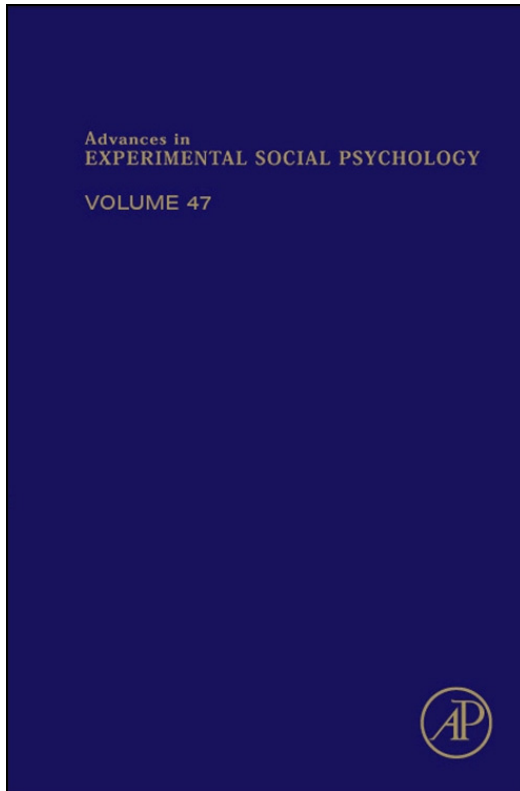


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# Implicit Attitudes and Beliefs Adapt to Situations: A Decade of Research on the Malleability of Implicit Prejudice, Stereotypes, and the Self-Concept

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## Abstract

In this chapter, I review my program of research on implicit attitudes and beliefs. These attitudes and beliefs are often acquired without individuals' awareness and influence judgments, decisions, and actions without intention. My work seeks to identify circumstances that produce changes in people's implicit attitudes and beliefs toward social groups. Over the course of a dozen years, my collaborators and I have found that implicit attitudes and beliefs are remarkably malleable even in the absence of active attempts at persuasion. I review four lines of research relevant to this issue. Collectively, this work shows that implicit attitudes and beliefs are mirror-like reflections of local environments and communities within which individuals are immersed. Changes in local environments (and sometimes emotions elicited by them) produce corresponding changes in people's implicit attitudes and beliefs. In essence, implicit attitudes and beliefs are better described as situational adaptations or reflections rather than personal possessions acquired and discarded by conscious acts of will.



## 1. IMPLICIT ATTITUDES AND BELIEFS ADAPT TO SITUATIONS: A DECADE OF RESEARCH ON THE MALLEABILITY OF IMPLICIT PREJUDICE, STEREOTYPES, AND THE SELF-CONCEPT

In a provocative article published a quarter century ago, Bob Abelson observed that in everyday discourse, attitudes and beliefs are often treated as if they are personal possessions that belong to individuals (Abelson, 1986). Attitudes and beliefs are talked about as “things” or possessions individuals acquire in response to life experiences, personal values, and information from the social world. Individuals carry these possessions with them as they navigate various situations in daily life. This metaphor highlights three important assumptions about the nature of attitudes that are latent in the mind of social psychologists and laypeople

alike. The first is the assumption that people consciously acquire attitudinal possessions as they navigate life; they reflect on them, speak about them if they so choose, and discard them when they want. The second is the assumption of a sharp distinction between one's own attitudinal possessions and that of others in the broader community around the individual. And the third is the assumption that changing attitudes involves an active act of giving up one's possession or exchanging it for another possession. This possession metaphor captures the way in which attitudes were conceptualized in classic theories of social psychology popular until the 1980s and it continues to be the way in which laypeople think of attitudes in everyday life.

However, the real story of attitudes is far more complicated and interesting. This story has been uncovered through meticulous empirical research and new theories in social psychology over the past two decades. The new story reveals that attitudes are not necessarily consciously acquired possessions. They often accrue passively in individuals' minds without their conscious awareness. Unlike personal possessions, the distinction between one individual's personal attitude and that of others in one's community is remarkably fuzzy. And attitude change does not have to involve an active act of discarding an old possession or changing it for a new one. Attitudes often change in the absence of conscious reflection and active consideration of new information. Expanding the conceptualization of attitudes and attitude change to include new theories and measures is immensely important to social psychology because this construct—attitude—is relevant to almost every topic in social psychology. It is relevant to the self-concept, person perception, intergroup relations, close relationships, social influence, helping, and aggression, just to give a few examples. Equally important is the need to understand the conditions under which attitudes and beliefs change, whether these changes are overt or subtle, and how these changes affect subsequent judgments, decisions, and actions. Expanding the scope of attitude change research promises to enhance the explanatory power of psychological theories to predict social behavior and to generate translational research that applies attitude change interventions to solve real social problems.

My research focuses on this new breed of attitudes and beliefs that are acquired passively without individuals' awareness and that influence subsequent judgments, decisions, and actions without intention or volition. These subtle attitudes and beliefs have been variously labeled *implicit*, *unconscious*, or *automatic*. I examine implicit attitudes and beliefs about *social groups*

(groups defined by race, gender, sexual orientation, nationality, and so on) and how group-based attitudes and beliefs impact group members' *self-concept*. I am particularly interested in understanding the circumstances under which implicit attitudes and beliefs change.



## **2. SETTING THE STAGE: THE ROLE OF THE UNCONSCIOUS IN SHAPING ATTITUDES AND BELIEFS**

A longstanding theme in social psychology is that people's attitudes and behavior are frequently shaped by factors that lie outside their awareness and cannot be fully understood by introspection and self-report. Although we as individuals think of our attitudes and actions as solely guided by conscious intentions and motivations, social psychological research shows that, to the contrary, attitudes and actions are often shaped by situational cues and motivational processes that operate with little awareness on the part of the perceiver (Banaji & Dasgupta, 1998; Bargh, 1994, 1997; Dasgupta, 2004, 2008; Greenwald & Banaji, 1995; Kihlstrom, 1990; Nisbett & Wilson, 1977). When people encounter a person, a group, or an issue they are familiar with, the attitude or belief associated with it pops into mind quickly and automatically in a split second. People may be unaware of attitude activation or only semiaware of it. But once an implicit attitude or belief is activated, it is difficult to inhibit or suppress right away and the activated attitude or belief is more likely to drive subsequent behavior, judgments, and decisions.

Implicit attitudes and beliefs are typically seen as conceptually distinct from explicit, controlled, self-reported, or conscious responses. As these terms suggest, attitudes are considered explicit when perceivers are aware of their evaluations and opinions, able to claim them as their own, and have the capacity to change their attitudes and beliefs given sufficient motivation and effort. Whereas explicit attitudes are measured by directly asking people to consider how they feel about a particular object or issue and report their thoughts and feelings in a deliberate fashion, implicit attitudes are inferred indirectly from people's performance on tasks that, at face value, seem unrelated to attitude measurement. For example, the speed with which people associate certain words or pictures during rapid reaction time tasks is used to infer their implicit attitudes. Similarly, people's choice of words in a word completion task might also be used to infer their implicit attitudes (Petty, Fazio, & Brinol, 2008).



### **3. IMPLICIT ATTITUDES AND BELIEFS ABOUT SOCIAL GROUPS**

Much of the research on implicit attitudes and their effects on social behavior have been conducted in the context of intergroup relations, particularly around issues of prejudice and stereotyping. Research has gravitated in this direction for two good reasons. First, the socially sensitive nature of intergroup prejudice and stereotypes typically raises concerns that people's explicitly reported attitudes toward in- and outgroups may be distorted by self-presentation and impression management concerns. That is, people may not always be willing to report socially sensitive attitudes honestly, especially if those attitudes deviate from social norms. Second, while self-reporting their attitudes, people sometimes make a sharp distinction between their own personal attitudes (their personal possessions) from the attitudes of others in their community or larger society. They might say, for example: "people in my community are prejudiced against Group X, but I am not." Yet, commonly held opinions of social groups are known by everybody immersed in a given community through hearsay, media exposure, and by passive observation of who occupies valued roles and devalued roles in the community. Passive exposure to commonly held attitudes and beliefs register in individuals' minds and get incorporated into their mental representation of a given group without their active consent. As a result, people's implicit attitudes toward social groups often mirror the societal hierarchy of privilege and disadvantage although their explicit attitudes and beliefs are likely to focus on their personal possessions as distinct from that of others.



### **4. CHANGING IMPLICIT ATTITUDES AND BELIEFS**

Empirical evidence that implicit attitudes are automatically activated without awareness and that they have the capacity to drive judgments and behavior regardless of explicit intention and control had, for a long time, led to the conclusion that these attitudes are relatively immutable. Early theories of implicit social cognition argued that implicit attitudes and beliefs are learned early in life and they change slowly only after long-term accrual of new associations and a great deal of training (Bargh, 1999; Devine, 1989; Petty, Tormala, Brinol, & Jarvis, 2006; Wilson, Lindsey, & Schooler, 2000). In other words, the assumption was that conventional persuasion techniques that change explicit attitudes by relying on perceivers' awareness of their attitudes, motivation to

reconsider their stance, and willingness to expend effort to consider new information, ought to leave implicit attitudes untouched.

As in the case of attitude change in general, so too prejudice reduction interventions had also been assumed to require conscious mental processes. The working assumption was that perceivers must be aware of their bias (Banaji, 2001; Dasgupta, 2004, 2008); motivated to suppress negative thoughts (Macrae, Bodenhausen, Milne, & Jetten, 1994; Macrae, Bodenhausen, Milne, & Wheeler, 1996); and motivated to change their responses toward outgroups because of personal values, guilt, compunction, or self-insight (Allport, 1954; Devine, Monteith, Zuwerink, & Elliot, 1991; Monteith, 1993; Monteith, Devine, & Zuwerink, 1993; Monteith, Zuwerink, & Devine, 1994; Myrdal, 1944). In some cases, prejudice reduction interventions involved highlighting the discrepancy between people's general egalitarian values and their prejudice toward specific groups and motivating them to align the two (Gaertner & Dovidio, 1986; Katz & Hass, 1988; Katz, Wackenhut, & Hass, 1986; Roakeach, 1973). One of the best tried and tested methods of prejudice reduction involved motivating people to engage in intergroup contact (Pettigrew & Tropp, 2006; Tropp & Bianchi, 2006; Tropp, Stout, Boatswain, Wright, & Pettigrew, 2006). Because changing prejudice and stereotypes was viewed as a conscious relearning process, the research cited above mostly focused on changing explicit attitudes. Until the turn of the new century, few had attempted to modify implicit forms of prejudice and stereotyping because these were seen as inescapable habits that are expressed despite attempts to bypass or ignore them (Bargh, 1999; Devine, 1989). With the advent of the twenty-first century, new research from several research laboratories including mine began to challenge assumptions about the immutability of implicit attitudes (for reviews, see Blair, 2002; Dasgupta, 2009; Gawronski & Bodenhausen, 2006).



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## 5. A ROADMAP OF MY RESEARCH PROGRAM

For the past dozen years, research from my lab has consistently shown that implicit attitudes and beliefs are remarkably malleable both in the short term and over time, without the need to invoke conscious intentions and motivated learning. We started with the working assumption that if implicit attitudes and beliefs about social groups are learned and strengthened through repeated observation of particular classes of people in valued or devalued roles through direct contact, indirect contact, or media exposure in one's local environment, then such attitudes and beliefs ought to remain

stable as long as one's local environment and its inhabitants remain constant. On the flip side, these attitudes and beliefs ought to change if the environments and its inhabitants change. If this assumption is true, we hypothesized that seemingly intractable implicit prejudice against historically disadvantaged groups (e.g., racial minorities and sexual minorities) might become less biased if the average person's local environment is changed.

Using this simple logic, in one line of research we focused on measuring or manipulating the types of local environments people are immersed in and who they observe in admired and valued roles. Do they observe admired and well-regarded outgroup members who belong to historically disadvantaged groups (e.g., African Americans, gays and lesbians, and elderly individuals) or are such individuals absent from their local environment? We then examined the effects of inserting such admired counterstereotypic individuals in the local environment on people's implicit attitudes toward the outgroup as a whole. We wanted to determine if relatively small changes in local environments and communities would produce substantial shifts in individuals' implicit attitudes toward disadvantaged outgroups.

In a second related strand of research, we moved beyond implicit *attitudes* (the degree to which people *like* or *dislike* a group) and sought to investigate whether changes in local environments affect perceivers' implicit *beliefs* about ethnic outgroups—particularly, their implicit beliefs about ethnic minorities' nationality. Who is seen as legitimately American and who is seen as a perpetual foreigner? Does exposure to particular types of admired ethnic minorities in one's local environment enhance the implicit perception of their group as legitimately American?

In a third line of research, we examined the malleability of implicit bias as it relates to individuals' *ingroup* and their *self-concept*. An insidious quality of implicit bias is that it functions like an "equal opportunity virus" that gets in the mind of anybody regardless of their own group membership. Even individuals who are members of disadvantaged groups learn and acquire implicit stereotypes about their own group if they are immersed in the same local environment as their advantaged counterparts. We shine a spotlight on the conditions under which changes in local environments shape people's implicit stereotypes about their ingroup, and examine, by extension, if they have downstream consequences on group members' implicit self-concept and life choices.

Local environments shape implicit attitudes and beliefs through passive observation of people and media around us. At the same time, local environments also shape implicit attitudes and beliefs in another more active



way—local events arouse specific emotions and motivations in individuals. My collaborators and I have found that strong negative emotions aroused in one local environment can linger in the mind and taint individuals' implicit attitudes toward groups encountered in a different environment even though the source of the original emotion was unrelated to the target being evaluated. Once aroused, negative emotions can unwittingly carry over from one local environment to another and increase implicit prejudice against specific social groups. This is our fourth line of research on the malleability of implicit attitudes.

Collectively, these four lines of research convey the message that implicit attitudes and beliefs are not like personal possessions acquired and discarded by conscious acts of individuals who possess them. Rather they are mirror-like reflections of local environments and communities within which individuals are immersed. Changes in these environments and communities (and sometimes emotions elicited by them) produce changes in implicit attitudes and beliefs about one's outgroup, ingroup, and the self. Put differently, I propose that implicit attitudes and beliefs are situational adaptations. As situations change, so too do implicit reactions.



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## **6. DO CHANGES IN LOCAL ENVIRONMENTS INFLUENCE IMPLICIT ATTITUDES TOWARD DISADVANTAGED GROUPS?**

### **6.1. Local environments influence implicit attitudes toward outgroups**

Recall that we started with the assumption that implicit preference for some groups and bias against others are learned associations acquired by passive immersion in an unequal society where people are segregated into disparate roles, jobs, and geographies based on group membership. In everyday life and in daily media, people observe that some types of individuals typically occupy highly valued roles, while others typically occupy devalued roles, and this distinction is often based on group membership. Take, for instance, the reality that in many local environments highly valued community members such as business leaders, educational leaders, and politicians are frequently White and male. Ethnic minorities and women are rarely seen in these roles. When they exist they are not as visible or publicly recognized as their male counterparts. At the other end of the spectrum, less valued members of many communities such as nannies, housecleaners, and laborers are frequently Black or Latino. Through repetition, these observations get passively recorded in the mind and become the basis of implicit attitudes

and beliefs. If this is how implicit attitudes develop then such biases should shift when people are immersed in different types of situations where they encounter admired and counterstereotypic individuals who do not fit their prescribed role in society.

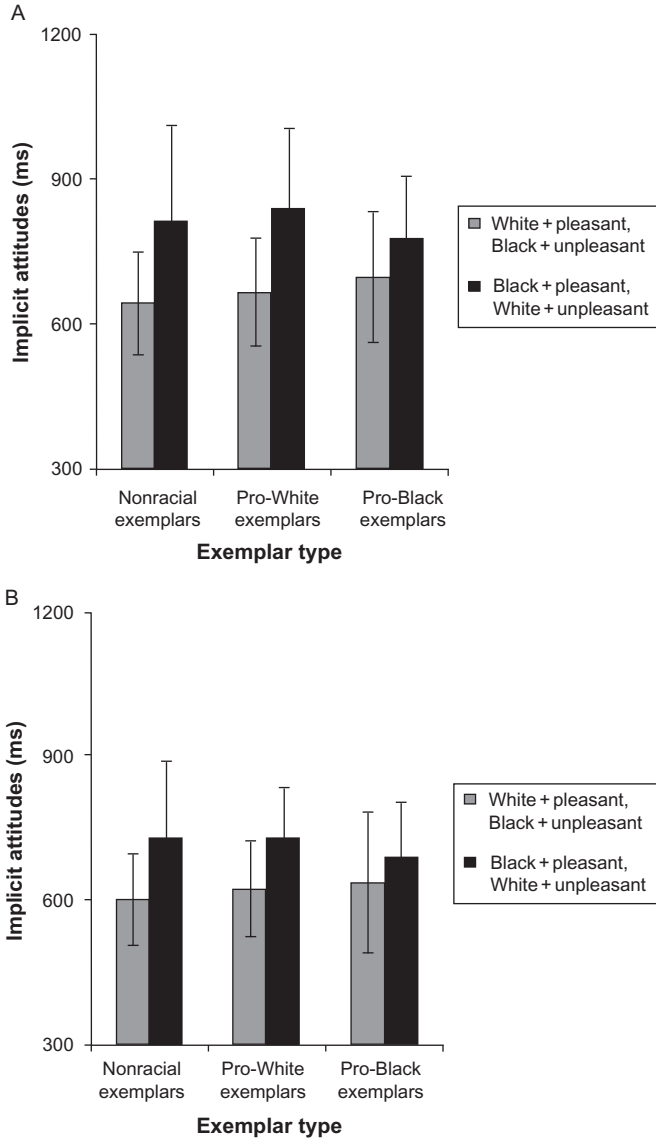
To test this hypothesis, we conducted a series of studies to determine if implicit bias against historically disadvantaged groups such as African Americans, the elderly, and gays and lesbians can be reduced by changing the local environment that people inhabit (Dasgupta & Greenwald, 2001; Dasgupta & Rivera, 2008). In our first such study, we brought people into the lab for what they thought would be a “general knowledge task” and immersed them in one of three types of media environments in the lab. Participants in one condition were shown images and brief biographies of admired and famous African Americans from various walks of life (e.g., civil rights leaders like Martin Luther King, actors like Denzel Washington, and athletes like Michael Jordan). We also showed them disliked and infamous White Americans (e.g., serial killers like Ted Bundy and Jeffrey Dahmer, and the Oklahoma City bomber, Timothy McVeigh). One might call this the *pro-Black media exposure condition*. Participants who were randomly assigned to a second condition were shown images and biographies of disliked and infamous African Americans (e.g., O.J. Simpson, Marion Barry, Louis Farrakhan) as well as admired and famous White Americans (President John F. Kennedy, actor Tom Hanks, comedian Jay Leno). One might call this the *pro-White media exposure condition*. Participants in the third control condition were shown images and descriptions of strongly positive and negative things but not people (flowers and insects). A little later, under the guise of a different and unrelated experiment, we measured people’s implicit racial attitudes unobtrusively, without asking any direct questions about their attitudes. In fact, people were typically unaware that their attitudes were being measured; they viewed the implicit measure as a hand–eye coordination task.

Implicit attitude measures are very different from the common way of measuring attitudes (e.g., surveys, interviews) in which people are asked to report how they feel about a person or group with the assumption that they are both willing and able to report their attitudes accurately. Implicit attitude measures start with the assumption that at its core an attitude toward a social group is simply a mental association between a group and a good or a bad feeling. Such mental associations vary in terms of how quickly they come to mind (i.e., how mentally accessible they are). For example, if a person holds a strong negative attitude toward a group, when he or she sees a member of that group, the negative evaluation should come to mind quickly

and automatically. By contrast, if a person holds a weak negative attitude toward a group, when he or she encounters a group member, the negative evaluation should come to mind much more slowly. In other words, the speed with which good or bad evaluations come to mind can serve as an important indirect indicator of people's attitudes toward particular groups without us having to ask them to report how they feel. Based on this logic, implicit attitudes are typically measured using rapid reaction time tasks that capture the speed with which good or bad concepts are associated with particular groups that participants see.

In our study, we used a rapid task called the Implicit Association Test (IAT) to measure people's implicit racial attitudes. This task measured the speed with which people associated African Americans and White Americans (represented by popular first names in each racial/ethnic community) with words that are strongly positive or strongly negative in meaning. Study participants sat at a computer and saw names and positive/negative words flash briefly, one at a time, on a computer screen. Their task was to categorize each name or word by pressing one of two response keys on the keyboard as instructed. We measured the speed with which people did the classification task when Black names and good words were to be classified together using the same response key and White names and bad words were to be classified together using a different response key. We compared these responses to another part of the task where response instructions were reversed: now Black names and bad words were to be classified together and White names and good words were to be classified together. If good thoughts pop into mind more quickly and easily when people think of Whites than Blacks, then they should respond faster on the IAT when White is paired with good and Black with bad than vice versa. And this is what past research has typically found for non-Black participants. The vast majority of participants in past studies showed strong implicit preference for White Americans and relative bias against African Americans on IATs and other similar tasks (Nosek, Banaji, & Greenwald, 2002a).

In our study, we investigated if the magnitude of implicit race bias against African Americans would be substantially reduced if people are first immersed in a pro-Black media environment rather than a pro-White media environment or even a control environment. We also wanted to determine if implicit bias reduction (if it occurred) would endure over time and continue to be revealed the next day if we brought people back into the lab and retested their implicit attitudes 24 hours later. Our results strongly supported our hypothesis. As illustrated in [Figure 5.1](#), study participants who had been



**Figure 5.1** (A) Implicit racial attitudes immediately after exposure to pro-Black versus pro-White media images. (B) Implicit racial attitudes 24 h after exposure to pro-Black versus pro-White media images.

immersed in a pro-Black media environment expressed significantly less implicit race bias than others who had been immersed in a pro-White media environment or a nonracial environment. Importantly, the prejudice reduction effect endured for at least 24 hours holding steady when participants' implicit attitudes were measured again the next day without reminding them of the media environment in which they had been immersed the previous day (Dasgupta & Greenwald, 2001, Study 1).

In a follow-up study, we tested the same hypothesis for a different group—the elderly. We wanted to determine if implicit ageism against the elderly could be reduced by placing people in a media environment where they saw admired and famous older people together with disliked and infamous young people (*pro-elderly media environment*) compared to the opposite (*pro-young media environment*). Similar to the previous study, we found a significant reduction in implicit bias against the elderly among people who had been immersed in a local media environment that afforded exposure to admired elderly individuals compared to others immersed in a different media environment that afforded exposure to admired young individuals (Dasgupta & Greenwald, 2001, Study 2).

## **6.2. How brief media environments and everyday local communities jointly impact implicit bias**

The research described above created local environments in the laboratory to determine their impact on implicit attitudes. Another way to examine the power of local environments is to focus on naturally existing communities and measure how often people come in contact with admired members of a stereotyped group in their local community. Does positive contact with such admired members influence people's implicit attitudes toward the group as a whole? What is the combined effect of living in diverse local environments and experiencing diverse media environments on people's implicit attitudes? And finally, how do naturally existing local environments and brief media environments influence behavioral intentions and decisions related to implicit bias?

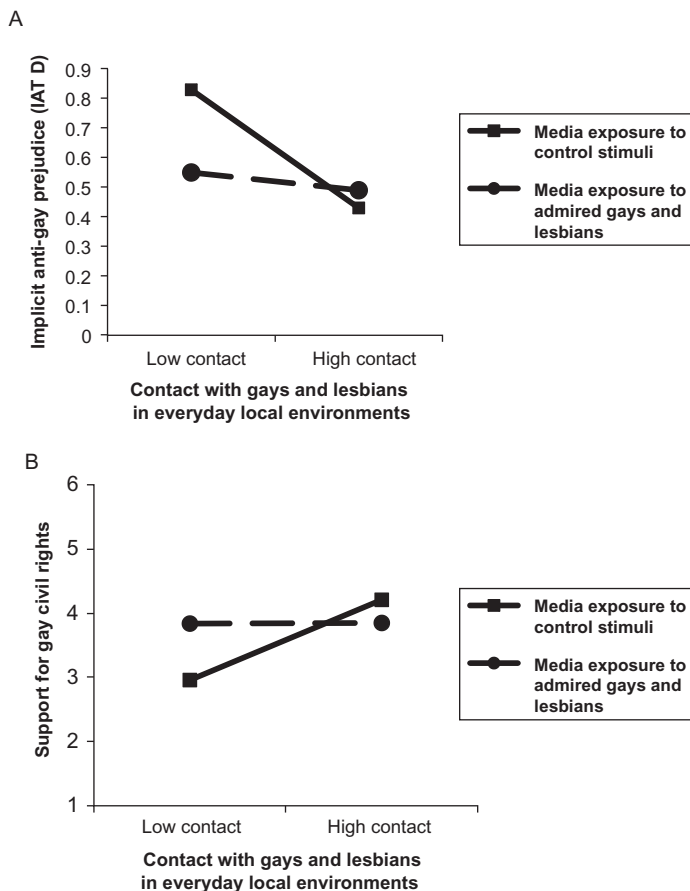
Luis Rivera and I took up these questions in a study on implicit bias against gays and lesbians (Dasgupta & Rivera, 2008). We recruited adult nonstudent community members in an urban area who varied in the degree of contact they had with gays and lesbians in their everyday local environment. Some participants were embedded in relatively diverse local environment where they had several friends, coworkers, and sometimes family members who were gay or lesbian. Other participants were embedded in a homogeneous local

environment (at least with regard to sexual orientation) where they did not know anyone who was gay or lesbian in their community. We randomly assigned these participants to one of two experimental conditions. Participants in one condition were immersed in a media environment where they saw pictures and biographies of admired and famous individuals who were gay or lesbian. These were individuals who were actors and celebrities (e.g., Rupert Everett), authors and writers (e.g., Alice Walker), athletes (e.g., Martina Navratilova), politicians (e.g., Barney Frank), and so on. This media manipulation was conceptually identical to the studies described earlier (Dasgupta & Greenwald, 2001). Participants in the other (control) condition saw positive information unrelated to gays and lesbians (pictures and descriptions of flowers). We hypothesized that participants who did not have any contact with well-liked gays and lesbians in their everyday local environment would benefit substantially from a gay-friendly media intervention, whereas other participants who had frequent positive contact with gays and lesbians in their everyday local environment would not benefit much from a gay-friendly media intervention (Dasgupta & Rivera, 2008).

Consistent with our predictions, and as shown in Figure 5.2A and B, results showed that people whose everyday environments were homogeneous—that is, who did not have any gays or lesbians in their social network—benefited *most* from exposure to gay-friendly media. Specifically, this group showed significantly less implicit prejudice against gays and lesbians and more support for gay-friendly legislation about same-sex marriage, adoption of children, and other civil rights legislation after exposure to a gay-friendly media compared to other positive (but nongay) media. In comparison, participants whose everyday local environment was diverse—who had several gays and lesbians in their social network—did not need gay-friendly media exposure. Their implicit attitudes showed low levels of implicit bias and their voting intentions were relatively gay-friendly regardless of the type of media exposure they experienced in the lab.

### 6.3. The take-away

Collectively, the research findings described above illustrate that multiple types of local environments can decrease implicit prejudice toward outgroups. These include a person's local community and social network in everyday life—their friends, well-liked classmates, coworkers, and neighbors. Local environments also include brief virtual situations people step into and out of through the books and magazines they read; the TV shows,



**Figure 5.2** (A) Implicit attitudes toward gays and lesbians after exposure to admired gay and lesbian media images and after everyday contact with gay people. (B) Support for gay civil rights legislation after exposure to admired gay and lesbian media images and after everyday contact with gay people.

movies, and online media they watch. Our data show that not only do these various local environments reduce implicit bias in one's attitudes, but they also increase people's support for public policies and legislation focused on fixing structural bias and extending equal rights to all groups.

It is worth noting that in everyday life people may land in these beneficial local environments in different ways. In some cases, people choose counter-stereotypic local environments because of their preexisting attitudes and values, but in other cases, they land in these local environments by happenstance—for example, if a family member or friend happens to come out as

gay or lesbian or if their college or workplace happens to have diverse group members who people get to know and like. Regardless of choice, being embedded in naturally existing local environments that facilitate positive contact with members of stereotyped groups create and reinforce positive implicit associations, thereby counteracting implicit bias. For others who are embedded in relatively homogeneous environments where contact with admired members of stereotyped groups is rare, brief media exposure to such admired members is invaluable effective.

The focus of the above research was on *implicit attitudes*—that is, the degree to which people *like* or *dislike* an outgroup quickly and automatically. But this is only one form of implicit bias. Implicit bias can take other forms as well that are quite different. Take, for example, the implicit assumption that individuals named Jorge Garcia and Hong-Kun Zhang cannot possibly be *really* American, while others named Greg Baker and Emily Walsh are unquestionably American. This example captures implicit bias about nationality. Who is seen as legitimately American and who is seen as a perpetual foreigner? Can implicit bias about nationality be reduced to enhance the recognition that diverse types of individuals are authentically American? These questions lie at the heart of a second line of research described below.



## **7. DO CHANGES IN LOCAL ENVIRONMENTS IMPACT PERCEIVERS' IMPLICIT BIAS ABOUT NATIONALITY?**

Not only do specific local environments change people's implicit attitudes toward outgroups, but they also shape people's implicit beliefs and assumptions about outgroup members' national identity. One strand of my research in collaboration with Kumar Yogeeswaran sheds light on this issue. We ask—who is seen as legitimately American and who is not? How malleable are these beliefs? How can implicit beliefs about nationality be rendered more inclusive? The 14th Amendment of the American Constitution defines American citizenship as follows: “All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside.” While this legal definition draws a bright line separating who is American from who is not, the psychological boundary defining nationality is fuzzier—driven by social norms, stereotypes, the context in which the question is asked, and who is answering the question.

A growing literature that predates our research suggests that Americans' perceptions of who is authentically American are often driven by who seems prototypical or representative of the country based on dimensions such as race



or religion (Devos & Banaji, 2005; Devos, Gavin, & Quintana, 2010; Devos & Ma, 2008; Dovidio, Gluszek, John, Dittmann, & Lagunes, 2010). People grant American identity more easily to Whites than to Blacks, Asians, and Latinos even if they were born and raised in the United States. Sometimes these beliefs emerge particularly starkly when measured unobtrusively with implicit tasks (Devos & Banaji, 2005; Devos et al., 2010; Devos & Ma, 2008). At other times, they also emerge in self-reports (Cheryan & Monin, 2005; Dovidio et al., 2010). The American-is-White stereotype leads to implicit misattribution of American nationality to celebrities who are clearly not American. For example, European celebrities who are White (e.g., Hugh Grant) are miscategorized as American more readily than African American celebrities are correctly categorized as American (e.g., Michael Jordan; Devos & Banaji, 2005). The miscategorization effect is stronger when perceivers' attention is focused on the famous individuals' race than on their individuality (Devos & Ma, 2008).

The stereotype that American-is-White exists despite widespread societal endorsement of multiculturalism which embraces the idea that there are multiple ways of being American without having to look the same and assimilate into the national melting pot. In our initial research, we sought to examine the behavioral consequences of this stereotype in order to determine whether the implicit stereotype that American-is-White would lead to behavioral discrimination in terms of hiring and employment. To test this hypothesis, we conducted a two-session study. In the first session, participants completed an IAT, a speeded categorization task that assessed people's implicit stereotype about who is "truly" American. During this task, participants saw quintessential American symbols (e.g., the American flag, symbol of the bald eagle, Statue of Liberty) and symbols of other countries (e.g., foreign flag, symbols, and architecture) flashed rapidly on a computer screen one at a time. Interspersed among these symbols were faces of White and Asian individuals. Participants' task was to classify these symbols and faces using two keys on the keyboard. In one part of the task, they were asked to classify White faces and American symbols using the same key (White + American) and Asian faces and foreign symbols (Asian + foreign) using the other key. In another part of the task, key assignment was switched (White + foreign, Asian + American). We unobtrusively measured how quickly and easily participants associated White faces and American symbols compared to Asian faces and American symbols. Faster responses on White + American compared to Asian + American would indicate participants' implicit assumption that quintessential American symbols are linked to Whites more than Asians. Next, after a few filler tasks, we used a survey

instrument to measure the degree to which participants thought various ethnic groups (including White Americans and Asian Americans) are patriotic and loyal to the United States, love the United States and are likely to defend America when it is criticized.

One week later, the same participants returned to a different location for what they thought was a different study on employment decisions. During this session, they were asked to evaluate job candidates for an important job in the National Security Agency (NSA) of the United States. Participants read a job description of a forensic investigator at the NSA. The position called for an individual who examines potential breaches to the nation's security by identifying and analyzing forensic evidence from criminal investigations related to national security thereby defending the country from foreign threats. Most elements of the job description were culled from actual jobs listed on the NSA's Web site. We created equally qualified resumes that ostensibly belonged to a shortlist of the top five candidates who had applied for this job. Each resume included demographic information about the candidate (gender, date of birth, place of birth, citizenship), educational background, and employment history. All resumes were matched for age, education, and prior work experience. The only difference was applicants' race which was indicated by their names: two of the candidates had Chinese sounding names (e.g., Sung Chang, Meilin Huang) and three of the candidates had European sounding names (e.g., Allen McMillan, Susan Cutting). In order to ensure that participants knew that the Asian American candidates were U.S. born, we included place of birth in the resumes and all resumes explicitly mentioned that the candidates were American citizens. Participants were asked to evaluate and rank order the candidates in terms of hireability based on their work experience and fit for the job.

As predicted, results revealed the more strongly people held the implicit stereotype that American-is-White the more they doubted Asian Americans' patriotism and loyalty to the United States, which in turn drove them to reject a qualified Asian American candidate and to hire a White candidate instead (Yogeeswaran & Dasgupta, 2010, Studies 1 and 2). A follow-up study replicated this finding and also showed that this hiring bias only occurred for jobs in national security but not for identical jobs outside of national security in the corporate world, indicating again that the bias was driven by doubts about Asian Americans' nationality and patriotism (Yogeeswaran & Dasgupta, 2010, Study 2).

We were interested in taking this work further by investigating whether the restrictive stereotype about who is American would become more malleable

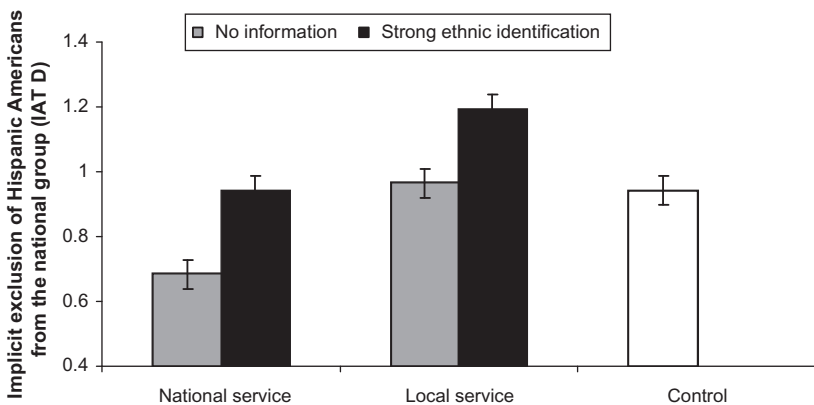
and inclusive if study participants are immersed in a local media environment where they are exposed to life stories of admired and well-known ethnic minority Americans. We tested this general idea using a media exposure procedure borrowed from our prior research. Our specific hypotheses in this line of work were informed by political science research which argues that there are two competing representations of American identity. Sometimes American identity is defined in terms of a shared ethnocultural heritage originating in Europe (we call this the *ethnocultural prototype* of who is American). At other times, American identity is defined in terms of Americans' shared commitment to civic responsibility and the public good (we call this the *civic responsibility prototype* of who is American). We hypothesized that highlighting the civic responsibility prototype would make national boundaries become more open and inclusive in one's mind because citizens of all stripes can contribute to the public good and fit this prototype. In contrast, we expected that highlighting the ethnocultural prototype should make national boundaries more restrictive in one's mind because only Americans of European descent can fit this prototype.

To test these hypotheses, we conducted a series of experiments in which research participants were placed in a media environment created in the laboratory where they read life stories of several admired well-known Americans (all Hispanic Americans). We orthogonally manipulated whether these life stories emphasized target individuals' civic responsibility or their ethnocultural heritage (Yogeeswaran, Dasgupta, & Gomez, 2012). For civic responsibility, we manipulated whether target individuals' professional work was framed as serving the national good or serving the local community. This manipulation allowed us to test whether national inclusion of ethnic minorities depends on any public service that exemplifies civic responsibility or whether ethnic minorities have to engage in work that specifically benefits the nation in order to overcome doubts about their patriotism. For example, in the "national service" condition, participants read about Luis Alvarez, a pioneering physicist who is Hispanic American, whose research was described as "helping in the creation of more energy efficient technologies that will reduce America's dependence on foreign oil." In the "local service" condition, participants read about the same physicist whose research was described as "helping in the creation of more energy efficient technologies that will generate grants for the university."

For ethnocultural identity, we manipulated whether individuals in the biographies were described as strongly identified with their ethnic group or no mention was made about ethnic identity. For example, in the strong ethnic identification condition, participants read about the same Hispanic

American physicist, Luis Alvarez, described earlier with the following sentences inserted in his biography: “Some of his fondest childhood memories come from dinner conversations with his parents and siblings in Spanish. As a child, his parents always encouraged him to speak Spanish as a way of preserving his Hispanic heritage.” In the other condition where no ethnic identification information was provided, the above-mentioned language was modified as follows: “Some of his fondest childhood memories come from dinner conversations with his parents and siblings. As a child, his parents always encouraged him to grow his vocabulary and communicate effectively.” In a final control condition, participants did not read about ethnic minorities. Thus, this study used a 2 (ethnocultural prototype)  $\times$  2 (civic responsibility prototype) + 1 (control) factorial design. We then measured whether exposure to these four types of media environments influenced the degree to which participants implicitly viewed ethnic minorities as American using the same IAT described earlier.

As shown in [Figure 5.3](#), results showed that emphasizing Hispanic American individuals’ national service (rather than their local service) made their entire ethnic group be seen as less foreign and more American because such portrayals highlighted their fit with the civic responsibility prototype. However, emphasizing Hispanic American individuals’ ethnic identity (vs. making no mention of it) made them appear more foreign and less American because such portrayals highlighted their deviance from the ethnocultural prototype of European American heritage. In a subsequent study, we identified the underlying psychological process responsible for these effects. We



**Figure 5.3** Implicit exclusion of Hispanics from being seen as American after media exposure to different types of Hispanic individuals.

found that highlighting minorities' ethnic identity increased concern that American distinctiveness was being threatened and diluted by "foreign influences," which in turn increased the American-is-White bias. In contrast, highlighting minorities' civic contribution to the nation increased pride in American distinctiveness, which in turn decreased the American-is-White bias.

### **7.1. Public versus private expressions of ethnic identity have different effects on national inclusion**

Not all ethnic identity expressions are the same. Extending the above-mentioned research, we proposed that perceivers draw a bright psychological line separating public expressions of ethnic identity from private expressions (Yogeeswaran, Adelman, Parker, & Dasgupta, 2012; Yogeeswaran, Dasgupta, Adelman, Eccleston, & Parker, 2011). We proposed that strong ethnic identity is likely to be accepted when it is practiced in the privacy of one's home but rejected when it is practiced in public life because public expressions openly violate the national prototype of what it means to be American (see Branscombe, Ellemers, Spears, & Doosje, 1999; Marques & Paez, 1994). Consider, for example, situations in which ethnic groups maintain and express their group identity through languages other than English. People may speak their ethnic language with fellow co-ethnics only in the privacy of their home or they may also speak their language in public spheres such as in restaurants, stores, and on the street. We propose that when perceivers learn that ethnic minorities speak a language other than English in public spaces they are more likely to see this group as un-American than when they learn that ethnic minorities speak their language at home. Whereas the former situation challenges mainstream norms and practices and evokes distinctiveness threat, the latter does not.

We also investigated if White and non-White ethnic groups are held to the same standard such that private ethnic identity expression is okay but public expression is not. Given accumulating research showing that the prototypical "true" American is automatically imagined to be White rather than of any other race, we expected that White ethnic groups may be implicitly regarded as American no matter how they express ethnic identity—publicly or privately; but non-White ethnic groups may be implicitly regarded as American *only* if they limit ethnic identity expressions to the home.

Two experiments were conducted to test the above predictions (Yogeeswaran et al., 2011). Participants were immersed in a local environment in the lab where they read life stories of some Americans who were

either members of ethnic minorities (e.g., Native American, Chinese American) or members of White ethnic groups (Polish American). All target individuals were portrayed as equally ethnically identified; however, we manipulated whether these individuals expressed their ethnic identity in private only or in both public and private. Ethnic identity expression was operationalized by individuals' use of their ethnic language. For example, in the public identification condition participants read about a Native American individual who spoke his native language with family and friends in both private and public spheres (e.g., "To this day, Thomas continues speaking Lakota Sioux both at home and in public with his family and friends."). In the private ethnic identification condition, the same individual was described as speaking his native language in private spheres *only* (e.g., "Although Thomas continues speaking in Lakota Sioux at home with his family, he only speaks English when he is out in public."). Likewise other participants read about a Polish American individual who spoke Polish with family and friends in private only (in one condition) or spoke Polish with friends and family in private and public (in the second condition).

Then later, under the guise of a "separate and unrelated study," we measured the effect of this media exposure on participants' implicit and explicit construal of the entire ethnic group as legitimately American. Results indicated that at an explicit level, White and non-White ethnic groups were held to the same standard and construed as significantly less American when members expressed their ethnic identity publicly rather than privately. However, at an implicit level, a double standard emerged: non-White ethnic groups were implicitly rejected as less American if members expressed ethnic identity publicly rather than privately, while White ethnics were implicitly accepted as legitimate Americans no matter how they expressed ethnic identity—publicly or privately.

## 7.2. The take-away

Collectively, this program of research highlights that local media environments influence the degree to which ethnic minorities are implicitly included as legitimately American. When local media environments define the American people as individuals who work for the public good and provide examples of ethnic minority individuals who fit this prototype, such media enhances the implicit perception that ethnic minorities as a group are genuinely American. However, when local media environments define the American people as individuals who share a common history rooted in

Europe, ethnic minority individuals are hard pressed to fit this prototype especially if they feel identified with their ethnic group. This type of media environment exacerbates the implicit perception that ethnic minorities are perpetual foreigners in America.

Another important take-home message from this research is the cost of ethnic identity expression for minority groups. Specifically, if White Americans encounter ethnic minority individuals in their local environment who express their ethnic identity publicly, such exposure makes perceivers implicitly view ethnic groups as quite foreign. However, if they encounter ethnic minority individuals who keep their ethnic identity private and separate, such exposure leads to more national inclusion.

Thus, the stereotype that the prototypical American-is-White is not a fixed immutable belief, but rather one that changes depending on the type of local environment in which perceivers are embedded and whether or not they see ethnic minority individuals who fit American norms and prototypes. For ethnic minorities, the dilemma is between freely expressing their ethnic identity and potentially being seen as a perpetual foreigner versus limiting their ethnic identity to the private domain and being accepted as American.

The two programs of research described thus far shine a spotlight on perceivers' implicit attitudes and beliefs toward *outgroups*—groups to which they do not belong—with the goal of illustrating that even strongly biased attitudes and beliefs can be attenuated by changing local environments. We now shift focus to people's implicit attitudes and beliefs about their *ingroup*—groups to which they belong—and the impact of those ingroup beliefs on their self-concept.



## **8. DO CHANGES IN LOCAL ENVIRONMENTS INFLUENCE IMPLICIT STEREOTYPES ABOUT ONE'S INGROUP?**

If immersion in counterstereotypic local environments reduces implicit bias against outgroups, will a similar benefit occur for ingroups? This question is important because implicit bias can operate like an “equal opportunity virus” that infects people's unconscious assumptions about their ingroup's abilities and competencies, as well as the outgroup's abilities. Take for example, the gender stereotype that women are less suited for professional leadership roles than men and more suited for caretaking roles than men. This stereotype is shared by women as well as men (Diekman & Eagly, 2008; Eagly & Carli, 2007; Eagly & Karau, 2002; Rudman & Kilianski, 2000; Swim & Hyers, 2008) and has been documented using implicit and explicit

belief measures (Dasgupta & Asgari, 2004; Rudman & Glick, 2001; Rudman & Kilianski, 2000). Using the gender-leadership stereotype as the starting point, Shaki Asgari and I sought to determine whether women's implicit beliefs about their group's leadership ability would become less stereotypic if they were embedded in local environments where they encountered professional women in leadership roles (Dasgupta & Asgari, 2004).

Using a multimethod approach, we tested our hypothesis in a pair of studies: one was a controlled lab experiment and the second was a field study that took advantage of natural variations in local environments. In the lab experiment, we randomly assigned female participants to a lab environment where they saw pictures and biographies about famous women who are leaders in their profession such as Ruth Bader Ginsberg (U.S. Supreme Court justice), Madeline Albright (former Secretary of State), Toni Morrison (winner of the Nobel Prize for literature), and Eileen Collins (first American woman to pilot a spacecraft). Other female participants were randomly assigned to the control condition where they read about non-gendered information. Subsequently, we measured all participants' implicit beliefs about gender and leadership using an IAT that assessed how quickly and easily they associated leadership attributes (e.g., ambitious, dynamic, leader) and supportive attributes (e.g., helpful, compassionate, supporter) with female names compared to male names. If people show implicit stereotypes about gender and leadership, we expected they would be much faster at associating male names with leadership attributes and female names with supportive attributes than vice versa.

In the second study, we recruited young women who had recently entered a naturally existing environment where they were more likely to see women in leadership roles (a women's college) or less likely to see women in such roles (a coeducational college). These two colleges were of similar quality and located in the same town. Using a longitudinal research design, we tracked female students from these two types of colleges from the beginning to end of their first year on campus. At the beginning of their first year in college, we assessed participants' implicit beliefs about gender and leadership using the same IAT described in the previous study. We also measured participants' experiences on campus (e.g., what classes they were taking, the gender of their professors, who they viewed as role models on campus, etc.). One year later, at the beginning of their sophomore year, we recontacted the same participants and administered the same measures again. Our goal was to use converging methods to test whether naturally existing local environments that provide exposure to women leaders (type



of college campus) and experimentally created local environments that do the same (media exposure in the lab) would both enhance young women's implicit beliefs about women's leadership.

As predicted, results from both lab and field studies revealed that when female students were immersed in local environments where they saw many women in professional leadership roles they were significantly less likely to implicitly assume that men make better leaders than women than female students in comparison environments. The field study further demonstrated that at entry into college female students at both institutions had similar gender stereotypic beliefs; but by the end of their first year their implicit beliefs had diverged substantially as a function of their college campus or local environment. Students at the women's college exhibited no implicit gender stereotypes at all at the end of their first year (i.e., they associated leadership roles equally with women and men), whereas their peers at the coed college exhibited very strong gender stereotypes (i.e., they associated leadership roles with men and supporter roles with women). Importantly, the frequency with which students met professional women on campus (particularly female faculty) mediated the beneficial effect of the women's college. Students who had more female faculty as course instructors during their first year showed less implicit gender stereotyping than others who had fewer female faculty as instructors in the same year. Because the women's college had more female faculty than the coed college, students at the women's college showed reduced implicit gender stereotypes over time compared to their peers at the coed college. Together, these studies reveal the power of local environments in shaping women's implicit beliefs about their ingroup's professional leadership abilities.



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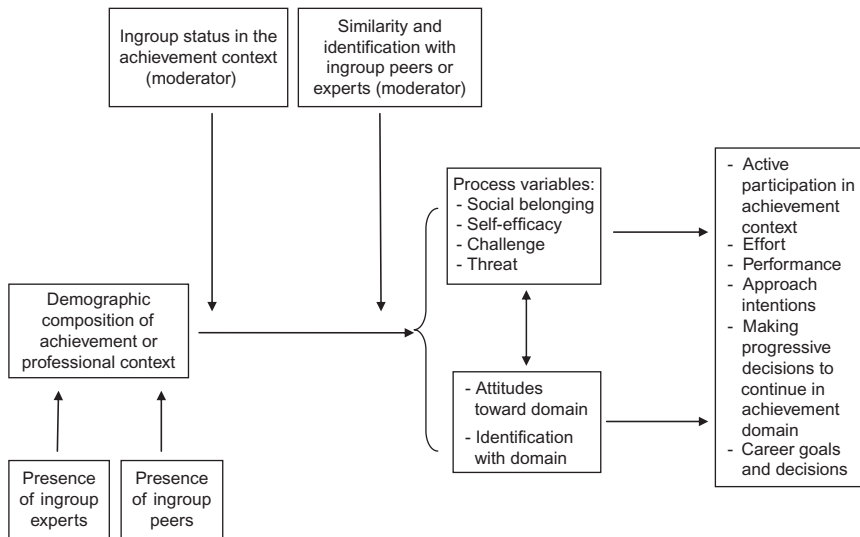
## **9. DO CHANGES IN LOCAL ENVIRONMENTS HAVE SIMILAR EFFECTS ON INDIVIDUALS' IMPLICIT SELF-CONCEPT?**

Not only do ingroup stereotypes limit what people think their group can accomplish, but they also constrain individuals' perceptions of their own skills and competencies thereby limiting their academic and professional trajectories. People tend to gravitate toward achievement domains that feel comfortable because they conform to ingroup stereotypes and they gravitate away from other domains that feel uncomfortable because they deviate too far from ingroup stereotypes. Consider the case of girls and women in science,

technology, engineering, and mathematics (STEM). Research shows even girls and women who perform well in STEM often feel less confident about their ability than their male peers, express less positivity toward STEM majors and careers, and are less likely to pursue these majors and careers than their male peers (Ceci, Williams, & Barnett, 2009; Ceci & Williams, 2011; Eccles, Wigfield, Harold, & Blumenfeld, 1993; Else-Quest, Hyde, & Linn, 2010; Mendez, Mihalas, & Hardesty, 2006; Park, Lubinski, & Benbow, 2007; Robertson, Smeets, Lubinski, & Benbow, 2010; Stout, Dasgupta, Hunsinger, & McManus, 2011). These studies and others suggest that cultural stereotypes alleging that women are less skilled in STEM compared to men implicitly shape girls' and women's self-concept, making them doubt their ability in science and engineering and avoid majors and careers in STEM (Dasgupta, 2011; Nosek, Banaji, & Greenwald, 2002b; Nosek et al., 2009; Stout et al., 2011). How might one inoculate women against these stereotypes so that more women who are talented in math and science consider themselves as potential scientists and engineers in the future?

Just as small changes in local environments affect women's implicit beliefs about their ingroup's ability, similarly small changes in local environments ought to bolster women's implicit beliefs about their own ability in traditionally masculine fields and professions in STEM. Put differently, who women aspire to become is likely to be heavily influenced by individuals they see in successful roles and professions and the degree to which they relate to those individuals, assuming of course a basic foundation of skills in a given achievement domain (Asgari, Dasgupta, & Gilbert Cote, 2010; Asgari, Dasgupta, & Stout, 2012; Dasgupta & Asgari, 2004; Lockwood & Kunda, 1997, 1999). To describe how local environments influence self-concept change, I developed a new theoretical model—the Stereotype Inoculation Model. In this model, shown in Figure 5.4, I proposed that analogous to biomedical vaccines that protect and inoculate individuals' body against viruses and bacteria, so too ingroup experts and peers in high achievement environments serve as *social vaccines* that protect and inoculate individuals' mind and sense of self against pernicious stereotypes (Dasgupta, 2011; Stout et al., 2011).

Four broad predictions emerge from the Stereotype Inoculation Model. First, as shown in Figure 5.4, I predict that contact with successful ingroup experts and peers in high stakes achievement environments will inoculate individuals against self-doubt, especially in early years of academic and professional development and other transitional periods when their self-efficacy is in flux. Such contact will enhance beginners' positive attitudes toward the



**Figure 5.4** Stereotype Inoculation Model.

achievement domain, strengthen their identification with it, enhance self-efficacy, and increase motivation to pursue career goals in the domain.

Second, I hypothesize that contact with ingroup experts and peers will be especially important for individuals whose ingroup is a numeric minority and who are negatively stereotyped in an achievement domain (as is the case for girls and women in science and engineering). Contact with ingroup experts and peers will be relatively less important for others whose ingroup is the majority and expected to succeed by default (as is the case for boys and men in the same fields). For members of a negatively stereotyped group, seeing successful ingroup experts undercuts the negative stereotype and thus enhances their own self-efficacy and motivation to succeed (Blanton, Crocker, & Miller, 2000; Brewer & Weber, 1994).

Third, I expect that exposure to ingroup experts will be most beneficial if individuals feel a subjective sense of connection or identification with those experts because subjective identification makes the path from one's present self as a novice to a future "possible self" as an expert seem more attainable given that one can imagine following the career trajectory of the ingroup member (see Markus & Kunda, 1986; Markus & Nurius, 1986; Markus & Wurf, 1987).

Fourth, I predict that the impact of stereotypes on individuals' self-concept in high achievement domains will be subtle and often unconscious. Individuals themselves may be unaware that the experts and peers they encounter had any effect on their personal academic and professional

interests and choices. Yet, the imprint of others ought to be evident in individuals' *implicit* self-conception—making them gravitate toward achievement domains where ingroup members are visible and away from domains where ingroup members are scarce. While individuals' implicit self-concept is often sensitive to people in their local environment, their explicit self-concept may remain relatively stable in the short term. This prediction is informed by theories and research in implicit social cognition, which show people are sometimes unable or unwilling to explicitly report their attitudes accurately because of incomplete awareness of how social contexts affect personal decisions and/or social desirability concerns (Dasgupta, 2004, 2009; Ferguson & Bargh, 2007; Greenwald & Banaji, 1995; Greenwald et al., 2002; Nisbett & Wilson, 1977; Nosek & Hansen, 2008; Petty et al., 2008; Wilson et al., 2000). Applied to the Stereotype Inoculation Model, I expect that contact with ingroup experts and peers will produce small changes in implicit self-conceptions that, initially, may be too subtle to be consciously noticed or reported (Greenwald & Banaji, 1995; Greenwald et al., 2002). Indeed, classic studies on the self-concept show that individuals spontaneously adjust and calibrate their working self-concept to fit with their social context and this is observed when measured indirectly, but not when measured directly by asking individuals to report their self-beliefs (Markus & Kunda, 1986; Markus & Nurius, 1986). At an implicit level, some self-traits become mentally accessible or valued by individuals more than other traits in particular situations, even though the global content of their explicit self-concept remain unchanged across situations.

Finally, I propose that four interrelated processes are likely to serve as underlying psychological mechanisms responsible for the inoculation process when individuals encounter ingroup experts and peers in high achievement environments: (1) a stronger and more stable sense of belonging in the environment, (2) increased self-efficacy, (3) feeling challenged by difficulty, and (4) less threatened. Thus far, my graduate student collaborators and I have conducted several lab experiments and longitudinal studies test different pieces of this model.

### **9.1. Local environments implicitly influence women's academic self-concept**

In one longitudinal study, we recruited students (both female and male) from a multiple sections of a college calculus class that is a prerequisite for all STEM majors on campus (Stout et al., 2011, Study 3). As a prerequisite or “gateway” course, this is a well-known site of student attrition from

STEM majors. Some of the calculus sections were taught by female professors while others were taught by male professors. Students were tracked from the beginning of the semester (September) to the end (December). At two time points in September and December, we measured students' implicit and explicit attitudes toward mathematics relative to humanities, identification with math relative to humanities, confidence in their math ability as assessed by their expected performance in calculus class, and the degree to which they identified with their math professor. Implicit attitudes were measured with an IAT that captured the relative speed with which participants associated words about math (equation, theorem, computation) versus humanities (poetry, Shakespeare, essay) with strongly positive and negative words (happy, warm, sad, death). Implicit identification with math was also measured with an IAT that captured the relative speed with which participants associated words about math versus humanities with first person pronouns (I, me, myself) compared to third person pronouns (they, them, theirs). As a performance measure, we obtained students' permission to get their calculus course grade from the registrar's office. Finally, to supplement our quantitative findings with qualitative data, we conducted classroom observations to capture student–faculty interactions at the beginning and end of the semester.

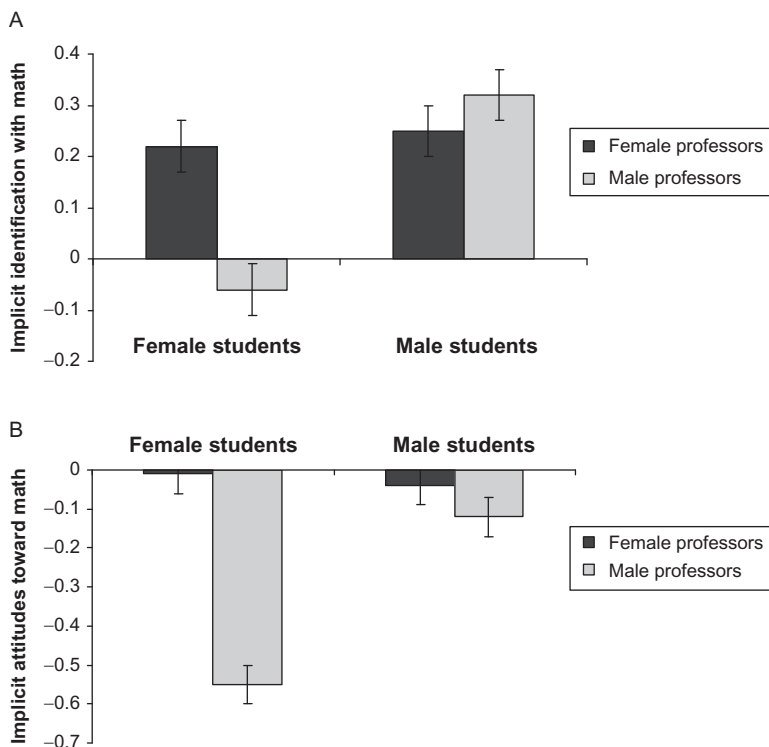
Although this was a quasi-experimental study, several important strengths of this study bring it very close to a controlled laboratory experiment. First, students preregistered for specific sections of this calculus class before the semester began—before professors had been assigned to each section. Thus, students could not have self-selected into specific sections based on prior knowledge of course professors including their gender. Second, thanks to unparalleled assistance from the Mathematics Department male and female professors who taught the sections from which we recruited our sample were matched in terms of their teaching skills, stage of career, and fluency in English. Third, professors teaching these sections were yoked to same-sex teaching assistants (TAs) to ensure that in the context of this class participants came into contact exclusively with female experts in mathematics (i.e., a lecture taught by a female professor and a discussion section led by a female TA) or male experts in mathematics (i.e., a lecture taught by a male professor and a discussion section led by a male TA). All instructors and TAs were blind to the real purpose of this study. Fourth, all course sections had identical syllabi and exams; thus, students learned the same material and were tested in the same way regardless of who their professors were. Finally, professors and TAs graded blind to students' identity and grading was shared across sections so that

instructors did not necessarily grade their own students' exams. Thus, professors' evaluation of students' exams and their final grade could not have been biased by their preexisting expectations of any student.

The longitudinal design allowed us to assess whether the predicted benefit of contact with same-sex experts for female students takes effect immediately and remains stable across the semester or if it grows stronger over time. It also allowed us to test whether the benefit of same-sex experts endures after students leave class and move to other environments where the experts are not physically present. If the positive effect of contact is confined to the classroom where such experts are physically present, then testing students outside the calculus class in other situations should wipe out the benefit.

Consistent with predictions from the Stereotype Inoculation Model, we found that for female students, contact with female (compared to male) professors enhanced implicit positive attitudes toward math, increased implicit identification with the field, and bolstered their self-efficacy in math (see [Figures 5.5A](#) and [B](#) and [5.6A](#)). For male students, professor gender had no effect on their attitudes, identification, and self-efficacy in math. Interestingly, even though women's self-efficacy fluctuated as a function of who their professor was, in terms of their final grade in calculus women outperformed their male peers on average across all sections of calculus regardless of the professor's gender (see [Figure 5.6B](#)). Despite their superior performance, women's attitudes toward math, confidence in their ability, and identification with the field were substantially lower than that of their male peers when they were in sections taught by male professors. In contrast, in sections taught by female professors, their attitudes toward math, identification with the field, and confidence bounced up to the same level as their male peers. Put differently, strong performance in mathematics was not enough to protect women's academic self-concept in math when they were immersed in a class environment that was stereotypically masculine. Contact with female experts (the professor and TA) was necessary to inoculate and strengthen their self-concept in mathematics. We also found the more women identified with female math professors at the beginning of the academic semester, the higher their self-efficacy in math at the end of the semester. But women's identification with male math professors had no effect on their self-efficacy.

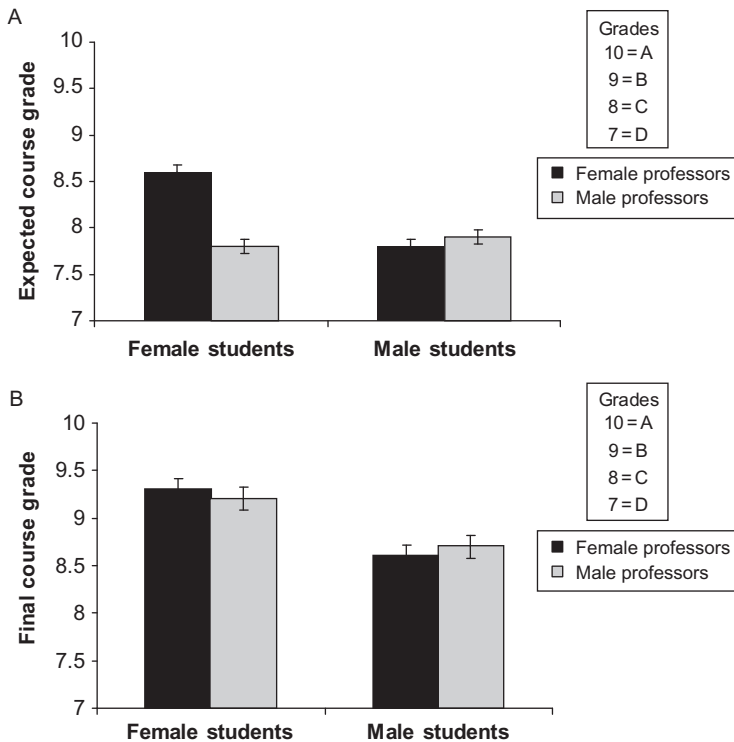
To supplement and enrich the quantitative measurement of students' attitudes and self-concept, we also collected qualitative data on classroom dynamics by conducting in-class observations. Research assistants observed students' behavior in class and coded interactions with their professor once at the beginning and once at the end of the semester. They coded the number of times



**Figure 5.5** (A) Students' implicit identification with mathematics after exposure to a female or male mathematics professor in class. (B) Students' implicit attitudes toward mathematics after exposure to a female or male mathematics professor in class.

students asked questions in class, answered professors' questions in class, and sought help from professors after class. From this, we calculated the percentage of female and male students who engaged in each behavior. These descriptive data revealed that female students became more responsive over time toward their female professors in terms of speaking up in class (this behavior did not change when professors were male). At the same time, they became more avoidant with their male professors over time in that they stopped seeking his help after class (this behavior did not change for female professors). Together, these results suggest that female experts may produce an approach-oriented response in terms of women's motivation to stay in STEM, while at the same time male experts may produce an avoidance-oriented response.

To complement this longitudinal field study, we conducted two other controlled lab experiments which replicated and extended the same pattern of results described above. In one such study, female students majoring in



**Figure 5.6** (A) Students' expected course grade in mathematics after exposure to a female or male mathematics professor in class. (B) Students' actual course grade in mathematics after exposure to a female or male mathematics professor in class.

STEM disciplines participated in a study on math ability where they were randomly assigned to come to a lab environment where they interacted with a senior math student who was either female or male. After a brief interaction, we measured participants' implicit attitudes toward math, their implicit identification with the field, their performance, and effort on a difficult math test. Results showed that after an interaction with the female math student, female participants showed more implicit positive attitudes toward math, more implicit identification with math, and more effort on the math test compared to other participants who had interacted with a male student majoring in math (Stout et al., 2011, Study 1).

In another study, female engineering students were randomly assigned to a lab-based media environment where they saw pictures and professional biographies of female engineers, male engineers, or they read about engineering innovations without any mention of the engineer's gender. We then



measured participants' implicit attitudes toward engineering, subjective identification with the engineers they had read about, self-efficacy, and career aspirations in engineering (Stout et al., 2011, Study 2). Replicating the previous studies, we found that immersion in a media environment that provided exposure to successful female engineers increased young women's implicit positive attitudes toward engineering compared to the other two conditions. Further, the more women identified with female engineers whose biographies they had read the stronger their own self-efficacy in engineering and implicit identification with the field, both of which mediated and predicted more career aspirations in engineering. Identification with male engineers did not predict women's self-efficacy, identification with engineering as a field, or career intentions.

## 9.2. The take-away

A consistent theme across all these studies is that small modifications in local classroom environments changed the way women implicitly conceived their academic self. Seeing same-sex experts in academic environments enhanced women's implicit attitudes and identification with math and engineering, even though their explicit attitudes and beliefs remained unchanged. Importantly, in talking to participants at the end of the study, it was eminently clear that these women were unaware that the people they came in contact with in class or read about in the lab had any effect on their own academic self-concept and career goals. Like most people, participants described their academic interests as driven mostly by their intrinsic interest and motivation. They were unaware of the profound effects their local environments were having on their intellectual self-concept and career trajectories.

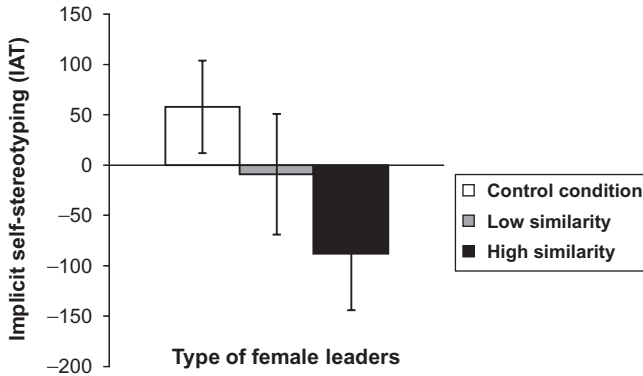
## 9.3. Same-sex experts in local environments are most effective if framed as similar to the self

While contact with same-sex experts in local environments produces subtle changes in young women's self-concept, our empirical work and theoretical model suggest this is more likely if individuals see themselves as similar to those same-sex experts. Similarity between the self and other makes the path from one's current self as a novice to a future self as a professional leader seem more attainable because one can imagine following the same trajectory as this expert. Instead of being portrayed as similar to the self, if female experts are portrayed as "superstars" who are unique and exceptional, they have little impact on young women's views of themselves (see also Lockwood &

Kunda, 1997, 1999). Some evidence for this prediction comes from studies on women in STEM described earlier where we found that young women who identified more strongly with female experts in math and engineering reported greater self-efficacy and more ambitious career aspirations in math and engineering (Stout et al., 2011, Studies 2 and 3).

Additional evidence comes from our studies on women's self-views as professional leaders. For example, in a longitudinal field study I conducted with Shaki Asgari and Nicole Gilbert Cote, we tracked young women across 1 year in college (Asgari et al., 2010). At the beginning of their first year and again in their sophomore year, we measured women's implicit beliefs about their own leadership ability relative to their male peers using an IAT that assessed how quickly and easily they associated agentic qualities (ambitious, go-getter) versus communal qualities (helpful, nurturing) with the self relative to others. We also recorded the classes participants were taking, the gender of their professors, the quality of their relationship with those professors, class participation as an instance of intellectually assertive behavior, and their career goals. We computed how frequently each participant had come in contact with female faculty members and academic leaders and how much they subjectively identified with those individuals. Results showed that frequent contact with female faculty produced more implicit attribution of leadership qualities to oneself and more ambitious career aspirations—but only when participants subjectively identified with those female faculty. Interestingly, frequent contact with female faculty did not have any effect on young women's self-concept when they did not identify with such female faculty. These findings suggest that changing implicit self-beliefs requires both frequent exposure to counterstereotypic ingroup members and feelings of connection with those individuals (Asgari et al., 2010).

In a subsequent series of lab experiments, we sought to provide a clearer causal test of the prediction that similarity with successful female experts in a local environment causes women's implicit self-beliefs to shift in the direction of leadership. So we manipulated similarity between female students' self-concept and the life stories of successful professional women (Asgari et al., 2012). In one such study, we brought young women into the lab and randomly assigned them to experience one of three media environments (Asgari et al., 2012, Study 3). All media environments involved pictures and biographies of successful women who are leaders in business, law, politics, science, and medicine. The difference between conditions lay in the instructions participants were given prior to media exposure. In one condition, participants were led to believe that these professional women had graduated



**Figure 5.7** Women's implicit beliefs about their own leadership ability after exposure to successful female leaders portrayed as similar to oneself or different from oneself.

from their own undergraduate institution (*high similarity condition*). In a second condition, they were led to believe that the same women had graduated from a very different type of institution (*low similarity condition*). In the third control condition, participants were given no information about these successful women's college affiliation. After media exposure, in all cases we measured how much participants identified with these successful professional women. Then, under the guise of a separate experiment, we measured participants' implicit and explicit self-beliefs and their career goals and aspirations.

As illustrated in [Figure 5.7](#), results showed that young women who were exposed to successful female leaders framed as similar to the self by virtue of their college affiliation implicitly viewed themselves *least* stereotypically feminine, and instead as having more leadership potential than participants in the control condition. The third group of participants who were exposed to the same successful female leaders but were told that these leaders were very different from the self by virtue of the colleges they had attended, did not show any change in their implicit self-beliefs compared to the control condition. In other words, successful women leaders only inspired female students' own leadership self-concept if similarity between them was made salient. Finally, in the case of career aspirations, exposure to successful female leaders framed as very different from oneself had a negative effect on young women. Participants reported significantly *lower* career aspirations after reading about successful women leaders framed as very different from the self compared to participants in the other two conditions. Thus, highly successful ingroup members framed as *dissimilar* from the self *deflate* women's career aspirations.

Two other studies provided converging evidence by manipulating similarity in other ways. In one study, high similarity was manipulated by describing women leaders' success as starting small, growing over time, and as something that is attainable for all women through hard work and persistence. In contrast, low similarity was manipulated by describing the same women leaders' success as driven by their exceptional ability that emerged early in life and is unattainable for most people. In the control condition participants did not see any biographies (Asgari et al., 2012, Study 1). In yet another study, participants were led to believe that their personality was very similar to that of successful women they had read about, or that their personality was very different, or no personality information was provided (Asgari et al., 2012, Study 2). After each of these manipulations, in both studies we measured participants' implicit beliefs about their own leadership ability. Results consistently revealed that young women's implicit leadership self-concept was enhanced if they had been immersed in a local environment where they saw successful women framed as similar to the self. However, when the same women were framed as different from the self, they either had no effect on participants' implicit self-beliefs or sometimes backfired—deflating participants' implicit self-beliefs about leadership (see also Parks-Stamm, Heilman, & Hearn, 2008; Rudman & Phelan, 2010).

#### 9.4. The take-away

A consistent theme across all these studies is that encountering successful ingroup members in local environments inspires young people's self-concept only if similarity between those successful others and oneself is made salient. Successful ingroup members who are described as exceptional superstars often have no effect on ordinary individuals' implicit self-concept. In fact, sometimes their presence can have negative effects, deflating young people's implicit beliefs about what is personally attainable for oneself. The best social vaccines are admired ingroup members who share some important similarities with the self so that their success and visibility in a stereotypic domain makes one's own success seem plausible. Another important theme running through these studies is the finding that exposure to successful ingroup members can change individuals' implicit self-conceptions even though their explicit self-descriptions might not reveal any change.

The various programs of research I have described thus far illustrate the various ways in which passive observations of people and media in one's local environment influence individuals' implicit attitudes and beliefs. However,

local environments can also exert an influence in a more active way—by arousing emotions and motivations in the individual. Strong negative emotions aroused in one local environment can linger in the mind and taint individuals' implicit attitudes in a different environment. This is another example of implicit attitude malleability that I examined in my research.

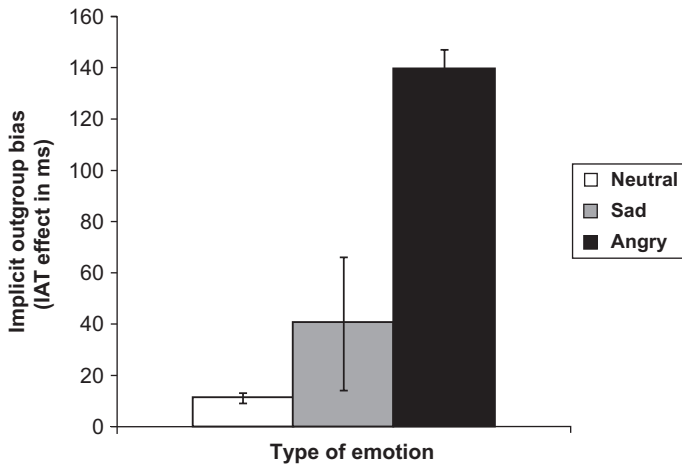


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## **10. DO SPECIFIC EMOTIONS AROUSED IN ONE SITUATION SPILL OVER INTO ANOTHER TO BIAS IMPLICIT ATTITUDES TOWARD OUTGROUPS? WHAT EMOTIONS AND WHAT GROUPS?**

In the final program of research in collaboration with David DeSteno, we are pursuing the topic of implicit bias malleability from a different angle—by examining how emotions and motivations activated by one local environment carries over into another, and biases perceivers' implicit attitudes and behavior toward outgroups. This project creates a synergy between implicit social cognition research and emotion research. Emotion theories argue that emotions allow individuals to adapt to obstacles and challenges in the environment (Damasio, 1994; Frijda, 1986; Keltner & Gross, 1999; LeDoux, 1996). These challenges include social interactions between groups. Because membership in social groups, and the benefits and conflicts inherent in those affiliations, play a central role in human life, we expect that appraisals of social groups will be informed by emotions via both automatic (implicit) and controlled (explicit) mental processes. Moreover, emotions that are functionally related to conflictual intergroup relations (e.g., anger, disgust, fear) are more likely to magnify implicit bias than other emotions that are unrelated to intergroup relations (e.g., sadness).

In an early series of experiments, we induced participants to feel angry, disgusted, sad, or neutral by recalling past events that had happened in their life. In a subsequent unrelated situation, we created minimal groups in the lab by giving participants a fake “personality test” and assigning them to one of two personality types allegedly based on their test results. We showed them photographs of people who apparently shared their personality type (the ingroup) and others who had a different personality type (the outgroup). We then measured participants' implicit attitudes toward these fictitious groups using an IAT that measured how quickly they were able to associate good versus bad words with pictures of ingroup and outgroup members. We found that participants who had previously recalled a past event in their life that had made them feel angry or disgusted expressed more implicit bias



**Figure 5.8** Implicit attitudes toward a fictitious outgroup after experiencing anger, sadness, or a neutral emotion.

against this unknown outgroup than others who had previously recalled a past event that had made them feel calm or neutral (see Figure 5.8). In other words, negative emotions carried over from one local environment to another without people's awareness and tainted their evaluations of these previously unknown group (Dasgupta, DeSteno, Williams, & Hunsinger, 2009; DeSteno, Dasgupta, Bartlett, & Cajdric, 2004). Interestingly, sadness had no effect on implicit outgroup attitudes and functioned much like a neutral state. The message here is that all negative emotions do not have the same carry-over effect. Negative emotions associated with intergroup conflict and competition (anger and disgust) carry over and get unconsciously applied to implicit evaluations of outgroups but other negative emotions that are not intergroup in nature (sadness) do not carry over in the same way.

Even though anger and disgust had similar biasing effects on attitudes toward unknown groups, they have very different effects on attitudes toward *known* groups about which people have preexisting knowledge. In a pair of studies, we put people in a mindset where they recalled a past event from a particular environment that had made them feel very angry, or very disgusted, or neutral. Participants had been randomly assigned to one of these three emotion recollection conditions. Subsequently, under the guise of an alleged "unrelated study," we assessed their implicit attitudes toward two known groups in another situation—gay men (Dasgupta et al., 2009, Study 2) and Arab men (Dasgupta et al., 2009, Study 3) using IATs. Our

results showed that anger (but not disgust) increased implicit prejudice against Arabs, a group that triggers stereotypes about aggression and terrorism. And disgust (but not anger) increased implicit prejudice against gays and lesbians, a group that evokes stereotypes about moral contamination. In other words, the carry-over effect of negative emotions was remarkably nuanced. Participants' preexisting negative emotion magnified implicit prejudice only when the threat signaled by the particular emotion was applicable to the stereotype of the particular group being evaluated (Dasgupta et al., 2009). In our current research, we are extending beyond implicit attitudes to examine whether negative emotions escalate biased actions against outgroup members like aggression.

### 10.1. The take-away

Collectively, these studies show that local environments have the potential to cast long shadows. When people recall past events that happened in long-gone local environments, emotions aroused by those past environments become vivid in the present moment. It is easy for thoughts and feelings triggered by the past to color judgments and evaluations in the present. This type of misattribution may be particularly likely for implicit attitudes that are "gut reactions" that happen too fast to allow self-editing.

A second important lesson from these studies is that while many negative emotions broadly relevant to intergroup relations accentuate bias against unknown groups, not all negative emotions have this effect. Sadness, which is more of an interpersonal (rather than intergroup) emotion did not increase outgroup bias. When it comes to known groups about which people hold preexisting stereotypes, emotion-induced implicit biases are more specific. Our ongoing research is beginning to suggest that these biasing effects are not limited to attitudes only; they also extend to aggressive actions.



## 11. COMMON THEMES, UNANSWERED QUESTIONS, AND FUTURE DIRECTIONS

In this chapter, I have reviewed more than a decade of research conducted in my lab in which my collaborators and I have found that changes in local environments, social networks, and affective states evoke substantial shifts in people's implicit attitudes toward outgroups, implicit beliefs about the ingroup, and their self-concept. This review brings together four programs of research that share a common take-home message: implicit attitudes and beliefs reflect and adapt to social situations fairly effortlessly in

the sense that they do not require perceivers' conscious introspection, deliberation, and intentional action. Several common themes and unanswered questions cut across these research programs. These, described below, are promising topics of future research.

### **11.1. The malleability of implicit attitudes and beliefs: How long does change endure?**

Based on our data and theoretical conceptualization, I expect that individuals' implicit attitudes will reflect whatever local environments they are chronically immersed in. If they choose (or, through happenstance, find themselves in) situations and communities that increase exposure to counterstereotypic ingroup and outgroup members repeatedly, then bias reduction will endure. If, however, they briefly pass through counterstereotypic environments and then return to stereotypic local environments for the long term, I expect their implicit bias will reduce momentarily and then return to baseline. It bears repeating that by the term "local environment" I do not mean society at large, but rather the types of people and media representations the individual encounters in daily life—at home, work, and in their social network.

Even though implicit attitudes and beliefs adapt to situations in which the individual is immersed and change if subsequent situations are different, this does not mean that implicit attitude change is so fleeting that it fades away as soon as the person leaves the situation. In support of that position, in [Dasgupta and Greenwald \(2001\)](#), we found that the reduction in implicit race bias brought about by exposure to admired African Americans endured for at least 24 hours after the original experience. Even better, in [Stout et al. \(2011, Study 3\)](#), we found that positive implicit attitudes toward math and self-concept malleability elicited in female students who interacted with a female math professor in class remained even when students were not in that classroom environment nor reminded of it when their attitudes and self-conceptions were assessed in various other situations outside class. In other words, something about interacting with female professors lingered long after class was over and students were back in mostly male environments. What may have helped the durability of implicit self-concept change in this case is that students encountered the female math professor several times a week over the course of the semester. In other words, they had repeated exposure to a same-sex expert in a counterstereotypic local environment.

We are pursuing the durability question more directly in an ongoing study on peer mentoring in engineering. In this longitudinal study, we



randomly assign first-year female students to female peer mentors who are advanced students in the same major, or equivalent male peer mentors, or no peer mentors for 1 year. After ensuring mentor–mentee contact for 1 year, we track participants' progress through the year and for the next several years until graduation long after their mentors have left in order to examine whether early contact with a female peer mentor in the first year of college will act as a social vaccine to protect and enhance women's engineering self-concept and success for the next 3 years of college (Dasgupta & Dennehy, 2012). Our hypothesis derived from the Stereotype Inoculation Model is that the first year of college is a critical period during which exposure to successful same-sex peers (or lack thereof) is more likely to “stick” and have a prolonged effect than is typical in other periods of time. As such, this study promises to provide a strong test of how long implicit self-concept change endures.

### **11.2. What is the mechanism that drives the effect of local environments on implicit attitudes?**

Another unanswered question and possible direction of future research involves identifying underlying psychological processes that drive implicit attitude and belief change seen in our research. Recent theories by Sherman, Gawronski, Bodenhausen, and others have argued that implicit responses are driven by a mixture of automatic associations rendered accessible by the local environment and executive control driven by internal states such as goals, motivations, and emotions; these two processes are thought to work independently to influence social behavior (Conrey, Sherman, Gawronski, Hugenberg, & Groom, 2005; Gawronski & Bodenhausen, 2006; Smith & DeCoster, 2000; Strack & Deutsch, 2004). Applied to my research, I propose that increasing the salience of counterstereotypic individuals in local environments will create new implicit associations linking the target group (or self) with counterstereotypic attributes reflected in the local environment (cf. Gawronski & Bodenhausen, 2006). While stereotypic associations are more accessible in default situations or decontextualized experiments, the introduction of counterstereotypic cues in the form of background situational characteristics or counterstereotypic individuals is likely to make alternative associations dominate in that situation. Counterstereotypic situational cues may also suppress stereotypic associations if these attributes are thought to be bipolar constructs that cannot be activated simultaneously (e.g., good–bad, masculine–feminine; see Greenwald et al., 2002). Over time, long-term immersion in counterstereotypic environments may reduce the default accessibility of stereotypes and/or enhance the chronic accessibility of counterstereotypes.

A different process may drive implicit attitude change produced by transient emotional states. Our past studies demonstrating that anger and disgust, exacerbate implicit prejudice may be driven by changes in control processes. Consistent with this idea, prior research shows that changes in cognitive control processes can influence attitude expressions typically thought of as implicit (Conrey et al., 2005; Payne, 2001, 2005; Payne, Lambert, & Jacoby, 2002). These researchers argue that although implicit attitudes are activated without awareness and expressed under time pressure (as demonstrated by studies using speeded reaction time tasks that constrain response time) such responses are not “process pure”; they are guided by a blend of automatic and controlled processes. Thus, it seems reasonable to expect that arousal of anger, disgust, and similar negative intergroup emotions may reduce the motivation to engage control processes and, as a result, increase implicit bias in attitudes and behavior.

### **11.3. The role of awareness and choice in changing implicit attitudes and beliefs**

One of the signature findings of my research is that participants were either unaware of the fact that their attitudes, beliefs, self-conceptions, and choices were systematically shaped by the situation or unaware of which aspects of the situation were producing the change. Cutting across several programs of research, our data often reveal that small changes in local environments elicit systematic shifts in people's implicit attitudes and beliefs even though their explicit responses remain unchanged. Even when informed about the research hypotheses at the end of the study participants typically do not think their own implicit reactions were affected by environmental cues. For example, people assume their academic self-conceptions and career decisions are freely chosen; solely guided by talent and intrinsic motivation; as if these choices are unconstrained by external factors. Yet, as our data have shown, for individuals who are numeric minorities and stereotyped in a field, their implicit attitudes toward science and engineering, identification with these fields, and self-efficacy are heavily influenced by the presence or absence of ingroup experts and peers. It is not a free choice solely determined by talent (Stout et al., 2011). Even though people are often unaware of the impact of stereotypic cues in achievement settings on their academic and professional interests and choices, these cues have profound effects on their intellectual and professional identities and career choices.

Having said that, conscious choice no doubt plays an important role in the selection of local environments and communities in to which people

enter. People routinely make decisions about what books and media to read and watch and what others to avoid; whom to seek out as friends and whom to avoid; where to go to college; and how much to engage with coworkers from different backgrounds and in different roles within the workplace hierarchy. Each of these decisions contributes to a unique local environment surrounding a given individual that may be quite different from others living in the same town. Individuals' implicit attitudes, beliefs, and self-conceptions reflect these local environments.

#### 11.4. Full-cycle research

An important theme in my research is that in many cases I do initial hypothesis testing in controlled laboratory experiments followed by replications and extensions of the same hypotheses in field settings to determine if lab-based findings, cause-and-effect relations, and underlying psychological processes apply to real-world social problems I would like to impact. This is consistent with Cialdini's (1980) description of full-cycle research. He suggests that some psychological phenomena, particularly in social psychology, benefit greatly from full-cycle research; testing ideas iteratively in the laboratory and field so that knowledge from both sources enriches understanding of the phenomenon of interest (Cialdini, 1980; Dasgupta & Hunsinger, 2008; Dasgupta & Stout, 2012). Applying this concept to our research, our data testing the Stereotype Inoculation Model combined controlled lab experiments and messier field studies, cross-sectional research designs and longitudinal designs in search of converging evidence of stereotype inoculation and the conditions that make it more or less likely (Asgari et al., 2010, 2012; Dasgupta, 2011; Dasgupta & Asgari, 2004; Stout et al., 2011). Full-cycle research allows controlled tests of cause-and-effect, encourages investigation in theoretically interesting field environments, helps identify differences between lab evidence and field evidence, and increases the chance that we will stumble upon new research questions and hypotheses about ways to change implicit bias in naturally unfolding environments.

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