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The Effect of Situational Attribution Training on Majority Group Members? Psychophysiological Responses to Out-group Members

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THE EFFECT OF SITUATIONAL ATTRIBUTION TRAINING ON MAJORITY GROUP MEMBERS' PSYCHOPHYSIOLOGICAL RESPONSES TO OUT-GROUP MEMBERS

by

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Under the Direction of Dominic Parrott

ABSTRACT

The present research explored the effects of Situational Attribution Training (Stewart, Latu, Kawakami, & Myers, 2010) on affective bias utilizing facial electromyography (EMG). Participants viewed a slideshow of randomly presented photographs of both and White and Black American men while rating how "friendly" each individual appeared. Simultaneously, *corrugator* and *zygomaticus* region activity, linked with positive and negative affect, respectively, was measured. Of these participants, half were randomly assigned to complete Situational Attribution Training beforehand. Results for EMG activity suggested no significant differences in EMG activity for White compared to Black photographs for either the training or control participants; thus, this study did not find evidence of affective bias by way of *corrugator* or *zygomaticus* activity. However, errors in slideshow presentation prevent clear interpretation of these results. Suggestions for future research and ways in which bias errors can be avoided are discussed.

INDEX WORDS: Attribution, Affect, Racism, EMG, Bias reduction

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This project is dedicated to my supportive and understanding family members, who have made tremendous sacrifices to help me complete my thesis. It is also dedicated to my grandfather who lost his battle with cancer this past year and sacrificed more than anyone else to help me succeed.

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1. INTRODUCTION

Minority groups in the United States continue to face discrimination based on intergroup biases such as racial stereotyping and prejudice. As discrimination in areas of employment, housing, education, and the legal system can substantially affect the lives of those who are targets of discriminatory behavior, exploring possibilities in reducing biases such as stereotyping has been an important focus of a substantial amount of research (e.g., Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Kawakami, Dovidio, & van Kamp, 2005; Stewart & Payne, 2008). Despite the fact that some research suggests stereotyping is automatic and often difficult to control, even with strong desire to control it (e.g., Devine, 1989; Galinsky & Moskowitz, 2007; Stewart, Doan, Gingrich, & Smith, 1998), there is new promising evidence that automatic stereotyping can, indeed, be reduced.

For example, Kawakami, Dovidio, Moll, Hermsen, & Russin (2000) designed a training task aimed at reducing automatic stereotyping by asking participants to “just say no” to stereotypic associations. In their training, participants were shown photographs of category group members (i.e., “skinheads” and “the elderly”) on a computer screen and, over many trials, responded “NO” by key press when a stereotypic trait was paired with the photograph and “YES” via key press when a non-stereotypic trait was presented with the photograph. Using both a primed Stroop task (Stroop, 1935) and the Person Categorization Task (Blair & Banaji, 1996), two commonly used measures of automatic processing, the authors found that participants who underwent training demonstrated reduced stereotype activation following their training task.

Later research by Kawakami, Dovidio, & van Kamp (2005) revealed that a modified version of the Kawakami and colleagues’ (2000) training task not only led to decreased stereotype *activation*, but also reduced stereotype *application* in a subsequent resume evaluation task. Although these effects were only significant for participants who were not purposefully avoiding being influenced by training, either due to reduced cognitive resources or the presentation of a filler task between training and the evaluation task, this research suggests that addressing stereotyping can lead to effects that extend to behavioral measures of discrimination.

In Kawakami and colleagues' (2000; 2005) training tasks, participants are essentially asked repeatedly say "NO" to stereotypic associations and "YES" to non-stereotypic associations, thereby *potentially* suppressing their automatic tendency to pair category members with stereotypic traits. Research has found that stereotype suppression actually may result in an increase in the accessibility of stereotypic associations later on and, subsequently, greater automatic stereotyping (Galinski & Moskowitz, 2000). In fact, research by Macrae, Bodenhausen, Milne, and Jetten (1994) found support for this theory such that participants who were asked to suppress stereotypes of skinheads exhibited greater automatic stereotype activation in a later task. The authors deemed this phenomenon a "rebound" effect. The possibility of rebound is proposed to occur under the assumption that stereotypic beliefs function as any other thought that is suppressed. Macrae and colleagues explain this rebound effect in terms of the same mechanisms described in research on priming and construct accessibility – the act of suppression of a particular stereotype ironically leads to it being more accessible thereafter. Concern regarding rebound effects has prompted research in which suppression does not play a key role in decreased stereotype activation and application.

For example, in another research paradigm, reducing automatic stereotyping was accomplished by addressing a foundational bias – the Ultimate Attribution Error (UAE; Stewart, Latu, Kawakami, & Myers, 2010). The UAE was characterized by Thomas Pettigrew as, "when prejudiced people perceive what they regard as a negative act by an out-group member, they will attribute it dispositionally, often genetically, in comparison to the same act by an in-group member" (Pettigrew, 1979). Therefore, when individuals minimize the influence of situational factors in explaining a negative behavior of an out-group member and, instead, focus on internal or dispositional explanations, they are committing the UAE. Evidence of this tendency is abundant. Duncan (1976) found that White participants attributed the same aggressive shove to dispositional factors (i.e., "He is aggressive.") when the actor was Black, yet to situational factors (i.e., "He was provoked.") when the actor was White.

It appears that these types of attributions can have substantial consequences for intergroup relations. Related to biases, the UAE can further reinforce stereotypes and perpetuate discrimination. For example, when an out-group member's negative behavior is attributed to internal factors while situational influences are minimized, it is likely that negative stereotypes related to the out-group are further reinforced and perpetuated. In fact, evidence suggests that the tendency to commit the UAE is more pronounced in highly prejudiced individuals (Greenberg & Rosenfield, 1979; Wittenbrink, Gist, & Hilton, 1997) and for groups with a history of tension and stereotyped views of one another (see Hewstone, 1990, for a review).

Based on the link between the UAE and automatic stereotyping, as well as evidence supporting the utility of training techniques in reducing stereotyping, Stewart, Latu, and colleagues (2010) attempted to "train away" the seemingly automatic tendency to fall victim to the UAE. Instead of asking participants to suppress stereotypes, however, researchers trained White participants to make situational (rather than dispositional) attributions for behaviors considered to be negative and stereotypic of Black males. For example, over many trials, participants undergoing Situational Attribution Training were presented with a behavioral sentence such as "Arrived at work an hour late" paired with a photograph of a Black male on a computer screen. They were simultaneously presented with two possible explanations for that behavior – one situational (i.e., "The power went out and reset his alarm") and one dispositional (i.e., "He is a particularly irresponsible person"). Using key press, they were instructed to choose the situational explanation over the dispositional explanation.

In two experiments, Situational Attribution Training was found by Stewart, Latu, and colleagues (2010) to decrease activation of negative stereotypes about Black men as measured by a reaction time task, the Person Categorization Task. This task, mentioned previously, involves randomly presenting photographs of White and Black men immediately following a particular trait prime. In their research, trials of interest involved positive and negative trait primes that were determined by pretests to be either stereotypic of Black men (e.g., religious, poor) or non-stereotypic of Black men (e.g., elegant, naive), although participants were also primed with race-neutral, White stereotypic, and White non-stereotypic traits. Participants were asked to use a keyboard to categorize each photograph by race as quickly as possible following the trait prime. In general, the faster participants are at categorizing a photograph after a certain type of trait prime, the greater the implicit association between the trait prime and individual depicted in the photograph. This association is indicative of automatic stereotype activation. For example, a participant who is quicker to categorize a photograph of a Black male after being primed with the trait "lazy", compared to categorizing a photograph of a White male after that trait prime, would demonstrate a stronger association between Black men and laziness, indicating greater automatic stereotyping of Black men.

In their research, Stewart, Latu, and colleagues (2010) found that, compared to control participants, participants who underwent training exhibited reduced automatic stereotype activation as measured by the Person Categorization Task. For their first two experimental studies, the authors compared response times for training participants with those of participants who were involved with one of two control conditions – a Grammar Control (Experiment 1) or No-Training Control (Experiment 2) condition. In the Grammar Control condition, participants were exposed to the same stimuli as training participants but were asked to make judgments regarding the number of nouns or verbs in the behavioral sentences presented. In the No-Training Control condition, participants were not exposed to any of the stimuli and completed no task prior to the Person Categorization Task. Despite their differences, type of control condition did not produce differential effects in this research.

More specifically, Stewart, Latu, and colleagues (2010) found that participants in both control conditions who did not undergo Situational Attribution Training were quicker to categorize photographs of Black individuals, compared to White individuals, presented after negative Black stereotypic primes (i.e., an anticipated automatic stereotyping effect). This tendency was diminished (i.e., non-significant) for participants who underwent Situational Attribution Training, a result which Stewart, Latu, and colleagues argue is less susceptible to rebound effects because no potential suppression is involved in training. This is because participants choose situational explanations but do not say “NO” or attempt to suppress dispositional inferences in the task.

In additionally promising research using the Situational Attribution Training technique, and in support of the hypothesis that rebound effects are less likely under this paradigm, Stewart, Myers, Latu, and Kawakami (2012) found that these positive results extend beyond immediate measurement after training to a delay of 24 hours in implementing the dependent measure. In this unpublished study, Stewart, Myers, and colleagues found reduced stereotype activation for participants who completed Situational Attribution Training, relative to No-Training Control participants who did not undergo training, even when training group participants completed the Person Categorization Task 24 hours post-training. Despite this new study and other previous research supporting the effectiveness of Situational Attribution Training in reducing bias in the form of automatic stereotyping, there is some research possibly calling the training method into question.

In her dissertation research, Latu (2010) conducted two studies with the goal of exploring mechanisms and moderators of Situational Attribution Training. In her research, Latu relied upon a different measure of automatic stereotype activation than previously used in Situational Attribution Training research. For example, in one study, Latu randomly assigned participants either to the Situational Attribution Training condition or a Grammar Control condition and then had participants complete a modified version of the Probe Recognition Task (modeled after Wigboldus et al., 2003; Study 2). This task involved presenting participants with a photograph of either a White or Black male paired with a behavior description indicative of a negative Black-male-stereotypic trait. After this presentation, participants saw 5 one-word probes, presented individually, and were asked to indicate via key press whether the word appeared in the behavioral sentence that preceded it. Two of the probes presented were of interest in this task – one that was a trait probe not presented in the sentence but that was indicative of a stereotypic trait, and a control probe that was not presented. Other probes were filler probes that were not presumably activated/implied or present in the behavioral sentence. In this way, automatic stereotype activation would be observed when participants take longer to reject (say “NO” to) the stereotypic trait probe, compared to control probe when paired with a photograph of a Black male.

Using this task, Latu (2010) failed to find evidence of reduced stereotyping for training compared to control participants. In fact, neither group demonstrated automatic stereotype activation. Given the preponderance of data that have found automatic racial stereotyping to be demonstrated across numerous implicit stereotyping dependent measures, the absence of evidence of automatic stereotyping in any condition in this study is quite surprising. This failure to find evidence of any automatic stereotype activation, even for the control participants, may well be a red flag in terms of the utility of the rarely-used Probe Recognition Task as a measure of automatic stereotyping, though some may argue it is threat to the utility of the task itself.

The question of whether the Situational Attribution Training technique is, indeed, effective, along with other questions related to its generalizability to different bias measures, does still remain. Thus, to aid with further exploring the usefulness of the technique, I conducted a study utilizing another implicit measure of bias linked to, but theoretically distinct from, stereotyping – prejudice in the form of negative affect. But (1) why explore this form of bias and (2) why would it be expected that Situational Attribution Training would influence affective responses to out-group members?

Foremost, why should research explore if Situational Attribution Training influences bias in the form of negative affect? As noted by Dovidio, Gaertner, Stewart, Esses, Vergert, and Hodson (2004), intergroup bias is a multifaceted phenomenon comprised not only of beliefs and behavioral proclivities but also comprised of emotions. More specifically, the multifaceted components of bias refer to "prejudice, stereotyping, negative affect, and discrimination," (Dovidio, et al., 2004; p. 244) all forms of bias that have been shown to contribute to less positive intergroup relations. Should Situational Attribution Training influence these multiple measures of bias, beyond stereotyping, there would be strong support for its effectiveness as a *general* bias reduction technique. In this way, if training not only reduces automatic stereotyping of out-group members (which has been shown in three experiments using the Person Categorization Task) but also reduces negative affective reactions to out-group members, there should be more confidence in the utility of the task as a measure worth pursuing.

Additionally, researchers have found that individuals exhibit negative implicit affective responses to out-group members, as measured using facial electromyography (EMG), despite explicitly reporting positive attitudes toward those out-group members (Vanman, Paul, Ito, & Miller; 1997). Negative affect has also been found to predict other forms of bias, particularly discriminatory action (e.g., Vanman, Saltz, Nathan, & Warren, 2004), when other implicit measures do not. In Vanman and colleagues' 2004 research, for example, participants were asked to make hiring decisions regarding Black and White applicants after completing a measure of implicit bias – the Implicit Association Task (IAT; Greenwald, McGhee, & Schwartz, 1998). Three weeks later, participants also completed a measure of implicit affective bias in which they viewed photographs of Black and White men while their facial electromyography (EMG) was recorded from sites linked to smiling and frowning. In this research, bias as measured by way of EMG activity predicted hiring decisions although bias on the IAT did not.

It seems important, then, to address the affective component of bias and determine if Stewart, Latu, and colleagues' (2010) training can modify affective responses, particularly negative affective responses. But, why would anyone even expect this effect on affective responses to occur? The Situational Attribution Training technique targets a fundamental biased tendency to attribute negative stereotype-consistent behaviors to an internal disposition of an out-group member, rather than considering situational factors. This tendency perpetuates negative stereotypic associations such that consistently attributing negative stereotype-consistent behaviors to internal factors reinforces that negative stereotype. Gugliemi (1999, p. 124) states, "Unfavorable judgments about a group and negative emotional reactions to it (prejudice) are supported by a particular belief structure (stereotypes)..." Considering this, it might be expected that training has an effect on the emotional component of bias because training is targeting a foundational bias (the UAE) which, when “trained away,” leads to reduced automatic negative stereotyping. With the reduced automatic tendency to stereotype negatively, there should be less support for (i.e., a reduced likelihood of) potential negative emotional reactions to out-group members to occur, which occurs by default. With less support for prejudice to occur, evidence of prejudice should be less likely to be observed.

The observations mentioned above speak to the necessity of exploring other measures of bias often linked with stereotyping (i.e., negative affect), in general, and in relation to the Situational Attribution Training paradigm, specifically. As previously referenced research suggests, the most common method of studying implicit affective responses is by way of facial EMG (e.g., Vanman et al., 2004). In this line of research, researchers often rely on the use of electromyography (EMG) to assess subtle smile and frown activity and reveal on-line affective reactions to stimuli (Cacioppo, Tassinary, & Fridlund, 1990). Specifically, researchers investigate activity along the *corrugator supercilia* muscle (linked to frown activity) and the *zygomaticus major* muscle (linked to smile activity). When an individual smiles or frowns, even below an observable threshold, EMG can pick up on this activity, which repeatedly has been found to be associated with negative and positive affect, respectively (e.g., Fidlund & Cacioppo, 1986; Vanman, Saltz, Nathan, & Warren, 2004). There is some debate, however, regarding the respective utility of activity at each region (*zygomaticus* versus *corrugator*) individually in assessing the ability of affective responses to predict out-group-directed behaviors. For instance, Vanman and colleagues (2004) found that cheek and not brow activity predicted racial bias in the form of job candidate selection, whereas Stewart, Amoss, Elliott, Perrott, Peacock, and Vanman (2012) found that brow activity better predicted heterosexual social action on behalf of sexual minorities. With the debate remaining unsettled, continuing to include measures from both regions in research is important. Thus, in the research detailed here, I attempted to explore how implicit affective responses, measured using facial EMG recorded along both *zygomaticus* and *corrugator* regions, are potentially affected as a result of the Situational Attribution Training task. Using another more established measure of implicit affective bias may provide further support for the technique or, alternatively, it may amplify earlier suspicions brought about through Latu's (2010) research that call into question this task as a bias reduction technique, in general.

2. SPECIFIC AIMS AND HYPOTHESES

In this study, I aimed to replicate the bias reduction effect found in previous research using the Stewart, Latu, and colleagues (2010) Situational Attribution Training task. However, I utilized a different measure of bias, facial EMG, to explore the continued utility of training. In other words, I hoped to address whether the training task also served as a prejudice reduction task (with prejudice being conceptualized as an affectively-based component of bias), in addition to being an automatic stereotyping reduction task, by reducing subtle negative affective bias measured using EMG. I hypothesized that White participants who did not undergo extensive Situational Attribution Training (i.e., control participants) would exhibit more negative affect and/or less positive affect when viewing photographs of Black individuals compared to White individuals, as indicated by relatively higher *corrugator* and/or relatively lower *zygomaticus* activity. In this way, White participants who were not trained extensively to make situational attributions would demonstrate the tendency to have subtle negative affective responses to Black males, a tendency that would be reduced for participants who underwent Situational Attribution Training.

More specifically, I anticipated a Condition (Training vs. Control) X Photograph Type (White, Black) interaction whereby mean EMG activity when viewing Black compared to White photographs differed depending upon condition. In other words, given previous evidence that Situational Attribution Training does indeed reduce implicit affective bias (Stewart, Latu, et al., 2010), I anticipated Control participants to demonstrate one or both of the affective biases described above. I expected Situational Attribution Training participants, however, to show no difference in *zygomaticus* or *corrugator* scores for Black versus White photographs.

It is important to note that previous research indicates that due to context effects, trait judgments made based on one individual may not necessarily generalize to judgments of other individuals in the same social group (Stewart, Doan, Ginrich, & Smith, 1998). This finding suggests that effects of training may be most pronounced when participants are making judgments of Black targets that were previously seen in training compared to never before seen Black targets. Thus, the present study also examined the potential effect of both types of stimuli: Black American men never seen before and those seen in training. This exploratory inclusion of a “seen” versus “unseen” component in this study’s design allowed for the examination of whether training differentially affects responses to previously seen versus new faces.

3. METHOD

3.1 Participants

Analyses using *G*Power* (Erdfelder, Faul, & Buchner, 1996) software suggested that a sample of approximately 80 participants would provide sufficient power for the project's design to detect a medium-sized effect (f=.25) with α = .05. This conservative power analysis was based on a design investigating *corrugator* and *zygomaticus* activity as two separate variables in separate ANOVAs, due to prior research finding that *zygomaticus* region activity better predicts positively of out-group-directed behaviors (Vanman et al., 2004) and other research finding *corrugator* region activity is better at predicting such behaviors (Stewart et al., 2012).

In this study, 77 (26 male, 51 female) undergraduate students who self-identified as native-speaking White Americans participated as a means to fulfill part of an introductory psychology course requirement. Participants were recruited through online human subject pool management software whereby students could search and sign up for a variety of available university research projects. Using a random numbers table, participants were randomly assigned to either the Situational Attribution Training Condition or a No-Training Control Condition when they arrived in the laboratory. All procedures described below were approved by the Institutional Review Board prior to data collection.

3.2 Measures and Procedure

Phase 1: Training. At the start of the experimental session, each participant reported to a lab room containing computers separated by privacy dividers. After providing informed consent, an experimenter told participants that they were assisting different graduate students with two separate research projects. Participants were informed that the first project investigated how we explain others' behaviors. Those participants randomly assigned to the Situational Attribution Training condition were told that the first study involved a computer task in which they would be shown numerous photographs of either Black American or White American individuals. All participants in this condition were also told that they had been assigned to the Black photograph condition, however, and would see only photographs of Black males. They were also told that one photograph would be presented on the computer screen with a description of a behavior and two possible explanations for that behavior – a situational explanation and dispositional explanation. Participants were asked to choose the situational explanation over the dispositional one using key press. Definitions of each type of explanation and examples were provided by the experimenter prior to beginning the task and this information was reiterated in the computer program. Control participants did not complete this first task but instead proceeded directly to the second phase of the experiment, the EMG task. The passage of time was not accounted for in this condition, however. Stewart and colleagues' (2010) found no significant differences in responding based upon whether a Grammar Control condition (in which participants viewed the same stimuli but made decisions regarding the number of nouns or verbs in the behavioral descriptions) or a No-Training Control condition was used; thus, the No-Training Control condition was utilized in this research. This control version was selected in order to avoid incorporating too many tasks into one experimental session and risking participant fatigue. For this study, then, it is important to note that participants in the Control condition were not exposed to any of the Situational Attribution Training stimuli.

After instructions and six practice trials with feedback (a red "X" for an incorrect response), the Situational Attribution Training participants began the training task taken directly from the Stewart, Latu, and colleagues (2010) experiment. The task was composed of 480 trials divided into six blocks of 80 trials, completed over the course of approximately two hours. During each training trial, one of 36 possible photographs of a young Black man was randomly presented in the center of the computer screen along with the label "African American" presented to the left of the photograph (included to ensure that participants categorized the person in the photograph; Livingston & Brewer, 2002). A sentence describing a behavior indicated by pretests to be strongly suggestive of a negative Black stereotypic trait (loud, criminal, unintelligent, unreliable, irresponsible violent, not honest, dangerous, lazy, promiscuous) was displayed directly below the photograph. After a 3000 ms delay, the words “I Choose” appeared in the middle of the screen, below the behavior description, and two possible explanations for the behavior appeared on the bottom left- and right-hand side of the screen. As mentioned, one of these explanations was situational and the other was dispositional. For example, the behavior “Arrived at work an hour late” was accompanied by the situational explanation “The power went out and reset his alarm” and the dispositional explanation “He is a particularly irresponsible person.” The location of these explanations on the screen was randomized across trials such that the situational explanation appeared on the bottom right side for half of the trials and on the bottom left for the remaining half. Participants chose the situational explanation of the two by pressing one of two designated keys on the keyboard: the “z” key, labeled “left,” to choose the explanation on the left side of the screen or the “?” key, labeled “right,” to choose the explanation on the right side of the screen. The display remained on the screen until a response was made.

Phase 2: The EMG task. Participants in each condition completed the EMG task in which they viewed a slideshow of photographs of White and Black men and were asked, as a cover for the true intention of this task, to rate how friendly each individual in the photograph appeared to be. While completing this task, participants had six electrodes (referred to as sensors to participants) attached to their faces. One pair of Ag-AgCl electrodes (4 mm in diameter), filled with standard electrolyte gel, was attached to the participant’s right cheek at the *corrugator* *supercillia* muscle location and another pair was attached above the right brow at the *zygomaticus major* muscle location, following recommendations established in the EMG literature (Fridlund & Cacioppo, 1986; Tassinary, Cacioppo, & Geen, 1989). One ground electrode was placed on the right forehead. Skin and electrode preparations followed EMG recording guidelines established by Fridlund and Cacioppo (1986) and Tassinary, Cacioppo, and Geen (1989). EMG activity was continuously recorded using an MP150 Biopac system (Biopac Systems, Inc; Goleta, CA) at a 1 kHz sampling rate, during which the signal was rectified and smoothed using a 10 Hz filter through Acqknowledge software. These data were then scored off-line using MindWare analysis software during which a 200 Hz high pass and a 10 Hz low-pass filter were applied. With these scores, more activity (i.e., higher scores) for *corrugator* data indicated more negative affect (i.e., more frowning) and more activity for *zygomaticus* data indicated more positive affect (i.e., more smiling).

As a cover for the true purpose of the experiment, in an attempt to discourage participants from either intentionally or unintentionally modifying their facial muscle activity during the task, participants were told that the electrodes recorded “involuntary neural responses that emanate from the head” (Vanman et al., 2004, p. 712-713). In addition, this task was described to participants who completed *Phase 1* as a second separate study conducted by a different graduate student investigating our perceptions of photographs. Computer displays for each phase differed in terms of font face, color, and size, and background color to aid with the cover story that both parts of the experiment were unrelated.

During the slideshow presentation, it was intended that all participants viewed a series of 32 photographs, 16 of which were of Black American men and 16 of which were of White American men. Of the 16 Black American male photographs, 8 of the photographs of Black males were meant to be new photographs never seen by any participants (herein referred to as "Black" photographs). The remaining 8 photographs were supposed to be selected from the Situational Attribution Training task (herein referred to as "Black - Training" photographs). As a note, these Black - Training photographs had been seen by participants randomly assigned to the Situational Attribution Training condition but were all new to Control participants, who did not complete that phase of the experiment. All photographs were presented in black and white and depicted men with neutral facial expressions.

Additionally, photographs in each of the three photograph-type groups (White, Black, and Black - Training) were intended to be randomly presented without replacement within photograph-type groups. In other words, a White, Black, or Black - Training photograph was supposed to be randomly selected for each trial by the presentation software. Furthermore, when a White photograph was randomly selected for presentation, it should have been (and was) taken from a list of 16 potential White photographs and then removed from the available list of White photographs to be presented in later trials. However, when a Black or Black - Training photograph was selected, it was randomly presented *with* replacement due to an error in programming. Each participant saw four of these types of photographs, each presented twice. Thus, eight photographs of each type had been seen more than once during just the slideshow presentation. The specific photograph repeated was *not* the same for each participant, however, because each photograph was randomly presented and returned to the pool of potential photographs to be randomly drawn for presentation.

In summary, all participants actually saw a total of 48 photographs. Of these 48, 16 were White photographs all participants had never seen before. They also saw 16 Black photographs (4 of which were repeated), and 16 Black - Training photographs (4 of which were repeated).

This means a total of 32 photographs of Black American men were seen, 16 of which were seen more than once (50% of the trials in which Black males were presented). See Figure 1 for a breakdown of this presentation error and the intended presentation.

Each photograph was presented on the computer screen for 5 seconds and was immediately followed by a rating task in which participants indicated via key press how friendly the individual in the previously presented photograph appeared to be. The rating task was included in order to encourage attending to each photograph presented since some research suggests attention to out-group members may differ from attention of in-group members, whereby we pay more attention to in-group members (Chance & Goldstein, 1981). It was assumed that having the goal of determining the perceived friendliness of each photographed individual would encourage processing of the individual in the photograph, more so than not giving participants any task to complete during the viewing phase. Participants were given unlimited time to provide their rating, since the photograph was no longer displayed. These ratings, although not a dependent measure of interest, were recorded on a 1 (very unfriendly) to 7 (extremely friendly) point scale. Participants' *corrugator supercilia* (brow) and *zygomaticus major* (cheek) activation was continuously measured as they viewed and rated each photograph, although analyses were conducted on data collected during the photograph viewing phase.

Following the EMG task, all participants were debriefed, thanked for their time, and any questions were answered by the experimenter. Participant responses were not associated with their names and any identifying information was stored in a locked file cabinet. Data were stored on a password-secure computer.

4. RESULTS

4.1 Design

EMG activity was divided into two distinct dependent variables, due to some prior research finding that *zygomaticus* region activity better predicts out-group-directed behaviors (Vanman et al., 2004) and other research finding *corrugator* region activity is a better predictor of such behaviors (Stewart, Amoss, et al., 2012). Therefore, I conducted separate 2 (Condition: Situational Attribution Training vs. No-Training Control) X 3 (Photograph Type: White vs. Black vs. Black - Training) mixed model ANOVAs with Photograph Type as the repeated measure for each of the two dependent variables (*corrugator* region activity and *zygomaticus* region activity). Additionally, I investigated explicit "friendliness" rating scores as a dependent variable in another 2 (Condition: Situational Attribution Training vs. No-Training Control) X 3 (Photograph Type: White vs. Black vs. Black - Training) mixed model ANOVA with Photograph Type as the repeated measure.

4.2 Data Preparation

Of the 77 participants who completed the study, 13 (16.9%) failed to produce complete data sets due to computer glitches during training (e.g., a computer froze and participant could not complete the training task), errors in EMG recording (e.g., impedance readings within a recommended range could not be obtained within a reasonable period of time), and/or artifacts in EMG recordings (e.g., participant coughed repeatedly). Thus, the complete data set consisted of 64 usable participants. *Corrugator* and *zygomaticus* scores for each of these participants were determined by separately averaging wavelength amplitude across phases of each photograph type (White, Black, and Black - Training). Each phase commenced upon presentation of the stimulus and concluded when the stimulus was removed from a participant's visual field (a span of 5 seconds for each photograph).

Additionally, outlier analysis was conducted on the remaining 64 participants' EMG scores, following recommendations set forth by Field (2005). Graphical displays of each *corrugator* and *zygomaticus* activity variable revealed consistent outliers for two participants, with average scores falling outside of the anticipated range of scores. For these two participants, one or both absolute *z*-scores were greater than 3.29; thus, these two participants were removed from further analysis, leaving 62 participants (21 male, 41 female) in the final data set. Outlier analysis conducted on explicit rating scores revealed no significant outliers.

4.3 EMG Data Analysis

Corrugator Data: Preliminary Analyses. Mauchly's test indicated that the assumption of sphericity had been violated with these repeated-measures data (χ^2 (2) = 55.45, p <.05), suggesting that there was a significant difference between the variances of differences between levels of the repeated measure. Violation of this assumption can lead to a loss of power, which was already a concern given the smaller than expected sample size and the inability to collect additional data; therefore, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = .62).

Homogeneity of variance was explored using Levene's test. Results indicated that variances were not significantly different for White means, F(1,60) = .891, p > .05, Black means, F(1,60) =. 049, p > .05, or Black - Training means, F(1,60) =. 096, p > .05; therefore, the assumption of homogeneity of variances was not violated with any of the repeated measures variables. Had this assumption been violated, it would compromise the accuracy of the F-test for Condition and transformation would be necessary to correct the variances (Field, 2005).

Finally, normality was examined using Kolmogorov-Smirnov test, which evaluates the hypothesis that the data significantly deviate from normality (i.e., a significant result indicates a deviation from normality). In the Training condition, *corrugator* data for White photographs, $D(31) = .119$, $p > .05$, Black photographs, $D(31) = .122$, $p > .05$, and Black - Training photographs, $D(31) = .126$, $p > .05$, did not significantly differ from normality. In the Control condition, *corrugator* data for Black photographs, $D(31) = .151$, $p > .05$, and Black - Training photographs, $D(31) = .149$, $p > .05$, did not significantly differ from normality. Data for White photographs did produce a significant result, $D(31) = .176$, $p < .05$, suggesting this distribution significantly deviated from normality[1].

Corrugator Data: Target Analyses. Analyses failed to find a main effect of Photograph Type, $F(1.24, 74.57) = .841$, $p = .386$, or Condition, $F(1,60) = .000$, $p = .989$. Similarly, the Condition X Photograph Type interaction was not significant, $F(1.24, 74.57) = 1.09$, $p = .312$. See Figure 2 for a graphical depiction of the means.

Although a lack of significant interaction for these data did not justify the investigation of simple effects, simple main effect contrasts were conducted. Post-hoc comparisons were conducted using Bonferroni corrected alpha level of .017 (.05/3) for each test. For Control participants, there was a trend toward a simple main effect of photograph type on *corrugator* scores, such that there was greater EMG activity when viewing White compared to Black – Training photographs, $t(30) = 1.99$, $p = .056$, $d = .087$. There was also greater activity when viewing Black compared to Black – Training photographs, $t(30) = 1.98$, $p = .057$, $d =.057$. However, there was not a trend toward a difference between scores when viewing White compared to Black photographs, $t(30) = 1.31$, $p = .202$, $d = .032$. For Training participants, there were no significant differences or trends toward significant differences between scores when viewing White compared to Black photographs, $t(30) = -.432$, $p = .669$, $d = -.042$, when viewing

White compared to Black – Training photographs, $t(30) = -.158$, $p = .875$, $d = -.012$, or when viewing Black compared to Black – Training photographs, $t(30) = 1.285$, $p = .208$, $d = .029$.

Zygomaticus Data: Preliminary Analyses. Mauchly's test indicated that the assumption of sphericity had been violated with these repeated-measures data (χ^2 (2) = 15.65, p <.05), suggesting that there were significant differences between the variances of differences with these data. Violation of this assumption can lead to a loss of power; therefore, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .81$).

Levene's test indicated that variances were not significantly different for White ratings, $F(1,60) = .578$, p >.05, Black ratings, $F(1,60)$ =. 157, p >.05, or Black - Training ratings, $F(1,60)$ =. 340, p >.05; therefore, the assumption of homogeneity of variances was not violated with any of the repeated measures variables.

Finally, the Kolmogorov-Smirnov test of normality suggested that, in the Training condition, the distribution of *zygomaticus* data for White photographs, $D(31) = .252$, $p < .05$, Black photographs, $D(31) = .246$, $p < .05$, and Black - Training photographs, $D(31) = .233$, $p < .05$, significantly differed from normality. Likewise, in the Control condition, *zygomaticus* data for White photographs, $D(31) = .199$, $p < .05$, Black photographs, $D(31) = .227$, $p < .05$, and Black - Training photographs, $D(31) = .239$, $p < .05$, significantly differed from normality.

***Zygomaticus Data: Target Analyses*.** Analyses failed to detect a main effect of photograph type, $F(1.62, 97.33) = .694$, $p = .473$, or Condition, $F(1,60) = .038$, $p = .847$. Similarly, a significant Condition X Photograph Type interaction was not found, $F(1.62, 97.33) = 1.38$, $p = .254$. See Figure 3 for a graphical depiction of the means.

Although a lack of significant interaction did not justify the investigation of simple effects, simple main effect contrasts were again conducted to explore the pattern of these data. As with *corrugator* data analyses, post-hoc comparisons were conducted using Bonferroni corrected alpha level of .017 (.05/3) for each test. For Control participants, there was a trend toward a simple main effect of photograph type on *zygomaticus* scores, such that there was less EMG activity when viewing White compared to Black – Training photographs, $t(30) = -1.891$, $p = .068$, $d = -.084$. However, there was not a trend toward a difference between scores when viewing White compared to Black photographs, $t(30) = -1.500$, $p = .144$, or Black compared to Black – Training photographs, $t(30) = .573$, $p = .571$. For Training participants, none of the comparisons between these means approached even a statistical trend. Observed power ($1-\beta$) for all *zygomaticus* and *corrugator* post-hoc analyses ranged from .061 to .076, indicating that these analyses were consistently underpowered.

4.4 Explicit Rating Analyses

Preliminary analyses. Mauchly's test indicated that the assumption of sphericity had been violated with these repeated measures data, (χ^2 (2) = 19.763, $p < .05$), suggesting that there were significant differences between the variances of differences between the repeated measures factor, Photograph Type. Violation of this assumption can lead to a loss of power; therefore, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .78$).

Homogeneity of variance was explored using Levene's test on the between-subjects factor, Condition. Results indicated that variances were not significantly different for White ratings, $F(1,60) = .188$, $p > .05$, Black ratings, $F(1,60) = .098$, $p > .05$, or Training ratings, $F(1,60) = .413$, $p > .05$; therefore, the assumption of homogeneity of variances was not violated with any of the repeated measures variables.

Finally, normality was examined using Kolmogorov-Smirnov test which tests the hypothesis that the data significantly deviate from normality (e.g., a significant result indicates a deviation from normality). Ratings of White photographs, *D*(62) = .071, $p > .05$, Black photographs, *D*(62) = .058, $p > .05$, and Training photographs, *D*(62) = .076, $p > .05$, did not significantly differ from normality. The same assumption held when tests of normality were conducted on scores separated by condition.

Target Analyses. A 2 (Condition: Training, Control) X 3 (Photograph Type: White, Black, Black - Training) mixed ANOVA with Photograph Type as the repeated measures detected a significant main effect of Condition, $F(1,60) = 7.23$, $p = .009$, such that Training participants (*M* = 3.95, *SE* = .11) rated all faces as significantly more friendly than Control participants (*M* = 3.53, *SE* = .11). Similarly, a significant main effect of Photograph Type on ratings was found, $F(1.56, 93.41) = 39.46$, $p < .001$.

Post-hoc comparisons were conducted using Bonferroni corrected alpha level of .017 (.05/3) for each test. Results revealed that participants rated photographs of White males as significantly more friendly than photographs of Black males not presented in the training task, $t(61) = 8.04$, $p < .001$, $d = .927$, but not more friendly than those which were presented in the training task, $t(61) = 1.87$, $p = .066$; however, the latter was found at a power ($1 - \beta$) of only .294 and an effect size (*d*) of .240, indicating that this analysis was underpowered to detect an effect. Finally, Black - Training photographs were rated as more friendly than Black photographs, $t(61) = -9.19$, $p < .001$, $d = -0.717$. Observed power for all explicit ratings post-hoc analyses ranged from .293 to .999, with the analyses which were underpowered being noted as such. Thus, for explicit ratings, most analyses had sufficient power to detect potential effects, unlike all post-hoc EMG analyses. For a summary of means and standard deviations, see Table 1. Although both main effects were significant in these analyses, the interaction between Condition and Photograph Type was not, $F(1.56, 93.41) = 39.46$, $p = .472$.

5. DISCUSSION

The primary goal for this research was to investigate the potential effects of Situational Attribution Training on implicit bias in the form of negative affect. In this way, negative affect was measured by recording facial EMG activity along the *corrugator* and *zygomaticus* muscle regions while participants viewed a slideshow of photographs depicting White and Black American males. To address this goal, I intended to replicate the bias reduction effects found in previous research (e.g., Stewart, Latu, et al., 2010; Stewart, Myers, et al., 2012) by first demonstrating implicit affective bias in Control participants. In the current research, this would mean Control participants would demonstrate greater EMG activity along the *corrugator* region (e.g., more frowning and, therefore, more negative affect) and/or lesser EMG activity along the *zygomaticus* region (e.g., less smiling and, therefore, less positive affect) when viewing photographs of any Black compared to White males. I, then, intended to demonstrate a null effect for Training participants whereby they would not have significant differences in EMG activity along the *corrugator* and/or *zygomaticus* muscle regions. In other words, for Training participants, implicit affective responses would not be significantly different and, therefore, any bias found in Control participants would have been reduced as a result of undergoing Situational Attribution Training.

Assuming support for the previous expectation was found, an additional exploratory goal of this research was to examine whether the effect of Situational Attribution Training differed depending upon whether the target of potential bias was an individual seen before compared to an individual never seen before. The purpose of investigating this “seen before” aspect was to look at whether affective bias reduction effects occurred for any individual considered part of the out-group, or just for those members of the out-group for whom participants had exposure (those seen previously or "trained against"). To address this goal, EMG activity for each region was averaged separately for photographs taken from the Situational Attribution Training task (i.e., Black – Training photographs) and photographs not taken from the task (i.e., Black photographs); therefore, separate variables were created for these data and entered in all EMG analyses.

Finally, not as a targeted concern in this research but of interest, and of importance when investigating the impact of Situational Attribution Training, I attempted to explore explicit participant ratings of how friendly each individual presented in the photograph slideshow appeared to be. I was interested in whether these explicit ratings differed depending upon (1) participant condition (Training vs. No-Training Control), (2) whether the individual presented in the photograph was White or Black, and, (3) for Black photographs, whether the individual in the photograph had been seen before in the training task. For all of these intended goals, an error in methodology described above, which was not detected until the data analysis phase of this research, led to tentative conclusions being drawn from the present data.

5.1 EMG Scores

Overall, analyses of EMG scores did not support the original hypotheses described above. Foremost, analyses failed to find any significant differences in *corrugator* or *zygomaticus* activity depending upon photograph-type or condition. Indeed, it was hypothesized that there *would be* no difference in EMG activity for Training participants as a result of the bias reduction effects of training. However, No-Training Control participants also failed to demonstrate any implicit affective bias to begin with that could be "reduced." In fact, Control participants who came into the laboratory and only completed the EMG portion (*Phase 2*) of the study, seeing all of the men in the photographs for the first time, did not even demonstrate bias in the anticipated direction as established in the literature, whereby either *corrugator* scores were higher for Black compared to White photograph trials, and/or *zygomaticus* scores were lower for Black compared to White photograph trials (Vanman et. al, 1997; Experiments 1, 2, and 3). Contrary to expectations, the trend in these data actually was for Control participants to respond more negatively to White compared to Black photographs and more positively to Black compared to White photographs.

For instance, simple main effect contrasts using Control participants' *corrugator* data confirmed that there was, indeed, a trend toward a difference in *corrugator* activity as a function of photograph type, an effect that was not present for Training participants. In other words, Control participants were frowning more while viewing and rating White men in photographs than Black men whose photographs were taken from the training task (Black - Training photographs). In this way, it would seem that any present bias was *against White males* and was possibly "trained away" as a result of Situational Attribution Training.

However, with these data there also appeared to be a difference in *corrugator* region activity when viewing Black - Training compared to Black photographs whereby there was a trend toward participants frowning more to Black photographs not taken from the Situational Attribution Training task than to Black photographs not taken from training. Why would this be the case? Perhaps there was something fundamentally different about the men depicted in the photographs selected for the Situational Attribution Training task compared to those photographs not used in the training task. Follow-up research could attempt to address this question by having participants not expected to complete the target experiment rate each photograph on a variety of factors other than friendliness, such as attractiveness or perceived criminality, characteristics which have been shown to influence person perception and judgments on a variety of levels, which could potentially influence affect toward that individual (see Eberhardt, Davies, Purdie-

Vaughns, & Johnson, 2006; Eberhardt, Goff, Purdie, & Davies, 2004). It may be the case that Black men whose photographs were used in the Situational Attribution Training task appeared more attractive, less criminal, etc., than those Black men whose photographs were not used in the task.

Likewise, when examining means for *zygomaticus* region activity, the data failed to show main effects of, or an interaction between, condition and photograph type. However, there appeared to be a trend toward more smiling, though not significantly so, when Control participants viewed White men than when they were viewing Black men whose photographs were taken from the Training task. Mean smiling activity was not significantly different for Black compared to Black - Training photographs in the Control participants. Again, like with *corrugator* region means, this “bias” against White men was reduced for Training participants, for whom there did not appear to be even a trend toward mean differences in subtle smiling activity. Thus, as with *corrugator* region EMG activity, this research failed to find evidence of an implicit bias against Black males when looking at *zygomaticus* activity, as well, and any potential differences were actually in line with more implicit affective bias against White males.

This pattern of means and failure to find significant effects with regard to EMG activity could be attributed to a fairly nonbiased (in the traditional sense) sample taken from a nonbiased population with whom no affective bias could be found to be “trained away” via Situational Attribution Training. Despite repeated evidence suggesting that college students posses both implicit and explicit biases against Black males, the student population sampled in this research could be unique in that it does not demonstrates such an anti-Black male bias. Being from an urban population with more diversity than many other locations may mean a sample has been selected that exhibits better intergroup relations, less prejudice, stereotyping, negative affect, and/or discrimination than those utilized in previous research, which subsequently influenced implicit affect measured through EMG activity. However, it is important to note that some of the research in which such biases had been previously observed was conducted utilizing a sample taken from the same geographic region (e.g., Stewart, Amoss, et al., 2012; Vanman, et al., 2004). On the other hand, this population may have experienced significant changes as a result of the present cultural climate such that perhaps there is less implicit bias than in previous years. Some may cite the election of an African American President as evidence of a reduction in bias and better intergroup relations nationwide which could, likewise, be present in this sample population.

It may also be the case that the measure of implicit bias utilized in this research (i.e.,facial EMG) does not adequately tap into, or cannot effectively demonstrate, implicit affective bias and/or that the error in slideshow presentation is to blame for the unexpected and potentially questionable results. For instance, as research by Latu (2010) led to questioning of the utility of the Person Categorization Task as an effective measure of implicit bias due to the inability to demonstrate basic biases found repeatedly in research. So, too, may facial EMG be a less-than-useful technique for measuring implicit affective bias or, perhaps it is tapping to some construct other than implicit affective bias. There would need to be research, in addition to work by Vanman and colleagues (1997; 2004), demonstrating this bias in order to investigate these possibilities.

Related to the error in slideshow presentation, it is possible that since quite a few additional photographs of Black compared to White men were seen by all participants, mere exposure (Zajonc, 1968; Bornstein, 1993) could be confounding and influencing the results obtained in this project, whereby simply perceiving an object or members of a certain group repeatedly, even below the threshold of awareness, increased participants liking for that object or group and influenced affective responses measured via EMG activity. These potential effects may have muddied results that would have been clearer, otherwise. To test whether and how the repeated images of Black men (and for Training Participants, how the repeated images of the same Black men) influenced responding, it would be necessary to separate the EMG trials from which a photograph had only been seen once and analyze these trials alone. Likewise, it may have been helpful to average trials where photographs were repeated and compare those mean amplitudes to those for trials where photographs were seen only once, in order to determine whether there was a significant difference in EMG responses depending upon the number of times a photograph was seen. At the point in which data had already been collected, however, it was not be possible to pull particular epochs and match them with the photographs presented at any point in time, given the way in which MindWare software reports data for analysis. It would be necessary to select phases from the raw EMG signal, manually, and attempt to match each phase in time with the photograph presentation information recorded in the DirectRT logs. Still, doing so may not have been informative given the potential confound of repeated exposure, which may not be limited to just the one photograph presented multiple times, but may also extend to all similar photographs presented within a set of trials. In fact, research on the mere exposure effect suggests that there is not only greater liking for specific objects or individuals repeated within a particular group, but also other members of that group (e.g., Gordon & Holyoak, 1983; Kramer & Parkinson, 2005; Rhodes, Halberstadt & Brajkovich, 2001). In this way, trials in which photographs were only once-seen could be influenced by the effect of other photographs presented more than once. Considering this and the limits of information collected using this method, such an endeavor was not pursued.

5.2 Explicit Ratings

As with EMG scores as a measure of *implicit* bias, friendliness ratings as a measure of *explicit* bias did not support my original exploratory hypotheses, either. The primary finding for these data was that both Training and Control participants saw White American males as significantly more friendly than Black American males whose photographs were not taken from the Situational Attribution Training task. Additionally, there was an overall trend toward rating White American males as more friendly than Black American males whose photographs were not taken from the training task. There was not a significant difference in ratings for White males compared to Black males presented in the training task, although there was a trend toward this difference being significant, in which case White male ratings were higher than those for the Black males. Collectively, these findings might indicate that participants explicitly stated that they perceived the White men in the slideshow to be friendlier than the Black men (those whose photographs were not seen in training), regardless of whether they underwent Situational Attribution Training, themselves; they possibly saw them as friendlier than the Black men whose photographs were used in the training task. At the explicit level, then, training did not seem to reduce bias in the form of seeing others as “more friendly” in that *both* Training and Control participants shared similar patterns of friendliness ratings for each type of photograph.

It is important to note that there was also a significant difference in friendliness ratings for Black compared to Black - Training photographs, regardless of condition, in which men whose photographs were presented in the training task were rated as more friendly than those not presented in the training task. Again, this may speak to some characteristically different aspect of the photographs used in the Situational Attribution Training task which could be explored in follow-up research in which the photographs are rated on a variety of factors other than friendliness. Although this explicit data may be subject to demand effects more so than the implicit data, they suggest that Situational Attribution Training is not influencing bias. Contrary to the implicit measures used in this research, though, there *is* evidence of a bias that is not being reduced by training. Evidence of a bias against Black males (in the form of seeing White males as more friendly) holds regardless of whether participants were exposed to Situational Attribution Training. Therefore, this could serve as evidence that, at the explicit level, Situational Attribution Training does not function as a reliable bias reduction technique since participants who underwent training demonstrated the same bias against Black males as those who did not. However, the potential effects of mere exposure potentially confound the results obtained even for explicit data.

5.3 Future Directions

There are many modifications that could be made to the current experiment that would provide more valid data and a sounder test of the research questions at hand. Foremost, ensuring the proper presentation of randomized photographs would allow for better comparisons within photograph groups and across photograph groups and would reduce the potential for confounds like mere-exposure effects. Additionally, including a control condition in which the same photographic stimuli are presented to both Control and Training groups would allow for better comparisons across condition with regard to the potential effects of Situational Attribution Training. This could be accomplished by using the same Grammar Control condition sometimes used by Stewart and colleagues (2010) and Latu (2010). Likewise, it would be helpful to have all White and all Black male photographs matched on a variety of characteristics (both between and within groups) including perceived friendliness, attractiveness, and emotional expression in order to reduce the potential for other characteristics influencing explicit ratings. With the photographs being more similar to one another, there would be less possibility of any observed changes in implicit affect being the result of any other variable besides the ethnicity of the individuals in the photographs and/or Situational Attribution Training.

Additionally, it may be more informative to have participants rate the photographs on a characteristic other than friendliness during the EMG task, or to have them complete some other unrelated task that still encourages attending to the stimuli. Choosing to have participants rate the individuals in the photographs on “friendliness” was done in order to replicate past research by Vanman and colleagues (2004). In their research, using this task was imperative for ensuring attention to the photographs presented while also making sure the participants had a stated goal provided to them rather than risking the potential for participants creating their own goals. Although the friendliness ratings are informative with respect to tapping into explicit affect, it could be argued that “friendliness” is not as closely linked to “liking” as merely asking participants how much they “like” individuals in the photographs. Liking may actually be a better measure of bias than perceived friendliness.

Finally, having a sample larger than 62 participants (31 in each condition) may have provided the additional power necessary to detect differences in *zygomaticus* and *corrugator* region activity in this study. As noted earlier, analyses suggested that a sample of approximately 80 participants would provide sufficient power for this design to detect a medium-sized effect (f=.25) with α = .05 and many post-hoc analyses were underpowered. Therefore, in addition to addressing the previously discussed issues, it would be beneficial to recruit a much larger sample of participants in order to account for the loss of data experienced due to participant withdrawal, technical errors, experimenter error, and so forth, and to obtain approximately 40 participants in each of the experimental conditions – enough participants to detect a medium-sized effect.

6. CONCLUSION

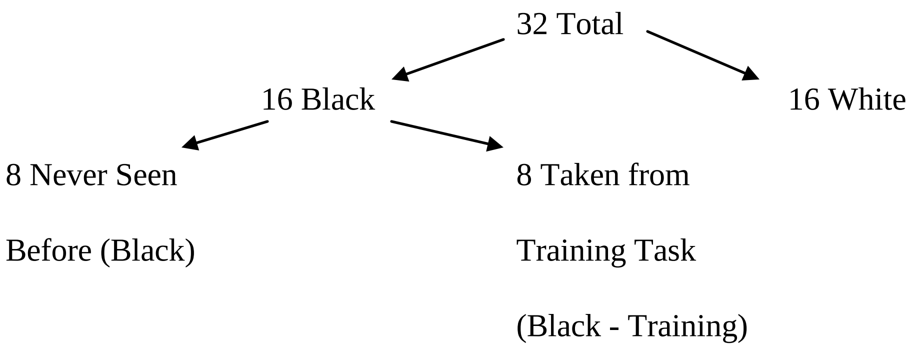
In summary, I did not find evidence to support the Situational Attribution Training task as a prejudice reduction technique in the way that previous research has found it to be a promising stereotype reduction technique. Based on this fact alone, my earlier questioning of the task appears to be warranted and it may be worth considering, then, to abandon the training task with two recent studies failing to replicate earlier findings. However, due to a substantial error in methodology leading to the potential of a confounding variable, this statement comes with some mild hesitation. Another similar investigation, with special attention given to the execution of the experimental procedures and the control conditions utilized, would provide a better test of the Situational Attribution Training task. Regardless of the results of this particular investigation, since stereotyping and prejudice remain issues in today's society, it is still important to consider ways in reducing these biases. Unfortunately, the question of whether the Situational Attribution Training paradigm should be relied on as a method of reducing these biases could not be definitively answered from the present research.

	Photograph Type			
Condition	White	Black	Black - Training	Overall
Training	4.29 (0.76)	3.53 (0.69)	4.01 (0.73)	3.95 (0.11)
Control	3.76 (0.71)	3.15 (0.72)	3.68 (0.72)	3.53 (0.11)
Overall	4.03 (0.78)	3.33 (0.73)	3.85 (0.72)	3.74 (.08)

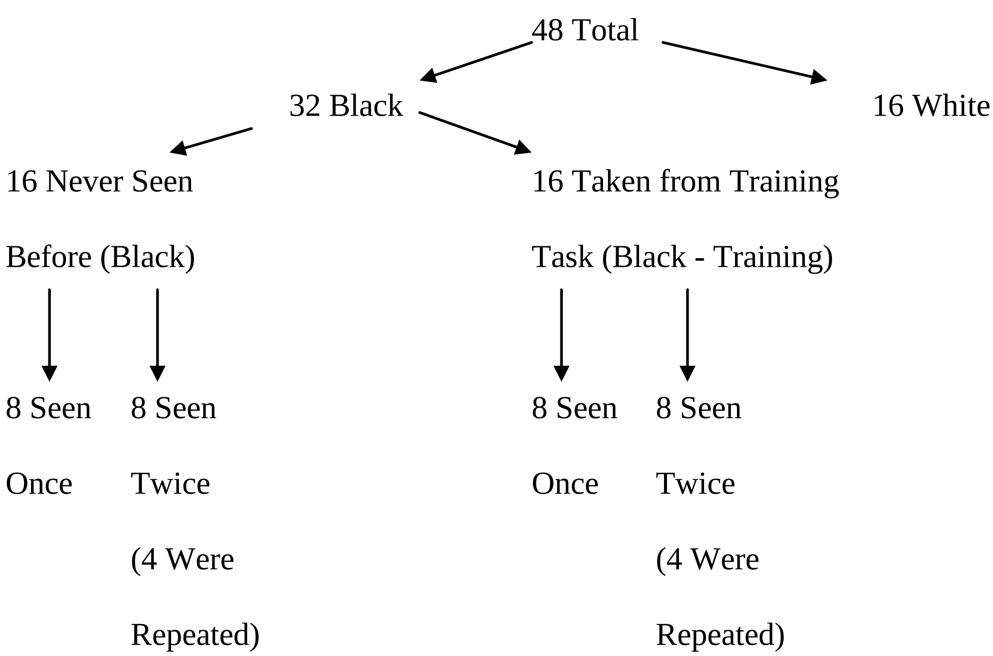
Note. N (Training) = 31, *N* (Control) = 31.

Table 1. *Average Friendliness Ratings as a Function of Condition and Photograph Type*

Intended Photograph Presentation



Actual Photograph Presentation



Note. In the intended photograph presentation scenario, all photographs should have been randomly presented without replacement. However, in the actual photograph presentation situation, both the Black and Black - Training photographs were presented with replacement such that 4 photographs from each stimuli group were repeated. Thus, 16 total photographs were repeated in this stimuli set.

Figure 1. *Intended and Actual Photograph Presentation Scenarios*

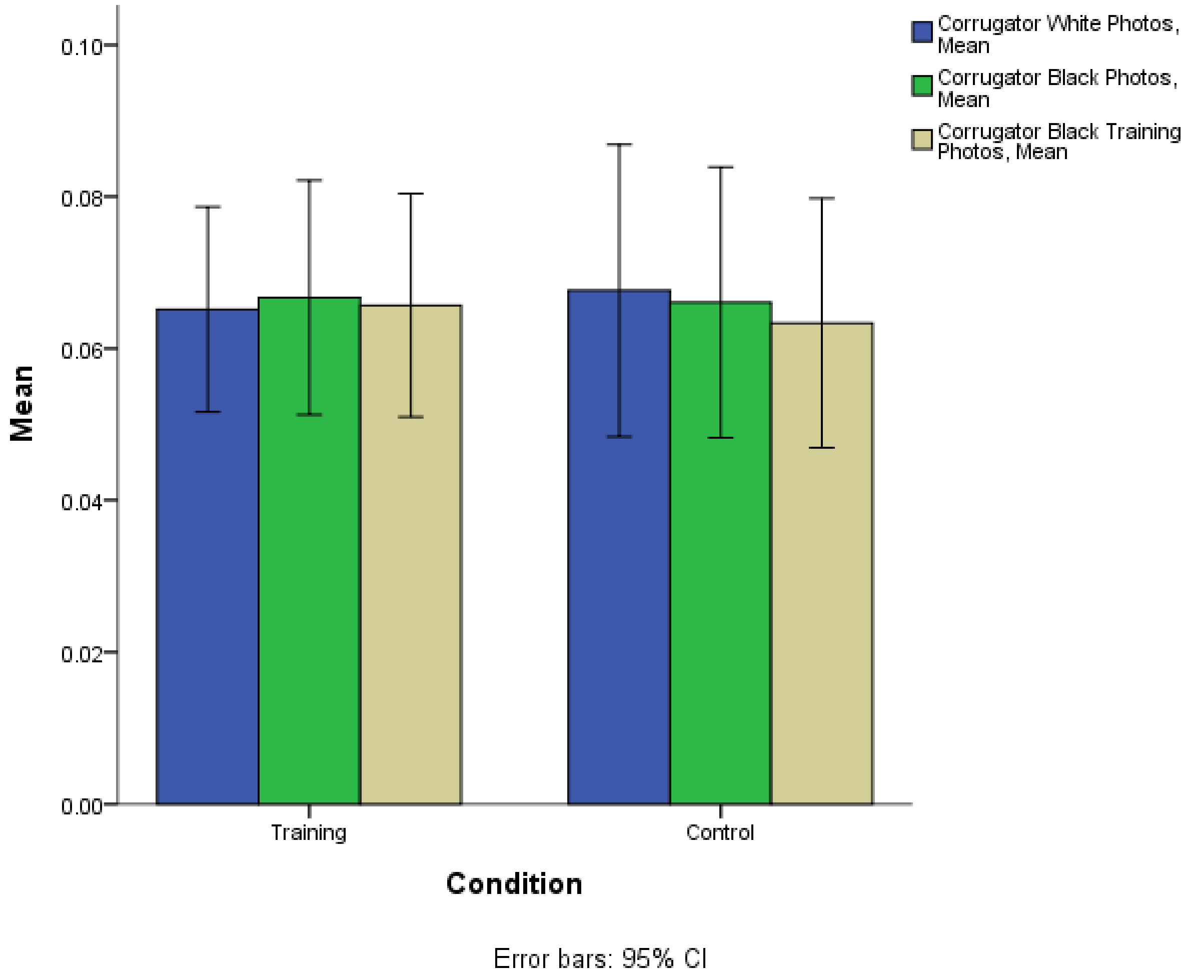


Figure 2. *Mean Amplitude Scores for Corrugator Region Activity as a Function of Condition and Photograph Type*

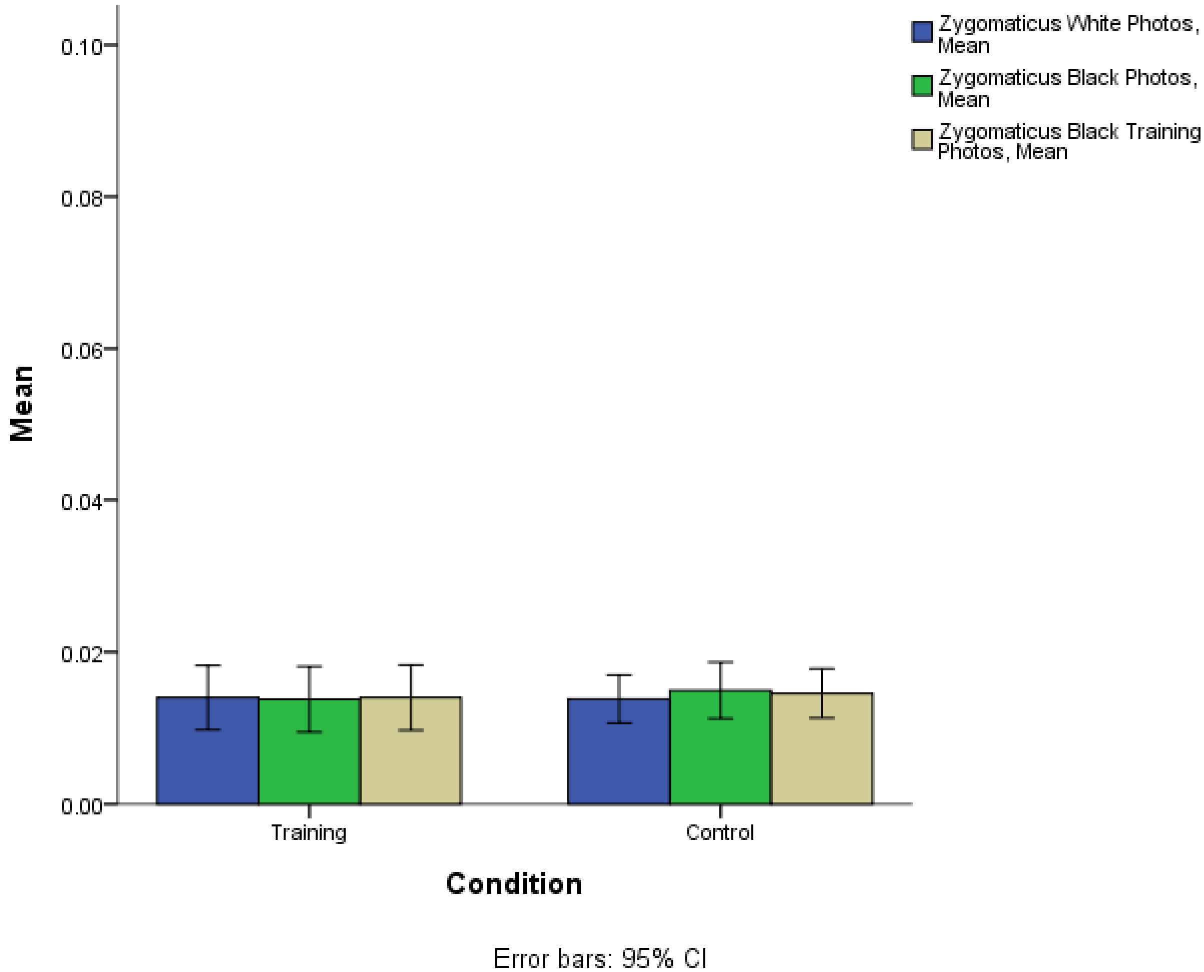


Figure 3. *Mean Amplitude Scores for Zygomaticus Region Activity as a Function of Condition and Photograph Type*

ENDNOTES

[1] In order to reduce skew, all dependent variables in which non-normality was an issue were logarithmically transformed in accordance with suggestions provided by Field (2005). However, analyses using transformed variables revealed the same results and subsequent conclusions as non-transformed data. Therefore, non-transformed data were utilized for simplicity of interpretation.

REFERENCES

Banaji, M. R., & Hardin, C. D. (1996). Automatic stereotyping. *Psychological Science, 7,* 136-141.

Blair, I. V., & Banaji, M. R. (1996). Automatic and controlled processes in stereotype priming. *Journal of Personality and Social Psychology, 70,* 1142-1163.

Cacioppo, J. T., Tassinary, L. G., & Fridlund, A. J. (1990). The skeletomotor system. In J. T. Cacioppo & L. G. Tassinary (Eds.), *Principles of psychophysiology* (pp. 325-384). Cambridge, England: Cambridge University Press.

Chance, J. E., & Goldstein, A. G. (1981). Depth of processing in response to own- and other-race faces. *Personality and Social Psychology Bulletin, 7*, 475-480.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5-18.

Dovidio, J. F, Gaertner, S. L, Stewart, T. L., ten Vergert, M., Esses, V. M., Hodson, G. (2004). From intervention to outcome: Processes in the reduction of bias. In W. G. Stephan & W. P. Vogt (Eds.) E*ducation programs for improving intergroup relations: Theory, research, and practice.* (pp. 243-265). New York, NY: Teachers College Press.

Duncan, B. L. (1976). Differential social perception and attribution of intergroup violence: Testing the lower limits of stereotyping of Blacks. *Journal of Personality and Social Psychology, 34,* 590-598.

Eberhardt, J. L., Davies, P. G., Purdie-Vaughns, V. J., & Johnson, S. L. (2006). Looking deathworthy: Perceived stereotypicality of black defendants predicts capital-sentencing outcomes. *Psychological Science, 17,* 383-386.

Eberhardt, J. L., Goff, P. A., Purdie, V. J., & Davies, P. G. (2004). Seeing Black: Race, Crime, and Visual Processing. *Journal of Personality and Social Psychology, 87,* 876-893.

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers, 28,* 1-11.

Field, A. (2005). Discovering statistics. Sage. Thousand Oaks, CA.

Fridlund, A. J., & Cacioppo, J. T. (1986). Guidelines for human electromyographic research. *Psychophysiology, 23*, 567-589.

Galinsky, A. D., & Moskowitz, G. B. (2007). Further ironies of suppression: Stereotype and counterstereotype accessibility. *Journal of Experimental Social Psychology, 43,* 833-841.

Greenberg, J. & Rosenfield, D. (1979). Whites' ethnocentrism and their attributions for the behavior of Blacks: A motivational bias. *Journal of Personality, 47,* 643-657.

Greenwald, A. G., McPhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology, 74*, 1464–1480.

Guglielmi, R. S. (1999). Psychophysiological assessment of prejudice: Past research, current status, and future directions. *Personality and Social Psychology Review, 3,* 123-157.

Hewstone, M. (1990). The 'ultimate attribution error'? A review of the literature on intergroup causal attribution. *European Journal of Social Psychology, 20*, 311-335.

Journal of Personality and Social Psychology, 72, 275-287.

Kawakami, K. Dovidio, J. F., & van Kamp, S. (2005). Kicking the habit: Effects of nonstereotypic association training and correction processes on hiring decisions. *Journal of Experimental Social Psychology, 41*, 68-75.

Kawakami, K., Dovidio, J. F., Moll, J., Hermsen, S., & Russin, A. (2000). Just say no (to stereotyping): Effects of training in the negation of stereotypic associations on stereotype activation. *Journal of Personality and Social Psychology*, *78,* 871-888.

Latu, I. M. (2010). Reducing automatic stereotype activation: Mechanisms and moderators of situational attribution training. Georgia State University, Atlanta, GA.

Livingston, R. W., & Brewer, M. B. (2002). What are we really priming? Cue-based versus category-based processing of facial stimuli. *Journal of Personality and Social Psychology, 82,* 5-18.

Macrae, C. N., Bodenhausen, G. V., Milne, A. B., & Jetten, J. (1994). Out of mind but back in sight: Stereotypes on the rebound. *Journal of Personality and Social Psychology, 67,* 808-817.

Pettigrew, T. F. (1979). The ultimate attribution error: Extending Allport's cognitive analysis of prejudice. *Personality and Social Psychology Bulletin, 5,* 461-476.

Stewart, B. D., & Payne, B. K. (2008). Bringing automatic stereotyping under control: Implementation intentions as efficient means of thought control. *Personality and Social Psychology Bulletin, 34*, 1332-1345.

Stewart, T. L., Amoss, R. T., Elliott, L., Perrot, D. J., Peacock, C., & Vanman, E. J. (2012). *The psychophysiology of social action*. Manuscript in preparation.

Stewart, T. L., Doan, K. A., Gingrich, B. E., & Smith, E. R. (1998). The actor as context for social judgments: Effects of prior impressions and stereotypes. *Journal of Personality and Social Psychology*, *75,* 1132-1154.

Stewart, T. L., Latu, I. M., Kawakami, K., & Myers, A. C. (2010). Consider the situation: Reducing automatic stereotyping through Situational Attribution Training. *Journal of Experimental Social Psychology, 46*, 221-225.

Stewart, T. L., Myers, A. C., Latu, I. M. & Kawakami, K., (2012). *Persistence of Situational Attribution Training in reducing automatic stereotyping*. Manuscript in preparation.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology, 18*, 643-662.

Tassinary, L. G., Cacioppo, J. T., & Geen, T. R. (1989). A psychometric study of surface electrode placements for facial electromyographic recording: The brow and cheek muscle regions. *Psychophysiology, 27,* 1-16.

Vanman, E. J., Saltz, J. L., Nathan, L. R., & Warren, J. A. (2004). Racial discrimination by low-prejudiced Whites: Facial movements as implicit measures of attitudes related to behavior. *Psychological Science, 15*, 711-714.

Vanman, E. J., Paul, B. Y., Ito, T. A., & Miller, N. (1997). The modern face of prejudice and structural features that moderate the effect of cooperation on affect. *Journal of Personality and Social Psychology, 73,* 941-959.

Wigboldus, D. H. J., Sherman, J. W., Franzese, H. L., & van Knippenberg, A. (2004). Capacity and comprehension: Spontaneous stereotyping under cognitive load. *Social Cognition, 22,* 292-309.

Wittenbrink, B., Gist, P. L., & Hilton, J. L. (1997). Structural properties of stereotypic knowledge and their influences on the construal of social situations. *Journal of Personality and Social Psychology, 72*, 526-543.