Directed Attention and Stereotype Threat in Interracial Interactions

by

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To Shanesha

indirectly provided the social, spiritual, and academic network I needed to successfully

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Abstract

  This research combines stereotype threat theory and attention restoration theory in an attempt to develop an intervention for stereotype threat. Applying stereotype threat to interracial communication provides a framework for understanding how Whites may have a more difficult time communicating about a race-related topic than another topic. Attention restoration theory contributes a potential intervention through the possibility of increasing cognitive resources available to threatened individuals in both a traditional stereotype threat paradigm and in an interracial communication paradigm. Study 1 tested the hypothesis that Whites may experience stereotype threat in interracial communication when discussing a race-related topic, and that this stereotype threat diminishes both speaking ability and recall of a partner's statement. Results supported this hypothesis, with participants exhibiting a higher rate of speech disfluencies and recalling fewer details of the partner's statements when the topic was race-related. Study 2 tested the hypothesis that restoring capacity for directed attention improves performance for women taking a math test under stereotype threat. Results did not support this hypothesis; the intervention did not improve participants' performance under stereotype threat, although it did have a positive impact on performance for those who were not under stereotype threat and for whom math performance was important. Lastly, Study 3 tested the hypothesis that increasing capacity for directed attention improves communication for Whites discussing a race-related topic. Results did not support this hypothesis, as the

directed attention manipulation did not appear to have any effect on communication performance. The topic manipulation replicated the recall effects demonstrated in Study 1 but not the speech disfluency effects. The role of regulatory strategies in determining the effectiveness of manipulating directed attention is also discussed.

Chapter 1

Introduction

While stereotyping was once thought of simply as a means for one group to differentiate themselves from another (Allport 1954), these stereotypes can have consequences well beyond intergroup perceptions. The effects of "stereotype threat" are one such consequence. Stereotype threat is the threat of confirming a negative stereotype about the performance or competence of one's group in a particular domain. Steele & Aronson (1995) first identified stereotype threat in a study on Black academic performance. Participants were asked to take a verbal ability test that was described as either diagnostic or non-diagnostic of their intellectual ability. When the test was described as diagnostic, Black participants performed worse than White participants, while Black and White participants performed equally well when the test was described as non-diagnostic. Black participants in the diagnostic/stereotype threat condition were both slower at answering questions and less accurate. Steele & Aronson therefore theorized that participants under stereotype threat may have had their attention divided between assessing the threat and taking the test, thus preventing them from fully focusing on the test itself.

Stereotype threat has been identified as having consequences for a wide variety of groups in a wide variety of situations (Frantz, Cuddy, Burnett, Ray, & Hart, 2004; Gonzales, Blanton, & Williams, 2002; Keller & Dauenheimer, 2003; Koenig & Eagly,

2005; Sekaquaptewa & Thompson, 2003). The sheer number of stereotype threat studies that have been published tend to confirm the generality of the stereotype threat effect. However, stereotype threat does appear to be partially dependent on domain identification, such that individuals are more affected when they are more highly identified with the threatened domain (Aronson, Lustina, Good, Keough, Steele, & Brown, 1999). Theoretically, stereotype threat is also expected to be dependent on task difficulty (Steele & Aronson, 1995), with performance on difficult tasks being more vulnerable.

Traditionally, academic performance has been the primary focus for most stereotype threat research. Along with Steele & Aronson's 1995 study on the effect of stereotype on Black students' academic performance, there is a significant body of research indicating that women are also affected by stereotype threat. Spencer, Steele & Quinn (1998) provide a strong basis for stereotype threat in the context of women's math performance. They found that women performed worse than men when taking a difficult math test. However, when women were explicitly given information indicating that they would not be evaluated according to the stereotype, their performance matched that of men. Implicit situational cues can also create stereotype threat conditions. For example, Inzlicht & Ben-Zeev (2000) found that the mere presence of men in a group of test-takers reduced women's performance relative to taking the test in an all-female group.

Stereotype Threat in Interracial Communication

Stereotype threat has been demonstrated in a wide variety of groups aside from women and African-Americans, who are the primary focus of much of the stereotype threat literature. Stereotype threat effects have also been found such disparate social

identity groups as Latinos (Gonzales, Blanton, & Williams, 2002), the elderly (Abrams, Eller, and Bryant, 2006), and individuals from a low-socioeconomic background (Spencer & Castano, 2007).

Whites' performance can also be negatively affected by stereotype threat under some circumstances as well. Aronson, Lustina, Good, & Keough (1999) found that White men performed worse on a math test after being told that Asians perform better in math than Whites. Thus stereotype threat can occur even for groups who might traditionally be stereotyped as performing well in a given domain.

One domain in which Whites may "naturally" experience stereotype threat is interracial communication. Several studies have provided evidence that Whites may experience stereotype threat around the possibility of being perceived as racist. Vorauer, Main, and O'Connell (1998) found that White Canadian participants expected to be negatively stereotyped by Aboriginal Canadians. A study by Frantz, Cuddy, Burnett, Ray, & Hart (2004) demonstrated that American Whites perform "worse" (as in more pro-White bias) on a measure of implicit prejudice when they believe that it is diagnostic of racism.

A recent study by Tatum & Sekaquaptewa (in press) showed evidence of stereotype threat activation for White participants in an interracial discussion group.   In that study, same-race and mixed-race groups of Black and White students engaged in a discussion about both a race-related and a non-race related topic. After the discussion, participants completed a variety of measures including concern about appearing prejudiced and how much they spoke. The results indicated that White participants were likely to report speaking less and feeling more like "learners" in the discussion when the

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topic is about race. Moreover, White participants' concern about appearing prejudiced was negatively correlated with their reported amount of speaking in the mixed-race/race-related topic group.

Although studies have not directly focused on the influence of White stereotype threat in interracial conversation, the fact that Whites are likely to experience stereotype threat regarding White racism, and that they may have more difficulty communicating in a situation where they could potentially confirm that stereotype strongly suggests the possibility that stereotype threat is involved in interracial communication. Thus, one of the primary hypotheses this research will test is whether stereotype threat affects Whites' ability to communicate in interracial conversations. There are some important differences to consider in comparing stereotype threat in academic performance with stereotype threat in interracial communication. In test-taking, the individual participant has control over the pace much more than when communicating with another person. When taking a test, one can pause to review questions or revise answers at any time, whereas with speaking and listening one cannot "go back" without interrupting the flow of the conversation. The implication here is that participants must attend constantly to both their own and their partner's communication to avoid missing what their partner has said. Based on these considerations, it is possible that any additional demands on attention associated with stereotype threat could have a significant impact on communication.

Identifying Mediating Factors

One major issue facing stereotype threat research is that there has been limited research indicating specific mediators for the effects of stereotype threat (Smith, 2004;

Wheeler & Petty, 2001). Wheeler & Petty (2001) note the emphasis that stereotype threat studies often place on "hot" motivational processes, i.e. those involving the emotional experience of being under threat. Smith's (2004) literature review indicates the lack of support for a specific emotion-based mediator. However, there has been some evidence supporting cognition-based mediators. One cognitive mediator has been demonstrated: an apparent loss of working memory (Schmader & Johns, 2003). Participants in the threat condition were given a standard stereotype threat manipulation (diagnostic vs. non-diagnostic) test, with the addition of a solo status manipulation. Participants in the threat condition both had diagnostic test instructions and had 2 male confederates working on the same test, while those in the non-threat condition had non-diagnostic instructions and worked alongside two other female participants. After the manipulation, participants took a measure of working memory followed by a math test. The results indicated significant mediation by working memory in the effect of stereotype threat on math test performance.

A "distraction model" of stereotype threat is consistent with the focus on cognitive mediators. This model takes the position that threatened individuals are motivated to perform well, but concerns about being seen as stereotypic automatically diverts resources away from the task at hand. Steele & Aronson (1995) make this point in reference to Baumeister (1984), who suggested that situations that require excellent performance can ironically impair performance either by making individuals self-conscious or generating additional pressure to perform well.

Inzlicht, McKay, and Aronson (2006) examined the cognitive effects of stereotype threat more closely. In two studies they found that stereotype threat impacted

participants' self-regulatory ability. Self-regulation is the ability to consciously direct one's own behavior or thinking over time (Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004)−it is particularly relevant in terms of resisting temptation or avoiding distraction. In one study, Black participants performed worse on a Stroop task when told they would soon be taking a diagnostic verbal test than when told the test was not diagnostic of intellectual ability. In another study, female participants were asked to squeeze a handgrip after either being told they would be taking a math test that had shown gender differences in performance, or one without gender differences. Women who expected to take the math test with gender differences were unable to squeeze a handgrip as long as those who expected a math test with no gender difference. Both of these tasks are highly dependent on self-regulation—in the first study, participants had to resist distraction from the mismatch word meanings, while in the second, participants had to resist the temptation to loosen their grip. Neither study required participants to take an actual test to demonstrate these results.

Shapiro & Neuberg (2007) provide further support for possible distractions as a mediator for stereotype threat. In attempting to explain stereotype threat, they have theorized a multi-threat model, which expands on the traditional emotion-based motivational models by identifying specific concerns that may be activated by stereotype threat. Threatened individuals may feel concerned about how they perceive themselves, how they perceive their own group, or about their personal or group reputation among either the in-group or the out-group. Notably, they suggest that intrusive, negative performance-relevant thoughts may be a unifying characteristic of all these possible threats.

Work by Cadinu, Maass, Rosabianca, & Kiesner (2005) also supports the role of such intrusive thoughts. In this study, female participants were asked to list their thoughts prior to each of two administrations of a series of math questions during a standard stereotype threat paradigm design. These thoughts were then categorized as negative math-related thoughts ("these exercises are difficult for me"), hatred of math, generic distress, low self-confidence, neutral references to the test, and not knowing what to write. As expected, participants in the stereotype threat condition performed worse than those in the no threat condition. However, Cadinu et al.'s findings also indicated that this effect was significantly mediated by the number of negative math-related thoughts participants reported. In other words, participants under stereotype threat reported more negative thoughts, and having more negative thoughts reduced their performance. Notably, this decrement in performance occurred primarily during the second administration rather than the first. This suggests that negative thoughts may lead to a decrement in performance over time.

A likely cause for this effect is that participants are naturally attempting to resist thinking negative thoughts, thus depleting their cognitive resources. As in the Inzlicht, McKay, and Aronson (2006) study discussed above, the task of not thinking negative thoughts is essentially a self-regulation task. Participants may be attempting to exert executive control, the ability to consciously control one's thinking or behavior. This effort, both prior to and perhaps even during the math test, may deplete their cognitive resources. It is not surprising that having one's resources depleted in this way prior to taking a difficult math test would result in worse performance compared with those who are not distracted by negative thoughts. However, it may be possible to counteract this

effect by increasing the amount of resources available beforehand. If stereotype threat makes a cognitively demanding situation more so, perhaps with additional cognitive resources participants could perform normally under stereotype threat without becoming depleted during the task.

Directed Attention

Attention Restoration Theory (ART) has not previously been associated with stereotype threat research, but seems applicable in light of findings relating stereotype threat effects to diminished working memory. Under Attention Restoration Theory, directed attention is posited as a cognitive resource that allows one to voluntarily focus one's attention on a particular subject or task (Kaplan, 1995). The distinction between voluntary and involuntary attention is important. Directed (or voluntary) attention refers to our ability to consciously choose to focus our attention on a particular object or task, whereas involuntary attention refers to the way in which some stimuli can automatically draw our attention. For example, directed attention may be required to pick the important information out of a boring lecture or book, while it would not be needed to listen to a good piece of music.

Significantly, there is strong evidence indicating that the capacity for directed attention (CDA) can become depleted, or fatigued, with use. Although this point may seem obvious to most people who have experienced mental fatigue, there is nonetheless a large body of research indicating that CDA becomes depleted with continued use. A recent study by Boksem, Meijman, & Lorist (2005) offers an excellent example. In this study, participants were asked to perform a visual attention task for 3 hours. The task required participants to respond to a target stimulus only when it appeared in certain areas

of a computer screen. Non-target stimuli, and target stimuli in non-target areas were to be ignored. Of course, Boksem et al. found that participants' performance decreased over time. However, their electroencephalogram findings are also of interest—they suggested that while participants took longer to respond to stimuli they were paying attention to, their reaction times to unattended stimuli remained consistent throughout the task. In other words, fatigue made it more difficult for participants to voluntarily focus their attention, but had no effect on their involuntarily responses to unattended stimuli.

The increased susceptibility to distraction would seem to indicate that the reduction in performance under conditions of directed attention fatigue may be general to a wide variety of tasks requiring directed attention. Notably, the types of tasks that one would expect to be impacted by reduced CDA and those impacted by stereotype threat overlap in that they are difficult enough to require focused attention (Beilock & McConnell, 2004; Beilock, Jellison, Rydell, McConnell, & Carr, 2006; Schmader & Johns, 2003). In addition, reduced CDA may also have a negative impact on mood, decision-making, and the ability to resist temptation (Taylor, Kuo, & Sullivan, 2002).

Even without having identified a specific mechanism for stereotype threat, distraction is implicated in almost all the potential mediators of stereotype threat (Smith, 2004). If this is the case, then working under stereotype threat will require even greater use of directed attention in order to resist these additional distractions while remaining focused on the task at hand. Of course, this assumes that participants' intentions are still in line with the task. If participants respond to stereotype threat by intentionally shifting their focus, changes in directed attention may be less relevant. In other words, the benefit of having more directed attention is dependent on how the resource is being used.

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Apfelbaum & Sommers (2009) found that increasing executive capacity (i.e. directed attention) can potentially cause a decrement in performance depending on the regulatory process being used. In that study, White participants interacting with a Black confederate were seen as less prejudiced by independent Black coders when their capacity for executive control was depleted. Apfelbaum & Sommers note that the depleted White participants who spoke with a Black partner spoke more directly about a race-related topic than those who were not depleted, whereas non-depleted participants spoke more cautiously. In this example, depletion ironically prevented participants from being as careful with their words as they would have been otherwise, thus making the interaction more enjoyable for themselves as well as appearing less prejudiced to their partner. Participants who had more directed attention performed worse because they intentionally made an effort to speak carefully, not realizing that speaking directly would yield better results.

The ego depletion model introduced by Schmeichel, Vohs, & Baumeister (2003) also appears to map closely to the directed attention concept from ART. They describe a limited resource which is expended in the process of executive control and self-regulation. When testing their model on attention, Schmeichel et al. asked participants in one study to watch and focus on a videotaped interview while irrelevant words flashed on the screen, and in another, to suppress their emotional response to an upsetting video. It should be noted that in both studies, the only difference between the manipulation and control groups was the instructions given. In the first study, participants in the resource depletion condition were specifically asked to ignore and avoid looking at the irrelevant words during the interview, while in the second study they were asked to suppress their

emotional response to the upsetting video. In both cases, control group participants watched the same videos with no instructions. The results of the two studies indicated that participants who were required regulate either attention or emotion performed worse on subsequent cognitive extrapolation and reading comprehension tasks, respectively.

Unfortunately, this ego depletion model does not include information on how this resource may be restored. This is an important issue because many activities require at least some directed attention, which is likely to leave many people with relatively low capacity for directed attention. Under these circumstances, increasing capacity for directed attention (CDA), rather than depleting it may be the best way to manipulate directed attention. Certainly, evidence for an effective method of increasing CDA would be helpful in designing stereotype threat interventions. Increasing CDA should be effective either before or after the depleting activity since either way restored participants will arrive at the performance measure with more directed attention available than those who did not receive restoration. Thus a CDA intervention could be effective either before or after a stereotype threat manipulation. If a CDA intervention proves successful, research on restoration will provide insight into positive actions that may improve performance under stereotype threat, rather than only indicating situations to avoid.

Restorative effects of natural environments on CDA

There is now a sizeable body of research involving the restoration of directed attention. Kaplan (2001) suggests several means by which capacity for directed attention may be restored. In particular, he suggests that meditation and exposure to natural environments can be restorative; the theory being that CDA is restored when directed attention is rested. Both of these methods rely on this principle by allowing the

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individual to relinquish executive control of attention. The supporting evidence for the restorative effects of nature on CDA is particularly strong. Natural environments have been shown to reduce aggression (Kuo & Sullivan, 2001), encourage social interaction, (Kuo, Sullivan, Coley, & Brunson, 1998), and even ameliorate the effects of Attention Deficit Disorder, a condition in which individuals have greater difficulty intentionally focusing their attention (Taylor, Kuo, & Sullivan, 2001).

There has also been some work that examines the question of what factors determine a particular environment's impact on capacity for directed attention. ART suggests four components of restorative environments: being away, extent, compatibility, and fascination (Kaplan, 2001). Together, each of these factors helps to rest the directed attention resource. *Being away* refers to being outside of the everyday experience. Continuously remaining in the same environment or engaging in the same task causes people to get tired of the environment or activity. Once the task or environment is no longer as novel, more directed attention is required to maintain one's focus on that task or environment (Kaplan, 2001).

Extent refers to the degree to which an environment has enough scope and coherence that it can be perceived as a unified entity. Environments with too little scope or coherence do not easily yield the cognitive maps necessary for effective navigation. For example, an empty environment with no apparent landmarks could be said to have "not enough scope." An environment could also have too little scope if there is not enough space to move freely, thus making it difficult to create a cognitive map. Likewise, in a completely cluttered environment it may be difficult to identify how each item relates to the others. On the other hand, a spacious environment with clear

landmarks allows the perceiver to navigate with minimal use of directed attention. Several authors take care to note that extent is not necessarily related to physical size— even a small location can have enough content to be high in extent (Herzog, Maguire, & Nebel, 2003; Kaplan, 2001).

Compatibility refers to the match between the requirements of the environment and the goals, intentions, and capability of the individual. For example, an empty computer lab would be a highly compatible environment for a graduate student who wants to check email, but not for a baseball player wanting to play catch. Compatibility is important to directed attention because compatible environments by definition have fewer irrelevant and/or distracting elements. A mismatch between the environment and the goals of the individual can turn features that might be restorative or neutral under other circumstances into distractions from the goal. Even a natural environment may not necessarily be restorative if the individual's primary goal is to go shopping.

Lastly, *fascination* refers to the degree to which an environment or activity naturally draws attention without additional effort. However, this is not a simple case of "more is better" for the purposes of restoration. Environments and tasks that are not fascinating enough will require additional directed attention in order to maintain focus. On the other hand, environments and tasks that are intensely fascinating tend to occupy all our cognitive resources and do not allows us to "reflect" i.e., to continue processing incomplete cognitive tasks (Kaplan, 1993). Incomplete tasks remain in memory more easily than completed tasks, and it is likely that these tasks demand some of our attention (Zeigarnik, 1938).

These four factors may be enough to explain why natural environments are

restorative, as natural environments frequently exhibit most of these qualities. Generally speaking, natural environments are away from our everyday setting, and have plenty of extent (in both scope and coherence.) Their content is usually fascinating enough to draw our attention without occupying all our cognitive resources. Compatibility is of course dependent on our intentions, though natural environments do provide a great deal of flexibility.

Three studies have also shown restorative effects for mediated or "virtual" environments. Berto (2005) found that capacity for directed attention could be restored using photographs. In that study, participants' CDA was first depleted using a sustained attention task. Participants were then exposed to a series of photographs on a computer screen depicting either natural or urban landscapes. After viewing the photographs, participants performed the sustained attention task again. The results indicated improved performance for participants exposed to nature images, whereas there was no change in performance for those who viewed urban images. This provides strong support for the idea that images of natural environments can be effective in restoring CDA.

Another study by de Kort, Meijnders, Sponselee, & IJsselsteijn (2006) provides some additional support, although he did not measure directed attention directly. In this study, de Kort et al. were able to demonstrate reduced levels of physiological stress for participants viewing natural images after a stress-inducing task. While not as specific to directed attention as the Berto (2005) study discussed above, this study also provides support for the idea that CDA may also be influenced through exposure to photographs as well as unmediated environments. Together these two studies provide ample evidence that capacity for directed attention can be manipulated simply by having participants

view photographs of restorative environments.

More recently, Berman, Jonides, and Kaplan (2008) found that participants who either walked through a natural environment or viewed nature photos performed better on a digit span backwards task than those who walked through urban environments or viewed urban photos. Participants also showed improvement on the executive control portion of the Attention Network Test. The Attention Network Test (Fan, McCandliss, Fossella, Flombaum, & Posner, 2005) is able to distinguish between attention associated with alerting, orienting, and executive control. Thus, these results also provide evidence for executive control's dependency on directed attention.

Given the apparent relationship between stereotype threat and the depletion of cognitive resources required for self-regulation, it may be possible to reduce stereotype threat effects by increasing individuals' capacity for directed attention. If stereotype threat does indeed apply to interracial communication, communication may be improved by increasing directed attention. Given the generality of the stereotype threat effect along with the fact that even tasks that do not involve working memory are still affected (Beilock, Jellison, Rydell, McConnell, & Carr, 2006), increasing individual's capacity for directed attention emerges as a logical means of reducing the impact of stereotype threat in interracial interactions. See Figure 1.1 for a flowchart of how manipulating CDA is hypothesized to influence stereotype threat outcomes. First, participants enter the situation with a baseline level of CDA. At the manipulation, participants are divided into the intervention group and the control group, one with increased CDA and one that remains at baseline. Next, both groups are given a stereotype threat manipulation, thus dividing participants into four groups depending on which combination of stereotype

threat and restoration manipulations they received. Groups under stereotype threat are expected to have reduced CDA due to the attentional demands of stereotype threat discussed earlier. On the other hand groups who receive restoration are expected to have higher CDA as a result of the manipulation. Higher CDA should then lead to better performance on any given task that requires directed attention.

For the reasons discussed earlier, interracial communication is likely to require a large amount of directed attention. Thus, an intervention with the potential to improve participants' ability to pay attention could be very beneficial in this area. It is entirely possible that the effect of restoring CDA is even greater for communication since the demands on attention are more acute. Of course, performance improvements would be expected in the traditional paradigm as well. Even though the demands are greater in interracial communication, one would still expect improvement in both situations since both do require a significant amount of directed attention.

However, there is also the possibility that increasing CDA could decrease performance under some circumstances. The assumption that increasing CDA will improve performance is predicated on the idea that restored individuals will be able to successfully apply their directed attention toward their intended goal. If additional directed attention were applied in a way that does not fit the intended goal, it is entirely possible that restoring CDA could make a bad situation worse.

In any case, before a directed attention manipulation is introduced in an interracial communication setting it must first be demonstrated that a) interracial communication is affected by stereotype threat, and b) restoring capacity for directed attention reduces stereotype threat effects in a more widely tested domain.

Figure 1.1: Capacity for directed attention flowchart
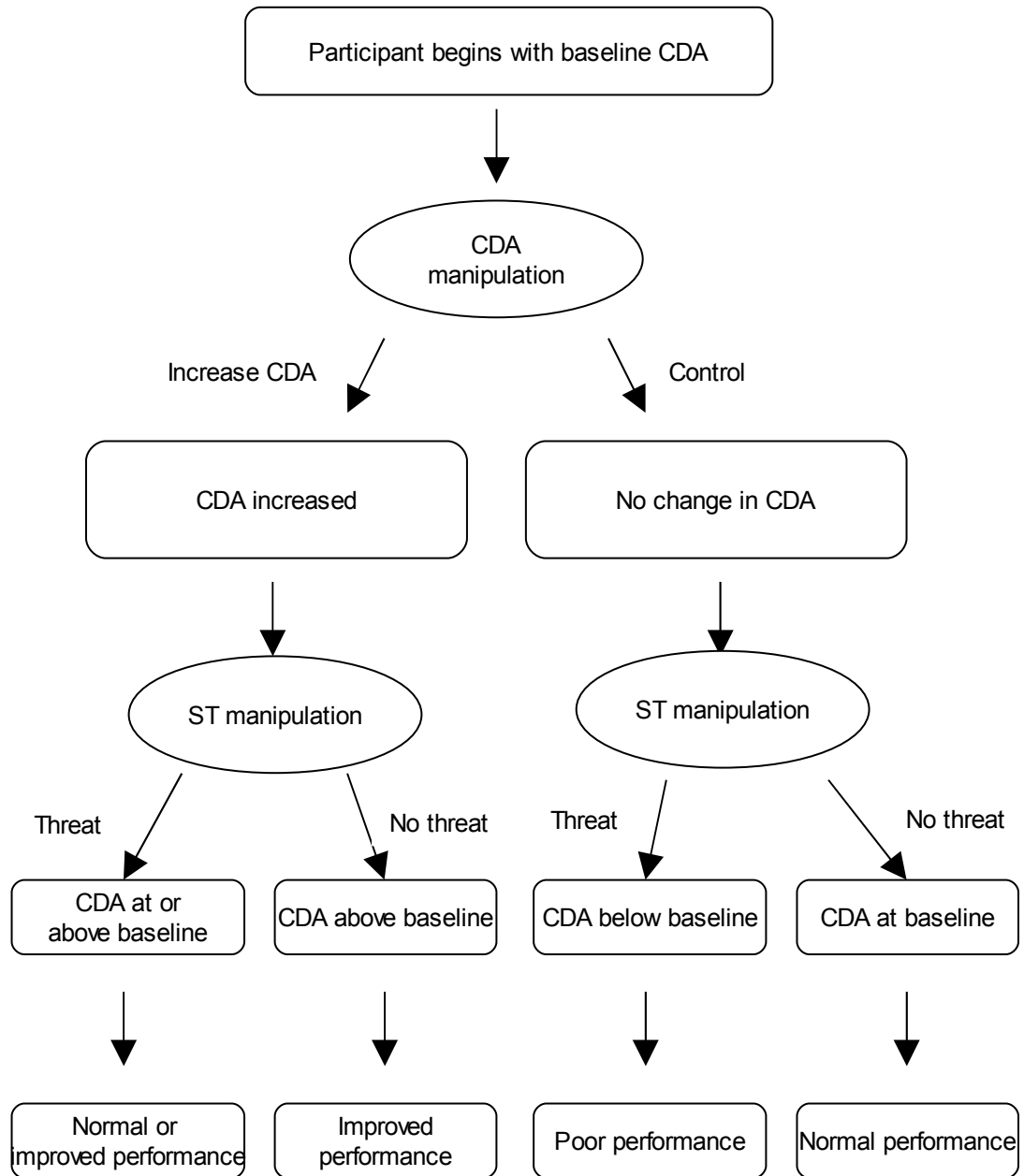
Chapter 2

Stereotype Threat in Interracial Communication – Study 1

The most common stereotype threat paradigms modify one of the following factors: the diagnostic nature of the task (Steele & Aronson, 1995), the salience of the participant's identity (Gonzales et al., 2002), or the social identity (i.e., race or gender) of the experimenter (Marx & Goff, 2005). Unlike prior stereotype threat studies, a study involving communication must include a real or perceived communication partner. Modifying the identity of the interaction partner can be effective threat manipulations in this case. For example, Richeson & Trawalter (2005) found that participants who were told they might be more prejudiced than they think they are prior to an interracial interaction had greater cognitive impairment on a Stroop task than those who received other negative feedback. However, this effect did not emerge with a same-race partner. This indicates that the race of the partner could be a relevant factor for stereotype threat in interracial communication, and it thus may be worthwhile to include partner race in the manipulation. Previous work (Tatum & Sekaquaptewa, in press) suggests that it may also be possible to manipulate stereotype threat in interracial communication by manipulating the topic of discussion. Stereotype threat may be activated for White participants when they are required to talk about race, perhaps even when their partner is also White.

The current study differs from other stereotype threat studies in that it uses quality of communication as a dependent variable. This choice of dependent variable does not

deviate from the standard stereotype threat paradigm in that this is an area for which

White participants are likely to be aware of a negative stereotype about their group.

Given that stereotype threat has been shown to be general to a variety of dependent

variables beyond academic test performance, such as athletic performance (Beilock &

McConnell, 2004), and car driving skills (Yeung & von Hippel, 2008), it is logical to

expect that stereotype threat may be a factor in this situation as well. This is particularly

true given past research on stereotype threat for White participants regarding prejudice

against other racial groups (Corenblum & Stephan, 2001; Frantz et al., 2004; Norton,

Sommers, Apfelbaum, Pura, & Ariely, 2006). Therefore, the hypothesis is that White

participants will experience reduced communication performance under conditions in

which their communication about race may be evaluated.

In this study, communication performance will primarily be measured in terms of

the participants' speech disfluencies and ability to recall a communication partner's

statements, which has been used as an indicator for attention in previous work (Marsh,

Hughes, & Jones, 2009). Using these two variables will allow the study to evaluate the

participants' performance both in terms of speaking and listening. The advantage of

using rate of speech disfluencies over other methods of measuring communication quality

is that it is a relatively objective measure of quality of speech that can be validated using

inter-coder reliability. Likewise, participant recall can be measured by counting the

number of details participants are able to report from their partner's statements, and inter-

rater reliability of recall judgments can be established.

It is expected that a similar pattern will emerge as Richeson and Trawalter (2005),

where White participants experience reduced performance when speaking with a Black

partner, but not with a White partner. However, since the race-relatedness of the topic is being used as part of the manipulation, the task itself may be enough to produce stereotype threat conditions for participants in the race topic condition. Thus, it is also possible that participants will experience threat when discussing race regardless of the race of their partner.

Method

Participants

Participants were 75 White undergraduates at a large Midwestern university. 37 participants were male and 38 were female. Participants were recruited through an introductory psychology subject pool, and participated for course credit.

Design

This study employed a 2 (race of partner) x 2 (discussion topic: race-relevant or irrelevant) between-subjects factorial design.

Measures

Speech disfluencies.

Participants' verbal responses were recorded and later coded by two independent judges for speech disfluencies.

Recall

Participants were asked to report what their partner had said during their conversation. These reports were coded by two independent judges for the number of details participants remembered about the conversation.

Length of Talking

In order to measure the rate of speech disfluencies, the amount of time participants spoke was also measured. This variable was also analyzed separately as a potential indicator of participants' engagement (i.e. more engaged participants may speak more than less engaged participants.)

Self-Regulation & Self Monitoring

Self-regulation was assessed using a 7-item scale (Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004). Responses were summed to create a single indicator variable. Self-monitoring was assessed using an 18-item scale (Snyder & Gangestad, 1986). The mean was taken to create a single indicator variable. See Appendices A & B for scale items.

Self-expression

Participants responded to several Likert-type self-report questions about their performance: "I was able to express my basic opinion to my partner clearly," "I wasn't at my best during this conversation" (reverse scored), and "I said what I needed to say as clearly as possible in a limited time."

Concern about appearing prejudiced

Participants were also asked how much they were concerned about appearing prejudiced to their partner, on a scale of 1 to 10, where 1 was not at all, and 10 was extremely concerned.

Materials

The materials in this study were designed to create the impression that participants are communicating live with another participant, when in fact they were

communicating with a pre-recorded confederate. There were four different recordings, one for each combination of topic and race of partner (see Appendix A). Separate recordings were used in order to ensure that minor differences in accent and speaking style would match the race assigned to the confederate. The discussion topics were "segregation on campus" (race-relevant) and "human cloning" (race-irrelevant).

Procedure

Upon arriving at the experiment, participants were quickly shuttled in to a small cubicle. From here, the experimenter provided a cover story suggesting that the experiment was really about methods of communication. Under this belief participants were asked to have a discussion with a partner through two different means of communication: over an audio system, and later, in person. The experimenter then asked participants to exchange a short biographical form with their "partner." This biographical form contained indicators of the partner's race via his name (Jamaal or Jeremy) and activities (Black Student Union, whose membership is Black, or Defend Affirmative Action Party, which is racially mixed), as well as class year and prospective major. Participants filled out their own copy of the form and exchanged it with their partner. After the biographical forms had been exchanged, participants were asked to use a pair of headphones and a microphone to communicate over an audio system with their partner (again, race was indicated through the partner's accent). The experimenter used the system to ask participants to introduce themselves to their partners by reiterating what they wrote on their biographical forms, while the partner apparently did the same. The experimenter then introduced the topic, followed by administration of the pre-interaction measures, including measures of self-regulation and self-monitoring. Once the

questionnaires were completed, participants were asked to use the audio system to briefly explain their opinion on the discussion topic. During the topic discussion, the participants were always asked to explain their position first, followed by the confederate recording.

After explaining their opinion on the discussion topic, participants completed the post-interaction measures, including how well they expressed themselves. The experimenter then took them to the back room to reveal the deception and debrief them about the study. During this time, participants were also asked whether they were suspicious about the confederate, and how much they were concerned about appearing prejudiced to their partner.

Results

Speech Disfluencies. In a coding scheme developed for this study, speech disfluencies were defined as instances in which a participant used an interjection such as "um", "like", "you know", or clearing their throat in order to delay speaking. A series of disfluencies occurring together without the participant continuing their statement was only counted as one disfluency. "Like" and "you know" were part of many participants' normal speaking style and did not necessarily interrupt the flow of speech. Therefore, they were counted as disfluencies only if they occurred together, twice in a row, or were associated with a noticeable pause. For example, the statement "I think human cloning is like, um, you know, just not right" would be considered to have only one disfluency. On the other hand the statement "I think, um, human cloning, uh, is like just not right," would be considered to have two disfluencies. Inter-rater reliability was high, at $r(61) = .75$, p < .001, after excluding one participant for whom raters did not agree by more than

10 disfluencies per minute.

The rate of speech disfluencies (the number of disfluencies per minute of speaking) was analyzed using a between-subjects analysis of variance with conversation topic and confederate race as between-subjects factors. The rate of disfluencies was used in the analysis instead of the total number of disfluencies to account for differences in how long participants spoke. 13 participants were not included in the analysis. 5 participants declined to be recorded and 7 were not recorded due to technical problems. One participant was excluded because the two raters did not agree by more than 10 disfluencies/minute. Among the remaining 62 participants, the mean rate of speech disfluencies for the remaining was 6.78 disfluencies per minute, with a range of 0 to 15.34. The standard deviation was 3.67 disfluencies per minute. See Table 1 for descriptive statistics by condition.   Results indicated a main effect of topic such that those who discussed the race-relevant topic had significantly more speech disfluencies per minute than those who discussed the race-irrelevant topic, $F(1, 57) = 4.85, p = .032$. However, neither an interaction nor a main effect of partner race emerged, both $Fs < 1$.

Partner statement recall. Four coders measured partner statement recall by assessing whether participants referred to each of 9 comments made by the confederate. Participants were given 1 point for each recalled comment, for a possible score of 0 to 9. One participant was excluded from the analysis due to a technical problem with the questionnaire. Inter-rater reliability for each possible pair ranged from a maximum of $r(69) = .871, p < .001$ to a minimum of $r(72) = .693, p < .001$. The mean of the four coders' scores was taken as the participants' recall score. The mean was 4.64 comments recalled, with a range of .33 to 8.5, and a standard deviation of 1.71. See Table 1 for

descriptive statistics by condition. These scores were analyzed using a between-subjects ANOVA. Results indicated a main effect of topic such that those who discussed the race-irrelevant topic recalled significantly more of the partner's statements than those who discussed the race-relevant topic, $F(1, 69) = 17.48$, $p < .001$. No main effect of partner race or interaction emerged, both Fs < 1.]

Length of speaking. Results suggested a marginally significant main effect of partner race, $F(1, 58) = 3.746$, $p = .058$, such that participants tended to talk more when speaking with a Black partner. There was no significant effect of topic $F(1, 58) = 2.000$, $p = .163$, or interaction, $F < 1$.

Self-Regulation & Self-Monitoring. Self-regulation and self-monitoring were tested as potential mediators of stereotype threat. However, self-regulation did not correlate significantly with the rate of speech disfluencies, $r(60) = -.142$, $p = .279$ or recall, $r(74) = -.195$, $p = .096$. Self-monitoring also did not correlate with the rate of speech disfluencies, $r(60) = -.003$, $p = .979$, or recall $r(74) = .168$, $p = .152$. Thus neither self-regulation nor self-monitoring emerged as mediators of stereotype threat.

Self-expression. No significant main effects or interactions emerged on self-reported ability to express oneself, topic $F(1, 70) = 2.143$, $p = .148$, partner race and interaction Fs < 1.

Concern about appearing prejudiced. A significant main effect of topic on concern about appearing prejudiced emerged, $F(1, 71) = 6.416$, $p = .014$, such that participants who discussed a race-related topic were more concerned about appearing prejudiced to their partner. No effect of partner race or topic x partner race interaction, emerged, both Fs < 1.

Correlations. The recall scores and rates of speech disfluencies were correlated such that participants with more speech disfluencies per minute also recalled less of the partner's comments, $r(60) = -.261$, $p = .044$. See table 2 for a full correlation matrix.

Discussion

Study 1 confirmed the hypothesis that White participants had significantly greater difficulty discussing segregation on campus, a race-related topic, than human cloning, a non-race-related topic, both in terms of their ability to communicate fluently and their ability to recall what their partner had said. Interestingly this effect occurred regardless of the partner's race, and the partner's race did not appear to have any additional effect either independently or as part of an interaction with the discussion topic.

The implications of these results are significant; they suggest that many Whites may have as much difficulty discussing race with one another as they would with a person of color.   The fact that participants had difficulty with both speaking and recall when discussing race suggests that in a real conversation, these challenges could make it difficult for both partners to understand each other.

That there was a sizable performance difference between those who discussed a race related topic and those who discussed a race-irrelevant topic clearly suggests that participants found it more difficult to discuss the race-related topic. On the other hand, the partner's race did not appear to be a relevant factor. This last point would seem to differentiate this scenario from previous stereotype threat research, as the identity of the potential evaluator is generally a significant factor in producing stereotype threat effects (Steele & Aronson, 1995).

However, stereotype threat studies examining White populations are relatively

uncommon, and there is an important contextual difference that may explain the null effect regarding partner race. According to stereotype threat theory, individuals can use a variety of environmental features to assess whether they are likely to be evaluated according to a stereotype. For example, Marx & Goff (2005) varied the race of the experimenter in a stereotype threat study on Black participants taking a verbal test. When the experimenter was also Black, the effect of stereotype threat was significantly reduced. In that study, Black participants clearly perceived the race of the experimenter as a relevant indicator as to whether they would be evaluated according to a negative stereotype about African-Americans' academic performance.

It stands to reason though, that White participants in the current study may have found other information such as the White partner's Defend Affirmative Action Party membership relevant in attempting to assess whether or not they would be evaluated according to the stereotype that Whites tend to hold racially prejudiced attitudes. This information may have been an indicator to White participants that their partner could potentially evaluate them according to the stereotype, even though they were of the same race.

Another possibility is that White participants did not necessarily perceive a significant difference in the likelihood of being perceived as prejudiced by a White or Black partner. It should be noted that during the period data collection significant media attention was being devoted to racist statements made on the air by prominent radio host Don Imus. This could have potentially increased the concerns of White participants discussing race even when communicating with other Whites.

Additionally, results did not appear to support a relationship between self-

monitoring and self-regulation and speech disfluencies. Given that these relationships

did not emerge, it may be that self-regulation and self-monitoring are not as relevant to

intergroup communication as previously thought. On the other hand, it is possible that

participants found the situation "unusual" enough that they did not apply their normal

self-regulation and self-monitoring strategies in this case. This is a strong possibility

given that the self-regulation measures used refer to participants' general self-regulation,

and not specifically to the situation at hand. Unfortunately, this issue was not detected

until after the three studies of this dissertation had been completed, but it may be helpful

to design a task-specific self-regulation measure in future research.

Although it was only raised as part of the debriefing, participants did seem to be

more concerned about appearing prejudiced to their partner in the race-related topic

condition. This would suggest that participants felt "threat" in the sense that they were

more worried about being seen as prejudiced when they discussed race. In future

versions of this study this question should be included as part of the questionnaire to help

avoid experimenter effects.

In any case, given the difficulties participants experienced while communicating

discussing a race-related topic, it would be valuable to develop a means of reducing these

stereotype threat effects, particularly in situations where a discussion about race may be

required.

Table 2.1: Study 1 Descriptive Statistics – Behavioral measures of communication

Partner Race	Topic		N	Mean	Std. Deviation
White	Non-race	Disfluency Rate	12	5.0139	3.96522
		Recall Score	12	5.7292	1.21290
	Race	Disfluency Rate	17	7.4057	3.74980
		Recall Score	17	3.8333	1.93649
Black	Non-race	Disfluency Rate	14	6.1016	2.78474
		Recall Score	14	5.3571	1.54021
	Race	Disfluency Rate	18	7.8249	3.76538
		Recall Score	17	3.9118	1.61279

Table 2.2: Study 1 Correlation Matrix

	Disfluency Rate	Recall Score	Length of talking	Self-regulation	Self-monitoring	Self-expression	Concern about appearing prejudiced
Disfluency Rate	1	-.219	.235	-.161	-.056	-.007	.097
Recall Score	-.219	1	-.353[**]	-.195	.168	.103	-.084
Length of talking	.235	-.353[**]	1	-.086	-.079	-.046	.035
Self-regulation	-.161	-.195	-.086	1	-.138	-.057	-.042
Self-monitoring	-.056	.168	-.079	-.138	1	-.132	.025
Self-expression	-.007	.103	-.046	-.057	-.132	1	-.163
Concern about appearing prejudiced	.097	-.084	.035	-.042	.025	-.163	1
**. Correlation is significant at the 0.01 level (2-tailed).							

Chapter 3

The Effect of Restoring CDA on Stereotype Threat – Study 2

While Study 1 demonstrates the role of stereotype threat in interracial communication, Study 2 attempts to establish an intervention to reduce or eliminate stereotype threat effects. Study 2 was designed based on Attention Restoration Theory (ART) as described by Kaplan (1995).

Attention Restoration Theory defines directed attention as a cognitive resource that is under our conscious control, but becomes fatigued with use. As with other, more automatic forms of attention, directed attention functions by inhibiting our perception of distracting stimuli. The capacity for directed attention can also be restored under certain circumstances, especially circumstances which allow our directed attention system to rest.

The study by Schmader & Johns (2003) found that reductions in working memory capacity mediated the effect of stereotype threat on women's math performance. However, their definition of working memory capacity included the ability to focus attention on temporarily activated information, which implies that directed attention is required for working memory. This makes sense given that recently acquired information can easily disappear from working memory given subsequent stimulation. The current study is distinct in that it experimentally manipulates directed attention in order to clearly test the hypothesis that restoring capacity for directed attention can buffer against the loss

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of performance from the stereotype threat condition.

The "restoration" aspect of directed attention theory is also essential in that it provides an apt intervention to potentially reduce stereotype threat effects. This study takes advantage of directed attention's restorability in order to manipulate participants' levels of directed attention. Berto's (2005) method of restoring directed attention using photographs will be used here in light of its past effectiveness.

Since this study will provide an initial test of the effectiveness of restoring capacity for directed attention as a possible intervention for stereotype threat, it may be helpful to begin with a more traditional design before assessing whether the intervention is generalizable to the stereotype threat in interracial communication scenario in Study 1. Since there has been some evidence for working memory as a mediator in stereotype threat studies examining women's math performance, this may be a good area for an initial test of a CDA restoration intervention. Testing the intervention in a situation in which the role of stereotype threat has already been well documented may provide a good starting point for assessing the effectiveness of restoring directed attention on reducing stereotype threat in general.

Method

Design

This study employed a 2 (photographs: nature or urban) x 2 (stereotype threat or non-stereotype threat) between-subjects factorial design.

Participants

Participants were 111 female undergraduates from a large Midwestern university. Participants were recruited through an introductory psychology subject pool, and

participated for course credit.

Materials and Procedure

Participants completed the study in small groups, working independently on separate computers. At the beginning of the study, participants completed a digit span backwards task (DSB) to assess their base level of directed attention. In the digit span backwards, participants were asked to listen to a series of numbers presented on their computer through a pair of headphones. After listening to the sequence, participants had to enter the numbers in reverse order on the computer. Participants had as much time as needed to think before entering their response, but had only 1 second per number once they began typing. The DSB was immediately followed by the directed attention intervention—a slide show consisting of either a series of nature images, or a series of urban images, as in Berto (2006). To keep participants engaged with the images, they were also asked to rate their liking for each image as it was presented.

Following this manipulation, participants completed a variety of pretest measures including interest in math, self-report SAT/ACT scores, and self-regulation. Interest in math was important since stereotype threat tends to affect only those who are highly identified with the targeted domain (Steele, 1997). SAT and ACT scores were collected to help control for preexisting math ability. Lastly self-regulation was included as a possible stereotype threat mediator. Participants then completed a second DSB, immediately followed by the stereotype threat manipulation. This study manipulated stereotype threat by identifying the math test as being either gender biased or not. After being told they would be taking a math test from an old edition of the GRE, participants read one of the following statements. In the no stereotype threat condition participants

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read the statement, "results from this edition of the GRE indicated no difference in performance for males and females. Your participation in this study will help us to identify factors that helped prevent gender bias in this test." In the stereotype threat condition they read, "although it is unclear why this may have happened, results from this edition of the GRE indicated that males and females perform differently on this test. Your participation in this study will help us to identify factors that led to gender differences in performance on this test."

Participants were then given a 30-minute time limit to respond to 30 GRE math questions. After completing the test, participants were debriefed and thanked for their participation.

Measures

Math performance

Participants responded to 30 questions from the math portion of the GRE general test. Responses were scored so that participants gained 1 point for each correct answer, and lost ¼ point for each incorrect answer to correct for random guessing.

Importance of math

Since stereotype threat is only expected to affect those who are highly identified with the targeted domain (Steele, 1997), participants were asked at the beginning of the study to report their interest in math. Participants reported how well the statement "It is important to me that I am good at math" applied to them on a scale of 1 to 11, where 11 was "very much" and 1 was "not at all".

SAT and ACT scores

Participants were asked to self-report their SAT and ACT scores to help control variance in preexisting math ability.

Self-regulation

Participants completed the same self-regulation questionnaire as in Study 1 (Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, 2004). Since the issue of "general" self-regulation vs. task specific self-regulation was not identified until after all three studies had been completed, no modification was made to the questionnaire. Again, self-regulation, was included because it could be a potential distractor that might influence available directed attention.

Digit span backward

Participants completed a computer-based digit span backwards (DSB) as a manipulation check. A baseline DSB was taken at the beginning of the study. A second DSB was taken after the photo restoration manipulation, just before the stereotype threat manipulation.

Results

See Table 2 for descriptive statistics.

Math performance. The mean score for math performance was 12.37, and scores ranged from -2.5 to 28.75 with a standard deviation of 6.26. Math performance scores were analyzed using a between-subjects analysis of variance with stereotype threat and slideshow type as factors, controlling for self-reported SAT and ACT scores. Since some participants reported SAT scores and others reported ACT scores, both SAT scores and

ACT scores were standardized and merged into a single variable. When both SAT and ACT scores were present, the mean of both standardized scores was used. Results showed no main effect of stereotype threat, $F(1, 66) < 1$, no main effect of slideshow, $F(1, 66) < 1$, and no interaction, $F(1, 66) = 1.327, p = .253$.

However, including the importance of math in the analysis yielded different results. In this model, restoration, stereotype threat, and importance of math were included as predictors along with their interaction terms in a multivariate regression. ACT and SAT scores were again included as a covariate. A pairwise analysis was used since 40 participants did not report either ACT or SAT scores. Neither restoration nor stereotype threat emerged as significant predictors alone, $\beta = .144, t = 882, p = .381$, and $\beta = .128, t = .761, p = .449$ respectively. Importance of math did emerge as a significant predictor, $\beta = .560, t = 2.494, p = .015$. The interaction terms of both restoration and stereotype threat with importance of math were significant predictors, $\beta = -.472$, t = -2.126, p $= .038$, and $\beta = -.530, t = -2.392, p = .020$, respectively. For participants for whom math was less important, both viewing nature photos and experiencing stereotype threat increased performance. On the other hand, for those for whom math was more important, viewing nature photos and experiencing stereotype threat decreased performance. The interaction term of slideshow type and stereotype threat was not a significant predictor, $\beta = -.186$, t = $-.962, p = .340$. The 3-way interaction term of restoration, stereotype threat, and importance of math did emerge as a significant predictor, $\beta = .456$, t = $2.044, p = .045$. This 3-way interaction was such that participants for whom math was less important tended to perform better under stereotype threat than without it after viewing urban photos, while those who viewed nature photos performed

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about equally well with or without stereotype threat. Participants for whom math was more important tended to perform worse under stereotype threat than without it after viewing urban photos, while again those who viewed nature photos performed about equally well with or without stereotype threat. For the group for whom math was less important, those who viewed urban photos and did not receive the stereotype threat manipulation generally performed worse than those who viewed nature photos, while those in the urban photo condition who did receive the stereotype threat manipulation performed about the same as those who viewed nature photos. On the other hand, in the high math importance group, participants who viewed urban photos and did not receive the stereotype threat manipulation appeared to perform better than those in the nature photo group, while those who viewed urban photos and received the stereotype threat manipulation performed about the same as the nature photo group.

To help address the potential for bias from the use of a pairwise analysis, a third model was tested using listwise analysis and excluding SAT & ACT scores. This model yielded similar results with math importance (β = .546, p = .003), the interaction of math importance and restoration (β = -.440, p = .026), the interaction of math importance and stereotype threat (β = -.469, p = .016), and the three-way interaction of math importance, stereotype threat, and restoration (β = .544, p = .011) all emerging as significant predictors.

A simple slopes analysis was performed on the model without SAT & ACT scores to identify significant predictors at different levels of math importance. At 1 SD below the mean of math importance, the interaction term of slideshow type and stereotype threat emerged as a significant predictor, β = .559, p = .018. Slideshow type was a significant

predictor at 1 SD below the mean of math importance for participants not under stereotype threat, $\beta = 2.829$, $p = .025$. No other significant predictors emerged from the simple slopes analysis. See Figure 2.1 for a chart showing the interaction split at the mean of math importance.

Digit Span Backwards. DSB performance was calculated by subtracting baseline scores from those taken after the restoration intervention. The mean of this change score was .861, with a minimum of -5 and a maximum of 6. The standard deviation was 2.57. Among both the full data set and the subgroup for whom being good at math was important, there were no significant effects of slideshow type on the change in DSB performance, all $ps > .249$.

Correlations. Among participants for whom being good at math was very important, SAT/ACT scores correlated with actual performance, $r(43) = .640$, $p = .001$, while for those for whom being good at math was less important, SAT/ACT scores only marginally correlated with actual performance, $r(27) = .370$, $p = .057$.

Discussion

The results of Study 2 reveal a fairly complex interaction between importance of math, directed attention restoration, and stereotype threat. Among participants for whom math was less important, participants under stereotype threat performed equally well across both restoration conditions. Those who were not under stereotype threat performed better with restoration than without. Participants for whom math was more important did not show any improvement in performance with restoration, and if anything there was a slight, non-significant decrement in performance.

Motivation may offer a potential explanation for these rather surprising results.

Among participants for whom math performance was less important, we would ordinarily not expect a significant effect of stereotype threat, as one of the criteria for stereotype threat is high identification with the targeted domain. Within this low math importance group, the restoration x threat interaction appears to be largely driven by very low performance among participants in the no threat/no restoration condition. Participants in this condition may have had unique combination of experiencing relatively high mental fatigue, and relatively low threat to either their personal or gender identity. Unfortunately, the unusually high variance in the computer-based DSB measure made it unclear whether the directed attention manipulation was in fact successful. Assuming, for the moment, based on Berto (2005), that the manipulation was effective, the computer-based DSB may have had too much variance to be an effective manipulation check. This may be due to less experimenter supervision than the traditional in-person version, in which the experimenter personally reads the numbers to the participant and records the participant's response. In any case, restoration results should be taken with a grain of salt since the manipulation check did not show improvements in directed attention. If the manipulation itself was indeed successful, non-restored participants may have had less incentive to put in their best effort than participants in other conditions. Other participants in the low math importance group would have at least had either their directed attention restored or had the threat of representing their gender poorly as a motivating factor. Since one of the requirements for stereotype threat is high identification with the threatened domain (Steele, 1997), low math importance participants under stereotype threat would not be expected to display the performance decrements normally associated with stereotype threat, and thus these participants may

have responded to "threat" by increasing their effort.

A second unexpected result was the lack of a main effect of stereotype threat. This may be a consequence of the study design, which allowed for multiple participants to work in the same room at the same time. It is possible that having a group of all female participants may have negated the effect of stereotype threat. Inzlicht & Ben-Zeev (2000) found that all female groups out-performed mixed-gender groups. Unfortunately their study did not test how group composition might interact with the more traditional gender bias description paradigm. Although this data cannot directly address the question since participants were all in same-gender groups, the fact that a main effect of stereotype threat did not emerge may be an indicator that stereotype threat was mitigated by the presence of same-gender groups.

Lastly, it was expected that participants' self-reported self-regulation would emerge as a predictor, although this result did not emerge. It may be that the "standard" self-regulation questionnaire designed by Luszczynska, Diehl, Gutiérrez-Doña, Kuusinen, & Schwarzer, (2004) was too general to detect participants' self-regulation on this specific task. In general the questions refer to chronic self-regulation, and not necessarily the extent to which participants may be self-regulating on this specific task.

Unfortunately the pattern that emerged in these results does not favor the use of directed attention as a means of reducing stereotype threat. In the 3-way interaction, restoring directed attention appeared to have the greatest benefit for those who were not under stereotype threat, rather than those who were. The benefit of restoring directed attention was fairly dramatic among participants with no stereotype threat and for whom math was less important. However, among the group for whom math was more

important, restoring directed attention was of no apparent benefit, and even may have decreased performance somewhat for participants who were not under stereotype threat.

One potential explanation for this result is that participants may not have been able to use their additional directed attention to effectively reduce stereotype threat effects. As Apfelbaum & Sommers (2009) found, increasing directed attention can sometimes backfire if participants do not apply it in a way that matches the situation. In the current study, the non-threatened group demonstrated that the possibility that increasing directed attention can improve performance, but it appears that participants were not able to use the resource effectively while under stereotype threat. Of course, given that participants did not show significant improvement on the DSB, it is not certain whether the manipulation successfully increased directed attention. However, it would nonetheless be worthwhile to see how the manipulation might affect participants in the interracial communication scenario examined in Study 1. It is entirely possible that the intervention will be more effective with interracial communication than with test performance because of the additional demands on attention associated with speaking and listening. Having to pay attention to both one's own and another's speech may require more directed attention than situations like test-taking in which the participant controls the pace on his or her own. Thus it may be worthwhile to proceed with a test of the intervention in an interracial communication scenario despite the somewhat limited benefits for math test performance.

Table 3.1: Study 2 Descriptive Statistics – Math Test Scores

Importance of Math	Photo Type	Stereotype Threat	Mean	Std. Deviation
Math less important	**urban**	**no threat**	7.500	5.396
		threat	13.542	4.296
	nature	**no threat**	13.167	4.651
		threat	10.844	6.599
Math more important	**urban**	**no threat**	14.368	6.202
		threat	13.250	7.184
	nature	**no threat**	12.369	7.008
		threat	13.790	4.223

Table 3.2: Study 2 Correlation Matrix

	Total math score	Importance of math	Standardized SAT/ACT	Self-regulation	DSB change score
Total math score	1	.191[*]	.430[**]	.008	-.072
Importance of math	.191[*]	1	.270[*]	.159	.039
Standardized SAT/ACT	.430[**]	.270[*]	1	-.017	.005
Self-regulation	.008	.159	-.017	1	.073
DSB change score	-.072	.039	.005	.073	1
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

Figure 2.1: Study 2 stereotype threat x restoration x math importance interaction, (splitting math importance at the mean)

Math less important*

Math more important
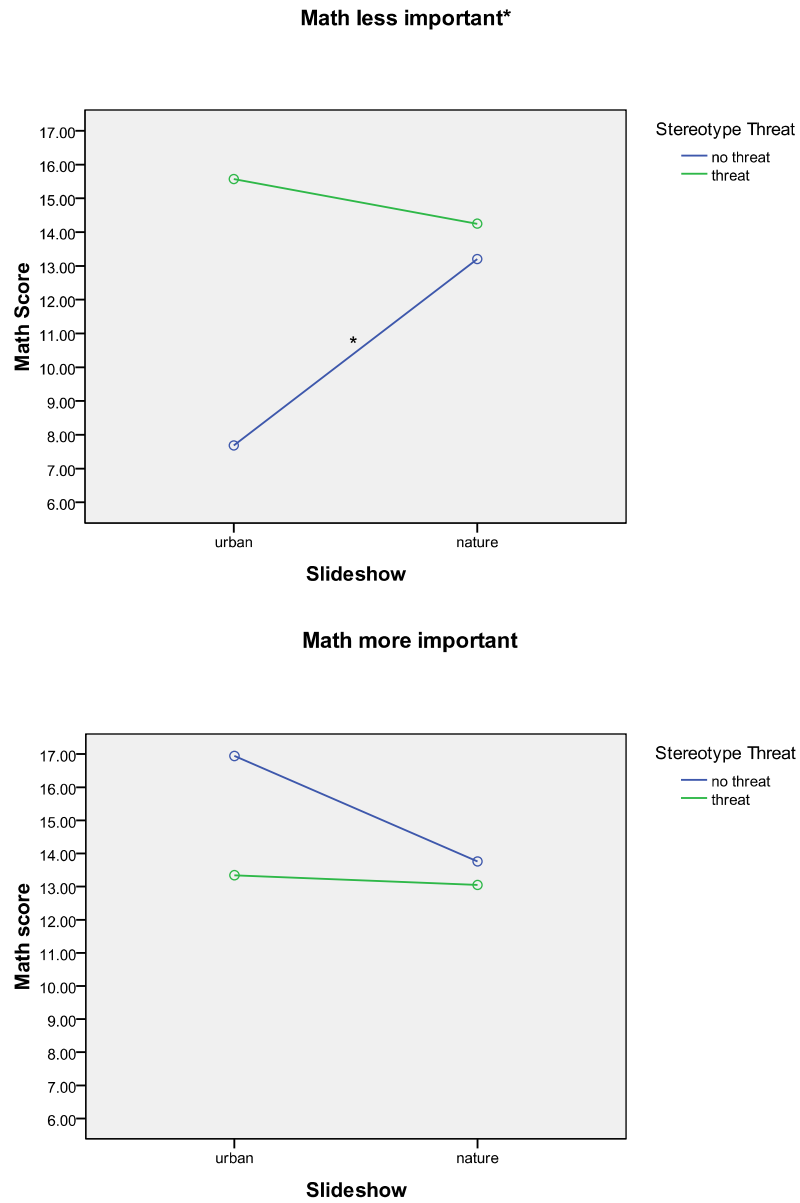
* indicates slope or 2-way interaction significant at $p < .05$ at 1 SD below the mean of math importance.

Chapter 4

The Effect of Restoring CDA on Whites' Interracial Communication under Stereotype Threat – Study 3

Study 3 combines the intervention used in Study 2 with the stereotype threat paradigm used in Study 1. Given Study 1's support for the hypotheses that stereotype threat can impair interracial communication regarding a race-related topic, Study 3 tested whether the effect of stereotype threat on interracial communication can be reduced by increasing directed attention. Although Study 2 provided only limited support for this intervention, the interracial communication scenario is quite different from the traditional stereotype threat scenario described in Study 2. Communicating with another person requires both attending to what the other person is saying as well as attending to the process of formulating one's own ideas. This is particularly true in a discussion when one is trying to explain one's opinion on a potentially controversial issue. However, good performance in both of these scenarios requires participants to actively focus their attention on the task at hand. This suggests that directed attention may be involved in interracial communication, and therefore it may be possible to improve performance by increasing directed attention. On the other hand, as Apfelbaum & Sommers (2009) found, there is also the potential for a negative effect on performance if participants' strategy for exercising executive control is maladaptive. In this study, the amount of time participants speak is also one potential measure, as participants may speak less as a way to avoid the possibility of appearing prejudiced to their partner.

Method

Design

This study employed a 2 (photographs: nature or urban) x 2 (discussion topic: race-relevant or race-irrelevant) between-subjects factorial design.

Participants

Participants in Study 3 were 77 White undergraduates at a large Midwestern university. 28 participants were female and 41 participants were male. Gender information was inadvertently excluded for 8 participants. 68 participants were recruited through an introductory psychology subject pool for course credit, while 9 others were compensated $10 for their participation.

Materials

Materials were identical to those used in Study 1, with the addition of the Sustained Attention Response Task (Robertson, Manly, Andrade, Baddeley, & Yiend, 1997), the nature and urban slideshows used in Study 2, and self-report measures of concern about appearing prejudiced and concern about offending one's partner. The last were added to provide insight into possible distractors that might increase the demand for self-regulation under stereotype threat. Because the computer-based digit span backwards did appear to be effective in measuring directed attention in Study 2, the measure was modified to be conducted in-person for the latter two thirds of the sample in Study 3. The in-person digit span backwards was performed by the experimenter reading a series of numbers to the participant, who was asked to repeat them back in reverse order. It may be that the computer-based version was not engaging enough to provide a reliable measure of performance (i.e. some participants may have rushed through the task

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without doing their best to recall the numbers.) Alternatively, participants may not have understood the instructions clearly, and performed the task incorrectly. Finally, the computer based version did not allow for any variance from differences in the difficulty of number sets to be controlled out, as each participant was given a unique randomly generated set. Thus, an additional test for homogeneity of variances will be used to determine whether or not the variances were different between the computer and in-person versions of the DSB. Lastly, In Study 3, the questions about participants' concerns about appearing prejudiced were incorporated into the post-interaction questionnaire instead of being asked during the debriefing.

Procedure

Study 3 combined the directed attention intervention from Study 2 with the interracial communication scenario in Study 1. In Study 3, prior to any interaction with their partner, participants completed the Sustained Attention Response Task, in which they were required to press a button on a computer in response to a series of numbers while excluding the number 3. Participants then viewed the slide shows as in Study 2. The same nature and urban photo slide shows were used as the manipulation, and the digit span backwards task was used as a manipulation check. Afterwards, participants introduced themselves, and expressed their basic opinions on the topic, just as in Study 1. Participants completed three digit span backwards measures to assess directed attention throughout the study. The DSB was performed once near the beginning of the study, immediately after the Sustained Attention Response Task, and once after the restoration and threat manipulations.

Measures

Speech Disfluencies

        Participants' verbal responses were recorded and later coded for speech disfluencies.

Partner statement recall

        Participants were asked to report what their partner had said during their conversation. These reports were coded for the number of details participants remembered about the conversation.

Directed attention

        Participants completed the digit-span backwards as described above.

Length of Speaking

        As in Study 1, the amount of time participants spoke was also measured in order to assess the rate of speech disfluencies. This variable was also analyzed separately as a potential indicator of participants' engagement (i.e. more engaged participants may speak more than less engaged participants.)

Self-regulation & Self-monitoring

        Self-regulation and self-monitoring were assessed using the same scales as in Study 1. See appendices A and B for scale items.

Self-expression

        As in Study 1, Participants responded to several Likert-type self-report questions about their performance: "I was able to express my basic opinion to my partner clearly," "I wasn't at my best during this conversation" (reverse scored), and "I said what I needed

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to say as clearly as possible in a limited time."

Concern about appearing prejudiced

   In Study 3, instead of being asked verbally, participants reported on a likert-type scale how well the statement "I was worried that my partner might think I was prejudiced towards them" applied to them, where 1 was "not at all" and 5 was "very much".

 Concern about offending partner

   Participants reported on a likert-type scale how well the statement "I was worried that I might say something that would offend my partner" applied to them, where 1 was "not at all" and 5 was "very much".

Results

   Speech Disfluencies. As in Study 1, the rate of speech disfluencies was analyzed using a 2 (topic) x 2 (slideshow type) between-subject analysis of variance.   Speech disfluencies were coded the same way as in Study 1. Given the relatively high inter-coder reliability in Study 1, only two coders were used in this study. Intercoder reliability was high at $r(61) = .793, p < .001$. 14 participants either declined to be recorded or were not recorded due to technical problems.

   The mean rate of speech disfluencies was 8.56 disfluencies per minute, with a range of 0 to 17.06. The standard deviation was 4.14 disfluencies per minute. Results did not yield main effects or an interaction for topic and restoration, all Fs < 1.

   Partner statement recall. Participant recall was measured using the same measures and coding scheme as in Study 1. Again only two coders were used since inter-coder reliability in Study 1 was high. Intercoder reliability was high at $r(66) = .838$. The mean recall score was 4.42, with a range of 0 to 8.5. The standard deviation was 1.86.

Results indicated a significant effect of topic such that participants recalled more about the race-irrelevant topic than about the race-relevant topic, $F(1, 69) = 25.602$, $p < .001$, as in Study 1. However, no significant effect of restoration emerged, $F(1, 69) < 1$. Also, no interaction emerged, $F < 1$.

Directed Attention. The DSB measure was calculated as a change score between the pre- and post-manipulation digit span backward scores. Levene's test of equality of error variances was performed to test whether performing the DSB in person showed a significant improvement in error variances. 21 participants completed the computer-based DSB, while 51 completed the computer-based version. The variance was reduced from 4.91 in the computer based version to 1.83 when the DSB was taken in person, $F(1, 70) = 5.164$, $p = .026$.

Among in-person sample, the mean was .333, with a minimum of -3 and a maximum of 3. The standard deviation was 1.35. Although the directed attention measure was changed during the study, and thus has a smaller sample size than other measures, the data was analyzed to assess the effectiveness of the restoration manipulation. An analysis of variance, controlling for the order in which each of 3 sets of numbers was presented, did not yield a significant effect of restoration, $F(1, 44) = 2.239$, $p = .136$[1]. No significant effect of topic or the interaction of restoration and topic and restoration emerged, both Fs < 1.

Length of speaking. The mean length of speaking was 34.93 seconds, with a range of 6.23 to 97.52. The standard deviation was 17.93 seconds. The amount of time

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1   Both samples together did not yield significant effects, $F(1, 68) = 2.496$, $p = .119$. In this analysis it was not possible to control for order effects because participants taking the computer-based DSB each had a unique randomized set of digits.

participants spoke was also examined as an alternative measure of communication. No main effect of either restoration or topic emerged, both $Fs < 1$. However, a marginally significant restoration x topic interaction emerged, such that participants who viewed urban photos spoke more while discussing a race-relevant topic, while those who viewed nature photos spoke more while discussing a race-irrelevant topic, $F(1, 63) = 3.784$, p = . 056.

Self-Regulation & Self-Monitoring. The mean self-regulation score was 23.5, with a range of 14 to 35. The standard deviation was 4.57. The mean self-monitoring score was 3.05, with a range of 2 to 4.28. The standard deviation was .45. No main effects or interactions of restoration and topic emerged on self-regulation, all $Fs < 1$. No significant effects emerged on self-monitoring either, $F(1, 75) = 1.173$, $p = .282$ for topic, $F < 1$ for restoration and the interaction of restoration and topic.

Ability to express oneself. The mean self-expression score was 2.87, with a range of 1 to 5. The standard deviation was .79. No significant main effect or interaction emerged on participants' self-reported ability to express themselves, topic $F(1, 75) = 1.282$, $p = .261$, restoration and restoration x topic interaction $Fs < 1$.

Concern about appearing prejudiced. The mean concern about appearing prejudiced score was 1.67, with a range of 1 to 5. The standard deviation was 1.04. A significant main effect of topic on concern about appearing prejudiced emerged, $F(1, 67) = 14.486$, $p < .001$, such that participants were more concerned about appearing prejudiced when discussing a race-relevant topic.

Concern about offending partner. The mean concern about offending one's partner score was 2.03, with a range of 1 to 5. The standard deviation was 1.17. A main

effect of topic on concern about offending the partner emerged, $F(1, 67) = 10.338$, $p = .$002, such that participants were more concerned about offending their partner when discussing a race-relevant topic. No main effect emerged for slideshow type, $F(1, 67) = 2.614$, $p = .111$. No interaction emerged, $F < 1$.

Correlations. No significant correlation emerged between disfluency rates and recall scores, $r(56) = -.138$, $p = .312$. See Table 4 for correlation matrix.

Discussion

The effect of topic on participants' recall of their partner's statement was replicated in Study 3, with participants remembering more of what their partner said about the race irrelevant topic than about the race-relevant topic.

However, Study 3 surprisingly did not appear to replicate the results of Study 1 in terms of the effect of topic on speech disfluencies. In Study 3, participants appeared to be able to speak just as clearly regardless of whether the topic was race-related. This lack of replication between Studies 1 and 3 may suggest an effect of the 2009 election on stereotype threat in interracial communication. Previous research has shown that stereotype threat effects can be reduced when in-group achievements in the threatened domain are made salient (McIntyre, Paulson & Lord, 2003; McIntyre, Lord, Gresky, Eyck, Frye, & Bond, 2005). If participants perceive the election of a Black president as an achievement in intergroup relations, it is possible that the effect of stereotype threat on intergroup communication could have been reduced. Alternatively, the election could have increased the amount of time participants spent discussing race in other settings, and thus had a positive impact on their communication during the study. Plant, Devine, Cox, Columb, Miller, Goplen, and Peruche, (2009) found significant reductions in implicit

anti-Black stereotyping after the Obama campaign compared with implicit stereotyping at the same institutions prior to the campaign. The implication of this is that the "threat" of discussing race may have been significantly reduced compared with Study 1.

The fact that Study 3 replicated Study 1 on one dependent variable but not the other is somewhat puzzling. It may be that the effect on recall is a result of participants' additional efforts to communicate clearly in the threatened domain. Although participants were able to communicate about race more successfully in Study 3 than in Study 1, those discussing a race-related topic may still have been using more resources thinking about what to say next than those discussing a non-race topic.

Although no effect of restoring directed attention emerged in the anticipated domains, there did appear to be a marginal interaction between restoration and topic on the amount of time participants spent talking. Participants appeared to spend more time talking about race when viewing urban photos than when viewing nature photos. Several factors could have yielded this result. First, it may be that restoring directed attention helped participants express themselves in a shorter period of time while under threat. However, this was not reflected in participants' self-reported ability to express themselves. Alternatively, it is possible that participants may have had a preexisting association between urban environments and race, and thus were more primed to discuss race after viewing urban photos. Both of these effects could potentially occur simultaneously to produce the apparent difference in how long participants spoke.

Unfortunately the sample size for the directed attention manipulation check was too small to fully test whether or not the manipulation was successful. However, although not statistically significant at $p = .136$, this does suggest a good likelihood for a

significant effect given a larger sample, particularly in the context of previous research in using the same manipulation (Berto, 2005).

Finally, the additional questions about participants' concerns about offending their partner or coming across as prejudiced confirm that these concerns were significantly more prevalent among participants who discussed a race related topic than those who discussed a race-irrelevant topic.

Table 4.1: Study 3 Descriptive Statistics – Behavioral measures of communication

Photo Type	Topic		Mean	Std. Deviation
Urban	Race-irrelevant	Disfluency Rate	9.187	5.056
		Recall Score	4.600	1.875
	Race-relevant	Disfluency Rate	10.014	4.043
		Recall Score	3.211	1.398
Nature	Race-irrelevant	Disfluency Rate	8.466	5.287
		Recall Score	5.059	1.600
	Race-relevant	Disfluency Rate	9.469	4.678
		Recall Score	3.643	1.499

Table 4.2: Study 3 Correlation Matrix

	Disfluency rate	Recall score	DSB Change	Length of speaking	Self-regulation	Self-monitoring	Self-expression	Concern about appearing prejudiced	Concern about offending partner
Disfluency rate	1	-.077	-.101	.050	.003	.262[*]	-.212	-.089	-.094
Recall score	-.077	1	.188	-.051	.152	.049	.047	-.298[*]	-.258[*]
DSB Change	-.101	.188	1	-.043	-.057	-.021	-.010	-.008	.020
Length of speaking	.050	-.051	-.043	1	-.216	.429[**]	.084	.046	.039
Self-regulation	.003	.152	-.057	-.216	1	.004	.089	-.134	-.195
Self-monitoring	.262[*]	.049	-.021	.429[**]	.004	1	.129	.035	.003
Self-expression	-.212	.047	-.010	.084	.089	.129	1	-.086	-.036
Concern about appearing prejudiced	-.089	-.298[*]	-.008	.046	-.134	.035	-.086	1	.698[**]
Concern about offending partner	-.094	-.258[*]	.020	.039	-.195	.003	-.036	.698[**]	1
*. Correlation is significant at the 0.05 level (2-tailed).									
**. Correlation is significant at the 0.01 level (2-tailed).									

Chapter 5

General Discussion

Taken together the results of these three studies reveal a fairly complex relationship between stereotype threat, directed attention, and other external factors. Study 1 provided strong evidence of stereotype threat effects in the domain of interracial communication, while Study 2 failed to demonstrate stereotype threat effects in a more traditional paradigm involving women in math. In this case, allowing participants to complete the study in groups may have been a mistake in the sense that the presence of other women may have reduced the effect of stereotype threat. Given previous research on solo status indicating additional performance decrements for women who are alone in a group of men (Sekaquaptewa & Thompson, 2005), it may be that being in a group of women could work as a buffer against stereotype threat. Indeed, Inzlicht & Ben-Zeev (2000) found performance improvements for women taking a math test with other women compared with those taking the test in a mixed group.

Interestingly, the intervention appeared to be highly effective for participants who were not under stereotype threat. The "least" threatened participants, those who were not under stereotype threat and for whom math was unimportant, showed dramatic improvements in performance after viewing the nature slideshow compared with the urban slideshow. This suggests the possibility that while increasing capacity for directed attention can benefit performance in some situations, stereotype threat may prevent

individuals from experiencing potential benefits.

Study 3's null result for stereotype threat in speech disfluencies initially appeared to conflict with the results of Study 1. On the other hand, stereotype threat did appear to influence recall as it did in Study 1. However, the results do seem to fit with previous stereotype threat research given its concurrence with Barack Obama's 2008 presidential campaign. Some previous research has shown that stereotype threat effects can be reduced when in-group achievements in the threatened domain are made salient (McIntyre, Paulson & Lord, 2003; McIntyre, Lord, Gresky, Eyck, Frye, & Bond, 2005). Thus it may be that the Obama campaign could have worked a salient in-group achievement for White participants in the domain of interracial tolerance.

It also may be that some of the changes made in Study 3 interacted with stereotype threat in both conditions, since all participants performed the SART and viewed photographs. For example, it is possible that having had more time between the beginning of the study and the stereotype threat manipulation helped participants feel more relaxed, and thus less susceptible to stereotype threat while speaking. Or, the act of viewing photographs prior to the stereotype threat manipulation may have had this effect. Unfortunately Study 3 did not include a control condition with no photographs, so it is difficult to assess whether or not the photographs had an effect on stereotype threat. While there may not be a strong theoretical reason to expect the process of viewing photos to have an effect without regard to content, there are relatively few differences between Studies 1 and 3 which could account for the differing results.

In any case, the replication of the effect on recall suggests that there may still have been some effect of stereotype threat on how well participants were able to pay

attention to their partner. Since the intervention did not show improvement in this area, it may be that again stereotype threat prevented participants from applying additional resources effectively. Of course, it is also possible that the manipulation was simply not strong enough to overcome the demands of speaking and listening while under the threat of confirming a negative stereotype about being racially prejudiced. Certainly given the lack of an effective manipulation check in Studies 2 & 3, it is also possible that the manipulation simply failed to improve directed attention enough to show an effect.

Unfortunately, the combination of a lack of an effective manipulation check and the possibility of an interaction between current events and the study design ultimately makes it more difficult to assess the role of directed attention in potentially reducing stereotype threat effects. Still, Studies 2 and 3 did reveal benefits of restoring directed attention in some circumstances. In Study 2, contrary to the predicted pattern, restoring directed attention actually provided more benefits to participants who were not under stereotype threat than those who were. On the other hand, for participants for whom math was important and who were under stereotype threat, restoring directed attention appeared to be detrimental to performance. In Study 3, the effect of restoring directed attention appeared as an interaction with the discussion topic on the amount time participants spoke.

Overall, this research raises quite a few questions about the relationship between stereotype threat and directed attention, and how they interact with one another. The results appear to suggest two distinct branches for future research—one examining directed attention in more traditional stereotype threat paradigms, and one focusing on stereotype threat in intergroup communication. In the traditional women/math

performance paradigm, it would be interesting to see how directed attention would relate to stereotype threat without the added influence of other same-gender participants. The clear boost to those participants under the least threat, and apparent detriment to those under the most threat suggests the possibility that effect of stereotype threat might be driven by participants' regulatory strategy. As Apfelbaum & Sommers (2009) found with resource depletion in interracial communication, it may be that having more directed attention resources may be detrimental when a maladaptive regulatory strategy is being used. In their study, non-depleted participants used their directed attention to avoid discussing race, while depleted participants communicated more effectively by speaking more directly. In other words, when the situation demanded open, direct communication, adopting a more cautious strategy was maladaptive, and to the extent that resource depletion prevented this strategy, participants were "better off" depleted. This could explain the interaction found between the intervention and stereotype threat on how much participants spoke—it could be that participants with more directed attention spoke less by the same process when discussing a race-related topic. An alternative explanation could be the effect of priming—participants viewing urban photos may have been primed to think about race, while those viewing nature photos may have been primed to think about biology, and thus each group was more easily able to think of things to say on those topics.

Grimm, Markman, Maddox, & Baldwin (2009) found a pattern similar to Apfelbaum & Sommers (2009) in the traditional stereotype threat paradigm. In the Grimm et al. study, the authors switched the reward structure by telling participants to avoid losing points. Importantly, "net value" of a correct answer was held constant;

participants had to get at least 90% of the answers correct to meet the goal of either "get 36 points" or "don't lose more than 24 points." The only difference was whether a correct answer was described as a gain of 2 points or losing only 1 point instead of 3. Their results confirmed that participants under stereotype threat performed better under the losses reward structure, while participants without stereotype threat performed better under the gains reward structure. Thus, stereotype threat effects appeared to be dependent on a regulatory mismatch between the prevention focus induced by threat and the gains reward structure of the task. When participants adopted a prevention focus strategy, they became motivated to avoid losses. For example, a participant pursuing a prevention focused strategy is focused on avoiding losing points on an exam, whereas a promotion focused participant is focused on earning more points. Ordinarily, standardized tests reward promotion focused participants—there is usually only a small penalty, if any, for an incorrect answer compared with the reward for a correct answer. Taken along with the current results, these two studies suggest the possibility that directed attention may be a significant benefit when the participants' strategy matches the task, but that making participants "better" at executing a mismatched strategy could make things worse.

Given this possibility, it may be that restoring directed attention is not an appropriate strategy for responding to stereotype threat. In the current research, both studies 2 and 3 were designed around the assumption that stereotype threat has its effect primarily by distracting participants, and thus reducing the attentional resources available for the task. However, if stereotype threat functions primarily by shifting participants' regulatory focus toward prevention when the task implies promotion, it may prevent

participants from benefiting from improvements in directed attention. There is still a good deal of evidence that stereotype threat causes distraction (Cadinu, Maass, Rosabianca, & Kiesner, 2005; Shapiro & Neuberg, 2007). Even so, if stereotype threat causes both distraction and a shift in regulatory focus, both of these factors would need to be addressed to restore normal performance. The fact that Grimm, Markman, Maddox, & Baldwin (2009) showed improvement by addressing regulatory focus alone suggests that that may be a more "essential" element of stereotype threat. Still, it is likely that restoring directed attention would provide additional performance benefits once this is addressed, particularly given the dramatic performance improvements seen in Study 2 for participants not under stereotype threat.

On the other hand, Study 3 did not show such an increase, even in the non-stereotype threat group, so it remains to be seen if there are other factors related to communication that could prevent participants from benefiting from increased directed attention. For example, it could be that participants adopted a prevention focus for both the human cloning and segregation on campus topics, since even the non-race topic still carried the potential for coming across as ignorant or uninformed. The lack of a stereotype threat effect in Study 3 tends to suggest the possibility that participants may have found the non-stereotype threat condition threatening even without stereotype threat. One might therefore speculate that participants may have adopted a prevention focus in both cases, thus reducing the effectiveness of the directed attention manipulation.

It may also be valuable to consider the relationship between stereotype threat and working memory, as directed attention and working memory are related concepts. Research by Schmader & Johns (2003) has shown that stereotype threat effects in

academic performance are mediated by a loss of working memory capacity, but Beilock, Jellison, Rydell, McConnell, & Carr (2006) also found stereotype threat effects for tasks that are not dependent on working memory. Thus it may be that the underlying mechanisms for stereotype threat are different for different tasks. If this is the case, there is a strong possibility that a different intervention for stereotype threat may be required in women's math performance than in White interracial communication.

There are many possibilities for future research based on the results of these three studies. First, although Study 1 found clear, strong effects of stereotype threat in interracial communication, Study 3 had more mixed results It would be helpful for future research to clarify whether this was a temporary effect of the recent election. Given stereotype threat effects in interracial communication, future research could potentially examine the circumstances in which stereotype threat is most likely to occur and where increasing directed attention is most helpful. Research by Trawalter & Richeson (2006) appears to suggest that having a prevention focus in interracial interactions reduces executive control. In that study, participants were given either promotion instructions, as in "approach the interaction as an opportunity to have an enjoyable intercultural dialogue," or prevention instructions as in "avoid appearing prejudiced in any way during the interaction," or no instructions. Both the prevention instructed and control groups showed impairment in executive control compared with the promotion group. On the other hand, Shelton, Richeson, Salvatore, and Trawalter (2005) found that White participants who had high implicit bias ironically appeared less prejudiced to their partners than those who had less implicit bias. This suggests that perhaps this high implicit prejudice subgroup may indeed benefit from a prevention focus in interracial

communication. Future research could examine whether increasing directed attention would contribute more heavily to improved communication for participants who are particularly high in implicit bias, and more generally, test the extent to which having a regulatory focus that matches the task is a prerequisite for participants to benefit from a directed attention intervention.

Conclusion

Ultimately, the integration of research on stereotype threat, directed attention, and interracial communication has great potential to improve performance in a wide variety of areas. There are several important points for future researchers to consider in order to address the shortcomings of the current research. First and foremost, a more effective manipulation check is essential to assessing the effectiveness of directed attention manipulations. The digit span backwards test used in the current research appeared to lose its effectiveness due to dramatically increased variance when administered on the computer. The attention network test (Redick & Engle, 2006) may be a more effective computer-based measure. The executive portion of the test has been used successfully by Berman, Jonides & Kaplan (2008) as a measure of directed attention.

Secondly, adding a regulatory focus approach may clarify where increasing directed attention is most helpful. As discussed earlier, previous research has shown effects of stereotype threat on regulatory focus. Theoretically, regulatory focus would be expected to interact with the effect of restoring directed attention since it may determine how directed attention is used. In the case of stereotype threat research, it may be valuable to test restoration while either manipulating regulatory focus as in Grimm, Markman, Maddox, & Baldwin (2009), or by testing for moderation.

Lastly, further research is needed on the relationship between stereotype threat, interracial communication, and directed attention. Since Studies 1 & 3 yielded different results in this area, it would be valuable for future research to verify the extent to which stereotype threat may affect Whites' communication about race-related topics, and how both directed attention and regulatory focus may be related to potential stereotype threat effects.

Hopefully, the current research will be taken as a starting point for integrating theories of stereotype threat, attention restoration, and regulatory focus. There is great potential to gain a better understanding of all three areas through research on how these factors influence performance in a variety of domains. Given its dependence on regulatory strategy, attentional requirements, and possible susceptibility to stereotype threat, interracial communication in particular is an area where a better understanding of these factors potentially could provide much greater knowledge of the complex underlying processes involved.

Appendix A: Self-Regulation Scale

Participants responded to each of the following items using a Likert-type scale.

1. I can concentrate on one activity for a long time, if necessary.

2. If I am distracted from an activity, I don't have any problem coming back to the topic quickly.

3. If an activity arouses my feelings too much, I can calm myself down so that I can continue with the activity soon.

4. If an activity requires a problem-oriented attitude, I can control my feelings.

5. I can control my thoughts from distracting me from the task at hand.

6. After an interruption, I don't have any problem resuming my concentrated style of working.

7. I stay focused on my goal and don't allow anything to distract me from my plan of action.

Appendix B: Self-Monitoring Scale

Participants responded to each of the following items using a Likert-type scale. (R) indicates item was reverse scored.

1. I find it hard to imitate the behavior of other people. (R)

2. At parties and social gatherings, I do not attempt to do or say things that others will like. (R)

3. I can only argue for ideas which I already believe. (R)

4. I can make impromptu speeches even on topics about which I have almost no information.

5. I guess I put on a show to impress or entertain others.

6. I would probably make a good actor.

7. In a group of people I am rarely the center of attention. (R)

8. In different situations and with different people, I often act like very different persons.

9. I am not particularly good at making other people like me. (R)

10. I'm not always the person I appear to be.

11. I would not change my opinions (or the way I do things) in order to please someone or win their favor. (R)

12. I have considered being an entertainer.

13. I have never been good at games like charades or improvisational acting. (R)

14. I have trouble changing my behavior to suit different people and different situations. (R)

15. At a party I let others keep the jokes and stories going. (R)

16. I feel a bit awkward in public and do not show up quite as well as I should. (R)

17. I can look anyone in the eye and tell a lie with a straight face (if for a right end).

18. I may deceive people by being friendly when I really dislike them.

Appendix C: Study 1 & 3 Confederate statements

Participants and the confederate responded to the following question in the race-relevant topic condition: "Your discussion will be about segregation on campus. Although this is a relatively diverse campus, students are often seen sitting with members of their own race in public settings such as the dining hall. How does this practice influence intergroup relations on campus? Ok [participant] it's your turn to speak."

[Following the participants' response, after a prompt from the experimenter]

Confederate: "Hmm, [pauses a moment to think] Well, on one hand, I think it makes it more difficult for people who are, like, different from one another to get to know each other. I know that where I grew up, in Illinois – in Springfield Illinois -- people in my high school would usually sit with people of the same race, like in the cafeteria and stuff. The Black students used to hang out together outside the gym. I guess people have a natural tendency to want to be around others who are like themselves. I think there's probably still a lot of people who don't really feel comfortable being around people of a different race, or maybe feel that they have something in common based on skin color. It's a comfort zone I think. Anyway, I'm not sure if it's necessarily something that influences intergroup relations on campus so much as it is, like, caused by intergroup relations—as long as people don't feel comfortable with each other, they probably won't sit together. Um, I guess that's it. I'm done."

Participants and the confederate responded to the following question in the race-irrelevant topic condition: "Your discussion will be about human cloning. Recent biomedical developments have allowed scientists to clone various animals. Is it appropriate to clone humans under any circumstances? If so, what circumstances? Ok

[participant] it's your turn to speak."

[Following the participants' response, after a prompt from the experimenter]

"Hmm, [pauses a moment to think] Well, I don't think we should clone humans for any reason other than, like, medical purposes. I mean, I think it would be okay to clone just a liver or a heart or something like that to help someone who needs a transplant, but not just so you can have an extra copy of yourself running around somewhere. I am just worried that if we continue to develop cloning, you know, make it easier to do, one day it will end up being used, or abused by people with a lot of resources; like millionaires, like Warren Buffet or something, could clone themselves or clone other people. That would be weird. I think the worst possible scenario would be if someone found some of my hair or something, and one day I run into an identical copy of myself. That would definitely creep me out. I guess the clone would be a little different, like a lot younger than me, but still--I would not be happy. Um, I guess that's it. I'm done."

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