> (35)	0.49
Study personnel	28	.11	[.03, .19]		
Naive partner	9	.00	[−.10, .10]		
Mode of interaction				$Q_b(1, 37)$	0.33
Face-to-face	32	.08	[.01, .16]		
Other media	5	.12	[.00, .24]		
Performance					
Racial status of participant				$Q_b(1, 52)$	<0.00
Minority	13	.07	[−.01, .15]		
Majority	39	.07	[.02, .13]		
Identity of partner				<i>t</i> (53)	0.87
Study personnel	48	.07	[.03, .12]		
Naive partner	7	.05	[−.04, .13]		
Mode of interaction				$Q_b(1, 55)$	0.03
Face-to-face	40	.07	[.02, .12]		
Other media	15	.08	[.00, .16]		

Note. *k* indicates number of samples; Mean *r* is the point estimate for mean effect size; 95% CI provides lower and upper bounds of the confidence interval for the point estimate; Q_b or *t*(*df*) indicates whether a regression (Q_b) or a subgroup analysis (*t*) was performed and the degrees of freedom; Test statistic is the Q_b or *t* value, as indicated.

** $p \leq .01$.

characteristics of frequency of interaction and sex of author, we found no significant differences between these two for any of our outcome variables. This indicated that use of study personnel did not systematically result in different outcomes than use of naive partners (see Table 4).

Mode of interaction. The data were examined for differences between studies that used face-to-face interactions and those that took place via the Internet, video, audio, text, paper, or some alternative form of interaction. No significant differences were found by the form of the interaction, suggesting that when participants believe they are interacting with another person, they behave in similar ways regardless of the medium (see Table 4).

Contextual Moderator Analyses

Interaction structure. In comparing structured and free-form tasks, we found that interaction structure did not moderate outcomes for explicit attitudes toward partner or nonverbal behavior. Results for participants' emotional state reached only marginal significance (see Table 5). However, there was a significant difference for performance outcomes. Structured interactions led to a smaller difference between interracial dyads and same-race dyads ($r = .04$) than did free-form interactions ($r = .17$). Thus, structured tasks resulted in performance outcomes that were less sensitive to the race of the partner than those resulting from free-form interactions.

Table 5
Average Correlations and Tests of Significance for Contextual Moderator Variables

Variable	<i>k</i>	Mean <i>r</i>	95% CI	<i>Q_b</i> or <i>t</i> (df)	Test statistic
Attitudes toward partner					
Interaction structure				<i>Q_b</i> (1, 41)	1.15
Free-form	26	.09	[.00, .18]		
Structured	15	.02	[−.07, .11]		
Location				<i>t</i> (39)	1.94 ^a
Lab	31	.02	[−.06, .10]		
Field	10	.19	[.09, .29]		
Frequency				<i>t</i> (39)	1.03
One time	33	.05	[−.04, .13]		
Multiple	8	.15	[.03, .27]		
Saliency of race				<i>Q_b</i> (1, 40)	5.27*
Race not salient	36	.08	[.01, .15]		
Race salient	4	−.10	[−.22, .04]		
Participants' emotional state					
Interaction structure				<i>Q_b</i> (1, 32)	2.84 ^a
Free-form	21	.14	[.08, .21]		
Structured	11	.04	[−.06, .14]		
Location				<i>t</i> (30)	5.07***
Lab	24	.07	[.01, .13]		
Field	8	.21	[.10, .30]		
Frequency				<i>t</i> (30)	4.47***
One time	26	.14	[.08, .19]		
Multiple	6	−.06	[−.22, .11]		
Saliency of race				<i>Q_b</i> (1, 32)	0.46
Race not salient	25	.11	[.04, .18]		
Race salient	7	.07	[−.01, .16]		
Nonverbal or observed behavior					
Interaction structure				<i>Q_b</i> (1, 37)	0.20
Free-form	21	.07	[−.04, .18]		
Structured	16	.10	[.02, .19]		
Location				<i>t</i> (35)	0.25
Lab	31	.10	[.01, .18]		
Field	6	.07	[.02, .12]		
Frequency				<i>t</i> (35)	0.39
One time	35	.09	[.02, .16]		
Multiple	2	−.09	[−.45, .28]		
Saliency of race				<i>Q_b</i> (1, 37)	0.91
Race not salient	32	.07	[.00, .14]		
Race salient	5	.18	[−.03, .38]		
Performance					
Interaction structure				<i>Q_b</i> (1, 55)	5.88*
Free-form	14	.17	[.08, .26]		
Structured	41	.04	[.00, .09]		
Location				<i>t</i> (53)	0.53
Lab	30	.09	[.02, .17]		
Field	25	.06	[.01, .11]		
Frequency				<i>t</i> (53)	0.55
One time	53	.07	[.03, .11]		
Multiple	2	.09	[−.13, .30]		
Saliency of race				<i>Q_b</i> (1, 55)	1.92
Race not salient	46	.05	[.01, .09]		
Race salient	8	.18	[.00, .35]		

Note. *k* indicates number of samples; *r* is the point estimate for mean effect size calculated using random-effects models; 95% CI provides the lower and upper bounds of the confidence interval for the point estimate; *Q_b* or *t*(df) indicates whether a regression (*Q_b*) or a subgroup analysis (*t*) was performed and the degrees of freedom; Test statistic is the *Q_b* or *t* value, as indicated.

^a *p* ≤ .09.

* *p* ≤ .05. *** *p* ≤ .001.

Interaction structure and gender. We used a multiple meta-regression analysis to examine whether the percentage of female participants would have a different effect on structured versus free-form interactions and found significant results for nonverbal behavior. The meta-regression showed a significant main effect for interaction structure ($Z = -2.46, p = .014$) and for percentage of female participants ($Z = -2.56, p = .011$), both qualified by a significant interaction between the two terms ($Z = 3.05, p = .002$). In free-form tasks, as the percentage of female participants increased, effect sizes decreased, indicating that nonverbal behavior between same-race and other-race dyads was seen as more similar. Conversely, in structured tasks, as the percentage of female participants increased, effect sizes also increased, indicating that nonverbal behavior was seen as being more favorable in same-race dyads (see Figure 2).

Field versus lab studies. We were interested in determining if outcomes would differ depending on location of the study. After controlling for the correlated study characteristics of publication year and frequency of interaction, we found that participants in field studies, compared to lab studies, showed significant differences in reports of their own emotional state. In field studies, participants reported feeling more positive affect in same-race compared to interracial interactions ($r = .21$); in lab studies, this effect was significantly reduced, although it did not disappear entirely ($r = .07$). Results were marginally significant for explicit attitudes toward partner, such that participants in field studies tended to show more bias against other-race partners than same-race partners and those in lab studies tended to express more egalitarian attitudes; this trend approached but did not achieve statistical significance (see Table 5). No differences were found for performance measures or for nonverbal behavior.

Frequency of the interaction. When controlling for the correlated study characteristics of study location and use of study personnel, the frequency of the interaction (one time vs. multiple meetings) did not significantly influence attitudes toward partners. There were also no significant differences for nonverbal behavior or performance, although these comparisons were based on a very small number of long-term studies. However, the racial composition of the dyad had less influence on participants' ratings of their own emotions over multiple sessions. Whereas there was a larger

difference in the emotional state of participants in interracial versus same-race dyads after a one-time encounter ($r = .14$), this difference was decreased with multiple meetings ($r = -.06$). Over time, interracial interactions and same-race interactions had comparable effects on participants' emotional state (see Table 5).

Salience of race. We compared outcomes for studies where race was or was not made salient to participants in the course of the experiment. When race was made salient, participants tended to make more positive explicit ratings of other-race partners compared to the same-race partners ($r = -.10$), whereas when race was not made salient, same-race partners were rated more favorably than other-race partners ($r = .08$). No differences were found for other measures (see Table 5). Of the studies that made race salient to participants, only one featured data from racial minority participants in both interracial and same-race interactions, so these effects may not reflect differences in outcomes for minority participants.

Historical trends. To examine trends in effect sizes over the past few decades, we ran a meta-regression analysis comparing publication year with effect sizes. After controlling for correlated factors, we found that attitudes toward other-race partners and same-race partners have converged over the past four decades, $t(39) = 2.56, p = .015$, and nonverbal behavior toward same-race and other-race partners has become more similar as well, $t(35) = 2.32, p = .027$. There has not been a significant change in reports of personal emotional state, $t(30) = 1.03, p = .31$, or measures of performance, $t(53) = 0.57, p = .57$. Figure 3 shows expected values of r for each outcome variable across the years. In a follow-up analysis, effect sizes from only the last decade (2000–2010) were combined with random-effects models. The results converged with findings from the historical trend analysis, indicating that mean effect sizes for attitudes toward partners, $k = 26, r = .02, 95\% \text{ CI } [-.08, .12]$, and nonverbal behavior, $k = 27, r = .06, 95\% \text{ CI } [-.01, .13]$, were not significantly different from zero over the past decade. However, the results for participants' emotional state, $k = 24, r = .08, 95\% \text{ CI } [.01, .14]$, and performance, $k = 27, r = .08, 95\% \text{ CI } [.02, .15]$, did not contain zero in their confidence intervals, indicating that in these two domains, interracial interactions and same-race interactions still result in slightly different outcomes.

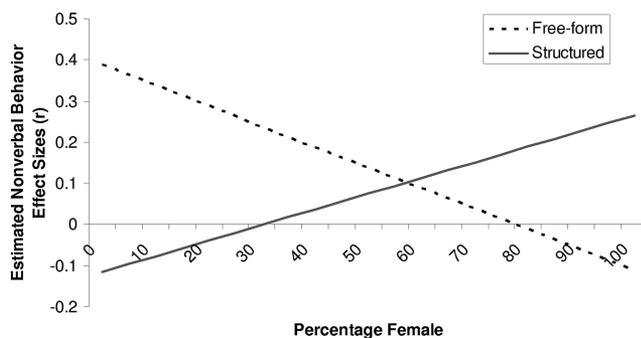


Figure 2. Effects of interaction structure and percentage of female participants on effect sizes for nonverbal friendliness. Positive values indicate a bias favoring same-race dyads, values equal to zero indicate no difference between same-race and interracial dyads, and negative values indicate a bias favoring interracial dyads.

Other Considerations

Cognitive or behavioral performance. Data from studies that used performance measures were separated into two subsets: those that examined cognitive measures of performance (e.g., tests of memory and cognitive depletion) and those that utilized behavioral measures (e.g., helping behavior and cooperation). Although there were too few effect sizes for us to keep these subsets separate throughout the moderator analyses, when the effect sizes were separated, we found that cognitive performance measures showed slight but significant bias favoring same-race dyads, with a mean $r = .13, 95\% \text{ CI } [.04, .22], k = 20$. Behavioral performance measures showed no significant same-race bias, with a mean $r = .04, 95\% \text{ CI } [-.01, .09], k = 32$. The difference between the two subsets of performance measures did not attain significance, $t(53) = 1.30, p = .20$, after controlling for the correlated measures of publication year and field versus lab setting.

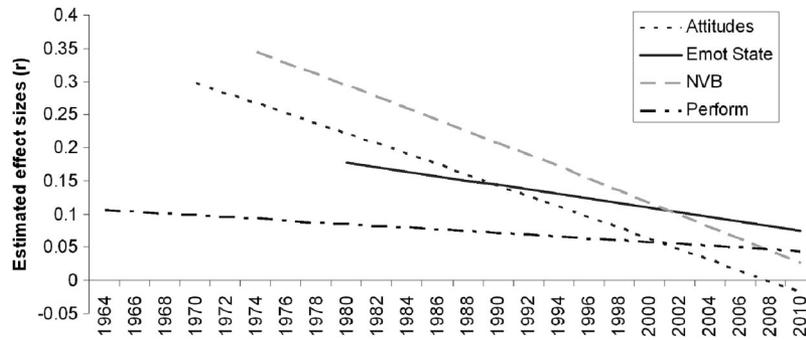


Figure 3. Historical trends in effect sizes. Higher values indicate more same-race bias; lower effect sizes indicate more egalitarian outcomes. Attitudes = attitudes toward partner; Emot State = participants' emotional state; NVB = nonverbal or observed behavior; Perform = performance.

Effects of sex/race of first author. Outcomes did not differ when the first author was a racial minority versus majority group member: attitudes toward partner, $Q_b(1, 35) = 1.19, p = .28$; participants' emotional state, $Q_b(1, 30) = 0.004, p = .94$; nonverbal behavior, $Q_b(1, 33) = 0.24, p = .62$; performance, $Q_b(1, 46) = 0.46, p = .50$. However, sex of the first author, after controlling for the correlated factor of use of study personnel, did affect outcomes for participants' emotional state, $t(30) = 2.31, p = .029$, and performance, $t(52) = 2.08, p = .042$, but not the other outcome measures (attitudes toward partner, $t(39) = 0.27, p = .79$; nonverbal behavior, $t(35) = 0.71, p = .48$). Female first authors were more likely to report higher effect sizes for performance, $k = 20, r = .14, 95\% \text{ CI } [.08, .20]$, than were male first authors, $k = 34, r = .02, 95\% \text{ CI } [-.28, .08]$, as well as lower effect sizes for participants' emotional state: female, $k = 19, r = .05, 95\% \text{ CI } [-.03, .13]$; male, $k = 13, r = .17, 95\% \text{ CI } [.10, .25]$.

Discussion

The results of this meta-analysis indicated small but significant differences in outcomes for individuals in interracial and same-race settings. Across 108 samples, participants reported experiencing less negative affect, were seen as behaving more warmly, performed better on tasks, and marginally tended to report liking their partners more when they were interacting with a partner of the same race rather than a partner of a different race. The direction of these effects is consistent with the notion that interracial interaction outcomes can be hindered by racial bias or intergroup anxiety (e.g., Dovidio, 2001; Shelton & Richeson, 2006b; Trawalter et al., 2009). At the same time, the magnitude of effect sizes was quite small, whether assessed with more traditional guidelines (Cohen, 1988) or recently developed empirically based guidelines (Hemphill, 2003; Lipsey & Wilson, 1993; Richard, Bond, & Stokes-Zoota, 2003). Richard et al., for example, examined hundreds of meta-analyses and found the average social psychological effect size to be $r = .21$, while ours ranged from $r = .07$ to $.10$. Based on these findings, dyadic racial composition alone would contribute only about 1% of the total variance in interaction outcomes. This small percentage illustrates the importance of considering the many factors in addition to race that influence these interactions. Still, the role of race itself should not be overlooked. Even small effects can have major consequences

(Prentice & Miller, 1992; Rosenthal, 1990), a conclusion that holds in the domain of race relations as well (e.g., Lin, Dobbins, & Farh, 1992; Mitchell, Haw, Pfeifer, & Meissner, 2005; Sweeney & Haney, 1992).

Two considerations in interpreting these findings are the tremendous variety of measures used and the goals of the studies themselves. Although each study reported adequate reliability for its measures, there were scarcely more than a handful of studies that used exactly the same set of questions or investigated exactly the same construct within each outcome category. For example, participants' emotional state measures included reports of self-esteem as well as comfort and anxiety. It is also worth noting that our data set was composed primarily of studies intended to investigate moderators of interracial interaction outcomes. This highlights the second goal of our meta-analysis, to investigate the intersectional, relational, and contextual factors that may influence the outcomes of interracial compared to same-race interactions. The results of these moderator analyses clearly illustrate the benefits of a more holistic approach to understanding interracial interactions.

Intersectionality

Gender composition of dyads had an effect on participants' emotional state. Namely, interacting with someone of the same gender minimized the difference between interracial and same-race interactions, whereas interracial interactions had more negative consequences when the partner was not of the same gender. Perhaps having a social identity such as gender in common with an interracial interaction partner improves outcomes (Crisp & Hewstone, 2007). Although the percentage of female participants did not significantly impact effect sizes when considered alone, this factor did have an effect when considered together with the nature of the task, discussed further below. We hope that future research is able to provide more information on how other identities, such as age, socioeconomic status, sexual orientation, and religious identity, may intersect with race to produce unique outcomes. Altogether, these findings highlight the importance of taking an intersectional approach (i.e., considering multiple social identities and the unique characteristics associated with each one) to the study of interpersonal interactions (Cole, 2009).

Relational Dynamics

Outcomes of interracial interactions are affected by the race of participants. Unlike members of the racial majority, minority group members reported more similar emotional outcomes in same-race versus interracial interactions—indicating that the race of the partner did not have as large an effect on minority group members' personal emotional states as it did on those of majority group members. This may be due in part to more experience with interracial interactions and the development of protective coping mechanisms on the part of minority group members (e.g., Crocker & Major, 1989). Majority group members, on the other hand, may have fewer interracial interactions and thus fewer opportunities to develop approaches and capacities to cope with the stress of these interactions. However, these results should be interpreted with caution. Members of minority groups vary in their sensitivity to race-based rejection (Mendoza-Denton et al., 2002), and the consequences of being reminded of the prejudice or stereotypes that others hold can be serious (e.g., lower academic achievement and retention; Steele & Aronson, 1995). In examining effects of other relational moderators, we found no significant differences when interaction partners were study personnel versus naive partners. In addition, no differences were found based on whether the interactions were purely face-to-face or through an audio, video, text, or other limited channel of communication. It seems that knowing the race of the interaction partner, regardless of his or her role in the experiment or the mode of communication, is sufficient to affect behavior (Heilman et al., 2010; Pittinsky et al., 2006).

Contextual Factors

Perhaps one of the most interesting findings from this meta-analysis concerns the ways in which interracial interactions have and have not changed over time. We found that over a period of four decades, individuals' attitudes toward their partners have become increasingly egalitarian. This mirrors observations that explicit attitudes toward people of other races have improved substantially over the past decades, due in part to changing social norms (e.g., Dovidio & Gaertner, 2000; Gaertner & Dovidio, 1986; Sears, 1988). Differences in nonverbal and observed behavior also showed a decline in magnitude over the past 40 years, indicating that implicit and uncontrolled attitudes are improving along with explicit attitudes. These findings highlight the tremendous progress in race relations that has been made in the past few decades, no doubt due in part to the proven positive effects of increasing intergroup contact in a rapidly diversifying world (Pettigrew & Tropp, 2006).

However, the effect of partner race on participants' reports of their emotional state has remained fairly constant over time. This effect may be driven by different factors now than it was a few decades ago, yet it persists. For example, it is possible that White people's fear or discomfort in interracial contexts may once have been driven by negative stereotypes about racial minorities but in more recent years has been combined with or supplanted by concerns about being viewed as racist (e.g., Gaertner & Dovidio, 1986; Trawalter et al., 2009). Differences in performance outcomes for same-race and interracial dyads have also remained stable, even accounting for changes in the typical methods employed. As with the findings for emotional state, it may be that the

stability in performance score differences over time can be attributed to a shifting set of underlying factors related to bias and intergroup anxiety.

Importantly, performance outcomes are influenced by the structure of the interaction. When the interaction is clearly structured, performance outcomes between same-race and interracial dyads are more comparable than when the interaction is free form and unstructured. Structured tasks thus lead to performance outcomes that are less sensitive to the race of the partner than those resulting from free-form interactions. This may be due to the decrease in self-presentational concerns that occurs with a more structured interaction (Avery et al., 2009). As a wealth of literature in the field suggests, individuals entering an interaction with a person of a different race may be concerned about how they will be perceived and treated, influenced both by stereotypes about the other person's group and meta-stereotypes about their own group (Mallett et al., 2008; Shelton & Richeson, 2005; Shelton, Richeson, Salvatore, & Trawalter, 2005; Vorauer, Hunter, Main, & Roy, 2000; Vorauer & Kumhyr, 2001; Vorauer et al., 1998). Despite a desire for positive social outcomes, many individuals may take a misguided approach to try to accomplish those goals (Apfelbaum et al., 2008). Providing these individuals with a level of structure can decrease the ambiguity of the situation and thus positively impact performance outcomes. For example, when White individuals received a script to use during an interracial interaction, they showed less cognitive depletion than individuals who spoke extemporaneously (Avery et al., 2009; Richeson & Trawalter, 2005).

Looking beyond performance measures, however, the impact of structure becomes more complicated. For nonverbal behavior, the gender of participants interacts with the structure of the interaction, in that women behave more similarly toward same-race and other-race partners when interactions are free form, whereas men behave more similarly toward same-race and other-race partners when interactions are structured. This echoes previous research that men and women behave differently in interactions depending on the nature of the task (Dovidio et al., 1988; Eagly & Karau, 1991; Wood, 1987). This interaction among structure, gender, and racial composition highlights the importance of considering contextual and intersectional factors in interracial interaction research. Indeed, given the complexity of these findings and the small size of the effects, it is too early to draw practical conclusions from this set of results. Additional research examining all of these factors is needed.

However, our other findings paint a clearer picture: Although historical trends do not show a significant decrease in effect sizes for negative affect, longer term contact can lead to more positive outcomes in this domain. Compared to one-time studies, longer term interactions resulted in less distinction between same-race and interracial dyads in terms of participants' emotional states. This may have been because multiple-session studies allowed participants to individuate their partners and thus rely less on group stereotypes to guide emotional responses (Brewer, 1988; Fiske & Neuberg, 1990). There was no significant difference between one-time and multiple-session studies in explicit reports of attitudes toward other-race partners relative to same-race partners. There were also no significant differences for nonverbal behavior or performance outcomes, although there were very few long-term studies in these two comparisons. Although at first this may seem inconsistent with findings about contact theory (Petti-

grew & Tropp, 2006), these results come with three caveats. First, many of the studies in our data set did not provide experimental conditions that met the conditions of contact theory—namely, that the interaction is clearly and explicitly marked by the presence of common goals, a cooperative environment, equal status of groups, and authority sanction for the contact (Allport, 1954; Pettigrew & Tropp, 2006). Second, we compared attitudes for interracial dyads relative to same-race dyads rather than solely examine improvement of intergroup relations. Third, as noted above, attitudes toward other-race partners have become more positive over the years, and thus the lack of a significant improvement in multiple-session studies does not necessarily indicate that overall attitudes were negative. Our findings may instead suggest not only that attitudes toward same-race and other-race partners remain similar over time but that longer term interactions show benefits for personal emotional state as well—indicating that the net effect of extended intergroup contact is positive.

Other findings highlight the role of self-presentational concerns. Studies set in realistic field settings showed a larger discrepancy between same-race and interracial interactions than did lab studies in terms of participants' emotional state (and marginally so for explicit attitudes toward partners). Thus, compared to participants in lab studies, participants in field studies reported feeling more negative affect in interracial than same-race interactions. As Cialdini (2009) has pointed out, field studies have the benefit of being more applicable to real-world outcomes. The present results suggest that field studies may reveal some amount of bias that may be concealed due to demand characteristics evoked by a laboratory setting—that is, participants are less likely to try to present themselves in a more positive light when no experimenter is present (Reis & Gosling, 2010).

Finally, making race salient led to more egalitarian expressions of attitudes toward partners. This suggests that self-presentational concerns, particularly in members of racial majority groups, may lead to altered responses in an attempt to not appear prejudiced when participants are aware that race is an issue (Devine, Plant, Amodio, Harmon-Jones, & Vance, 2002; Goff, Steele, & Davies, 2008; Monteith, Ashburn-Nardo, Voils, & Czopp, 2002). The implications of this finding are broad. For example, research by Sommers and Ellsworth (2000) demonstrated that when race was made salient to White mock jurors, the race of the defendant did not adversely affect their decisions. However, when race was not made salient, White jurors rated the male defendant as more guilty, violent, and aggressive when he was described as Black than when he was described as White. Thus, making race salient can lead to alterations in behavior that are aligned with social norms about race (Sommers & Ellsworth, 2000, 2001). It is worth noting that most of the studies in this meta-analysis that manipulated race salience featured racial majority participants. For racial minorities, research suggests that making race salient actually reduces anxiety relative to racial majorities, possibly by decreasing ambiguity or by activating a sense of “expertise” on race-related topics (Trawalter & Richeson, 2008; Trawalter et al., 2009).

Other Considerations

The objective performance measures used in these studies reflect, to some extent, a shift in methods over time. Performance measures in the 1970s often included helping and other behavioral

outcomes, whereas in the past decade, measures of executive function and cognitive performance have gained prominence. Even accounting for this historical change, however, our analyses showed that the effect sizes for behavioral and cognitive performance measures were not significantly different from each other. In our investigation of race- and sex-of-author effects, we found no significant differences in effect sizes between racial minority and majority authors but did find sex-of-author differences. Often differences of these kinds are attributed to some form of researcher bias, either in the methods used to perform the study or in the selection of results reported. For example, sex-of-author effects sometimes tend to favor the author's own gender but not always—and may instead be due indirectly to a number of minor decisions along the way that subtly alter final outcomes (Eagly & Carli, 1981; Wood, 1987). In our case, male authors tended to report larger effect sizes for participants' affective states, and female authors tended to report larger effect sizes for performance outcomes. These differences do not seem to reflect author bias but may indicate a more indirect relationship between author gender and outcomes. For example, it may be that male authors incline toward scenarios that provoke more intergroup anxiety in participants. As for the sex-of-author effects on performance, some of the highest effect sizes for performance outcomes in our data set come from studies that used the Stroop (1935) test of cognitive depletion, and research on the effects of interracial interaction on cognitive depletion was pioneered by female authors (e.g., Richeson & Shelton, 2003).

Limitations of Our Approach

One of the potential limitations of this meta-analysis is that the majority of the samples (over 70%) were based on interactions between White and Black individuals in a U.S. setting. Fewer samples examined relationships with Asian, Latino, Middle Eastern, and First Nations partners, and only a handful of studies examined interracial interactions across national borders (German and Turkish, Italian and African, Japanese and non-Japanese students). Each one of these interracial pairings is linked to a unique set of historical circumstances and thus will have its own influencing factors. For example, White individuals in America might be more concerned about appearing prejudiced toward Black people and more likely to attempt to compensate for that possibility, whereas the fear of being seen as racist may be less of a factor in interactions between members of other groups.

Furthermore, these findings do not touch upon institutional forms of discrimination that continue to shape outcomes for all members of society. Differences in political and legal representation, economic wealth and employment opportunities, residential restrictions, quality of educational resources, media portrayals, access to medical care and health outcomes, interactions with law enforcement and the criminal justice system, and a host of other institutional factors are not reflected in the data we present here on interracial interactions (see Plaut, 2010, for a review). At the core of these issues is power. Given our results, grappling with the interplay between institutional and interpersonal racial bias opens up new arenas of study. For example, nonverbal bias shown toward racial minority characters on television shows has been linked with increases in implicit bias in viewers of those shows (Weisbuch, Pauker, & Ambady, 2009). On a societal level, what

does it mean for explicit and nonverbal racial bias to have decreased interpersonally, if the interactions being described are largely in lab and university contexts and if, due to residential segregation and lack of social affordances, even well-meaning individuals are never drawn deeper into the lives of people of different racial backgrounds to witness firsthand the effects of institutional disparities? This and many important related questions, unfortunately, cannot be addressed by the data we have explored here, but they should not be neglected.

Future Research Directions

The results of this meta-analysis suggest several areas for further inquiry, taking relational, contextual, and intersectional factors into account. For example, future studies should examine how the processes already identified in the context of White–Black relations in the United States apply in other intergroup settings. To our knowledge, only one study has directly compared White–Black dyads to White–Asian dyads, and it found that although both evoked more anxiety than same-race interactions, members of White–Asian dyads reported less anxiety than members of White–Black dyads (Littleford et al., 2005). A longitudinal study of roommate groups also demonstrated unique outcomes for individuals who had Asian American, Latino, Black, or White roommates (Van Laar, Levin, Sinclair, & Sidanius, 2005). Because there is so little literature on interactions beyond the Black–White binary, further investigations of other interracial pairings are sorely needed, not only between majority and minority groups but also between minority group members of different races.

Moreover, there seems to be a need for more ecologically valid studies, including more field studies. Although field studies require more investment and the loss of some experimental control, the behavior they capture may be more reflective of the real world than that observed in the lab, and their findings are more likely to be understood and seen as relevant by a broad audience (see Cialdini, 2009). Similarly, participant age was highly constrained in our data set. Very few studies used non-college-student samples, and those that did were predominantly in field settings. The frequent use of college students as participants in experimental studies has been a source of concern for many years, as it risks creating a limited understanding of psychological phenomena (McNemar, 1946; Rosenthal & Rosnow, 1969; Sears, 1986). There are differences between college students and noncollege adults across a number of domains, although the presence, magnitude, and direction of such differences show no systematic pattern (Peterson, 2001). Thus the question remains whether college students and noncollege adults differ in terms of interracial interactions. More interaction studies utilizing noncollege adult samples are needed to examine the effects of participant age, student status, and the influence of cohort. Furthermore, although we found no significant differences in outcomes for studies using naive partners versus study personnel, the use of naive partners may provide a unique opportunity to study the dynamics affecting both members of an interaction simultaneously, better reflecting the relational nature of real-world interactions (Shelton & Richeson, 2006b). Whereas study personnel are often given scripted roles and trained to act the same with each participant, naive partners are free to engage in behavior that may either counteract or confirm their partner's

expectations about the interracial interaction (e.g., Mallett et al., 2008; Shelton, Richeson, & Salvatore, 2005).

Future studies should carefully consider the effects of the interaction structure. How do factors such as the presence of a task, the type of task (collaborative or competitive, for instance), the incentives provided for task performance, and the roles of the individuals in the interaction affect the outcomes of the interaction? The effects of gender composition of interracial dyads also merit further investigation. The results so far are provocative and indicate that outcomes are affected by gender composition and participant gender, the latter particularly in conjunction with structural aspects of the interaction. Thus, gender effects should be carefully examined in future work. Studying other forms of identity intersectionality, including identities such as sexual orientation, socioeconomic status, and religion, may also prove a fertile source of new understandings about intergroup relations.

To understand the complexity of interracial interactions, we must take an approach that is characterized by an appreciation for intersectionality, relational dynamics, and the influence of context. Using these three themes to inform our analysis does not answer every question—rather, it reveals just a few of the ways in which these factors can interact to influence outcomes, demonstrating the relevance of this approach and opening new avenues of inquiry. For instance, although we are able to show that the structure, racial composition, and gender composition of an interaction interact to affect outcomes, we cannot yet determine exactly how and when these three factors play a role. To take one example, what happens when a White woman and a Black man interact during a task-focused encounter? The results of this meta-analysis provide some clues, but it seems clear that a more complete understanding of this type of interaction requires considering the contextual, intersectional, and relational aspects simultaneously—and that these factors are crucial for understanding social interactions more broadly. In this case, it seems that the old adage “The whole is greater than the sum of its parts” rings true.

Conclusions

Although there is evidence for significant differences in how individuals respond to other-race partners compared to same-race partners—in terms of explicitly reported attitudes and nonverbal behavior, self-reported affect, and performance outcomes—the magnitude of the effect sizes tended to be small and should be interpreted in context. For example, the existence of these small differences should not be taken as evidence that interracial contact should be avoided. On the contrary, our findings indicate that as interracial contact increases, outcomes become more positive as well. This is evident on a broad scale, in an examination of historical trends in the context of an increasingly diverse population. Over the past 40 years, not only have explicit ratings of other-race partners improved but nonverbal behavior toward other-race partners has likewise become more similar to that shown toward same-race partners. However, affective and performance outcomes have remained largely consistent for individuals in interracial compared to same-race dyads. Yet, here too the potential of increased and extended contact is promising, as racial minorities—who typically have more experience with interracial interactions—tended to experience less negative affect than majority group members in interracial interactions, and differences in emo-

tional state for interracial and same-race dyads disappeared in longer term interactions. Importantly, interracial interaction outcomes become much more complicated when other intersectional, relational, and contextual factors are considered. For example, same-sex interactions reduce negative affect in interracial interactions, and structured interactions lead to performance outcomes that are less affected by dyadic racial composition—while the effects of interaction structure on nonverbal behavior depend on participant gender. Therefore, much more than the racial composition of a dyad must be known before one can predict whether interaction outcomes will be positive. Altogether, these analyses serve to highlight the value of taking a comprehensive rather than a reductionist approach to the study of interracial interactions. This approach will undoubtedly engender many new areas of inquiry and investigation. What is true of race relations in general seems also to be true for the study of interracial interactions: We have come a long way but have a long way yet to go.

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