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Does Entitativity Reduce Behavioral Attentional and Evaluative Biases Toward Homosexual Couples?

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by

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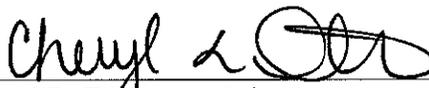
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Running Head: REDUCING BEHAVIORAL BIASES TOWARD HOMOSEXUAL COUPLES

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Abstract

Previous research has shown that the degree to which participants direct early attention to outgroup lesbian versus ingroup straight couples is related to their familiarity with homosexual individuals (Dickter, Forestell, & Mulder, 2015). The goal of the current study was to extend this work to examine whether a manipulation of perceived group entitativity would affect implicit responses to homosexual couples. Entitativity characterizes the degree to which a group of individuals are dependent on one another and pursue a common goal. Heterosexual participants were presented with a set of statements about homosexual groups that were either high or low in entitativity. They then completed behavioral tasks that measured affect and attention. Finally, participants completed questionnaires that assessed their attitudes toward and experiences with gays and lesbians. Results of the current study demonstrated that participants in the low entitativity condition rated a higher proportion of lesbian couples as positive compared to straight couples, signifying reduced implicit affective bias in this group. The manipulation had no effect on attentional bias to the couples. These findings suggest that entitativity may serve as a mechanism to explain the association between familiarity and implicit affective bias.

Keywords: implicit bias, affect, sexual orientation, entitativity, attentional capture, couples

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In social psychology, the study of person perception (i.e., how individuals are viewed and judged) features a specific focus on prejudice and discrimination. Prejudice and stereotypes are the result of social categorization, which occurs when people are thought of as members of a particular social group rather than individuals (Macrae, Milne, & Bodenhausen, 1994). Research examining social categorization has demonstrated that this often occurs within a few hundred milliseconds of perception (e.g., Dickter & Bartholow, 2007; Giner-Sorolla, Garcia, & Bargh, 1999; Ito & Urland, 2003, 2005). Due to the complex nature of our social world, individuals must efficiently categorize groups of people in order to quickly and efficiently make determinations about others (Fiske & Neuberg, 1990). Although social categorization serves an important cognitive function, it also leads to the activation of inaccurate prejudices and stereotypes (Brewer, 1989; Fiske & Neuberg, 1990). While prejudice is the affective component and is related to how perceivers feel about a certain group of people, stereotypes represent the cognitive component of person perception and reflect thoughts and beliefs that perceivers have about groups.

Prejudice and stereotyping are made up of both automatic and controlled processes. Automatic processing is implicit in nature and beyond the conscious awareness of the perceiver, while controlled processing is explicit and conscious (Devine, 1989; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997). Understanding automatic and controlled processing is important because they both predict different aspects of behavior. Automatic, implicit racial bias has been shown to lead to negative implicit behaviors towards racial minorities such as reduced eye contact and negative body language (Sue et al., 2007). Explicit racial bias leads to more

overt behaviors such as making prejudicial comments (Dovidio, Kawakami, & Gaertner, 2002). Given that controlled processing reflects explicit rather than implicit attitudes, it is possible that responses on attitude batteries may not fully measure prejudice or a true change in attitudes toward group members over time. Differences in self-reported attitudes may originate from participants' unwillingness to report their true attitudes because of their sensitivity to societal norms of equality or a lack of knowledge of biased implicit associations that lead to discrimination against minority group members (Dovidio & Gaertner, 2000; McConahay, 1986). Given that implicit bias may lead to discriminatory behavior (Dovidio et al., 2002), studying its role in relation to social groups that experience discrimination is important.

Sexual orientation has yielded increasing attention from researchers. Although evaluations of sexual minorities have become more positive in nature and there has been increasing opposition to discrimination (Steffens & Wagner, 2004), negative attitudes about sexual minorities are still well-documented in the literature (e.g., Sherrill & Yang, 2000). Research has shown that sexual minorities are faced with disadvantages in education, access to healthcare, lack of a sense of community (Meyer, 1995; Meyer, 2003) and, in many cases, do not have the same rights as sexual majorities (e.g., same-sex marriage; Brumbaugh, Sanchez, Nock & Wright, 2008).

Recent research has investigated the behavioral and neural constructs of the implicit cognitive processes involved in prejudice and discrimination that may lead to these injustices in society. In general, research demonstrates that heterosexual participants generally hold more unfavorable attitudes toward homosexuals relative to heterosexuals when social groups are labeled or named categorically, as well as when pictures are used to identify couples of differing sexual orientation (Banse, Seise, & Zerbes, 2001; Dasgupta & Rivera, 2006; Gabriel, Banse, &

Hug, 2007; Inbar, Pizarro, Knobe, & Bloom, 2009; Rowatt, Tsang, Kelly, LaMartina, McCullers, & McKinley, 2006).

An important construct involved in studying perceptions of social groups is affect. Affect is valuable for determining emotional responses to stimuli without any interference from conscious decision-making (Payne, Cheng, Govorun, & Stewart, 2005; Payne, Hall, Cameron, & Bishara, 2010). Previous research includes a handful of studies that have investigated affective processes involved in perceptions of ingroups and outgroups (Hugenberg & Bodenhausen, 2004; Amodio & Devine, 2006). For example, Payne et al. (2005), using the affective misattribution procedure (AMP), demonstrated that greater unpleasant implicit affect was allocated to images of racial minorities compared with racial majorities. Only a small number of studies have examined implicit affect and sexual orientation. Dickter, Forestell, and Mulder (2015) found differences in activation of implicit affect as measured by event-related potential (ERP) components of EEG. Specifically, they found that gay and lesbian couples elicited more extreme implicit neural affective responses than straight couples, as shown by greater amplitudes in the P3 ERP component for gay and lesbian couples compared to straight couples (Dickter, Forestell, & Mulder, 2015). These findings suggest that implicit affective responses may differ as a function of sexual orientation, however, more research is needed to support this hypothesis.

Implicit attention has also been found to differ as a function of social category. While biased attention does not necessitate the prevalence of prejudicial attitudes, it is important in assessing the focus of the perceiver (Hashtroudi, Mutter, Cole, & Green, 1984; MacLeod, Mathews, & Tata, 1986). Attention to certain groups may also lead to implicit prejudicial behaviors in the automatic response to outgroup stimuli. For example, the degree to which perceivers pay attention to a particular stimulus is thought to be an indication of threat (Koster,

Crombez, Verschuere, & De Houwer, 2004; Salemink, van den Hout, & Kindt, 2007). Trawalter, Todd, Baird & Richeson (2008), for instance, showed that White participants showed attentional biases to Black compared to White faces when the eyes were looking straight ahead, which purportedly yielded a threat response in the participant. This was eliminated in a subsequent task in which the eyes of these faces were looking to the side and thus did not represent a threat (Trawalter et al., 2008). Recent research using electrophysiological methods (i.e., EEG) to measure responses to homosexual couples has demonstrated that implicit attention, as quantified by early attentional event-related potentials, was directed differently to homosexual versus heterosexual couples (Dickter, Forestell, & Mulder, 2015). This finding added to previous research looking at implicit attitudes and prejudice toward homosexual couples (Colzato, Van Hooidonk, Van Den Wildenberg, Harinck, & Hommel, 2010; Jellison, McConnell, & Gabriel, 2004; Banse, Seise, & Zerbes, 2001), as well as bias of ingroup versus outgroup attention (Bailey, Gaulin, Agyei, & Gladue, 1994; Colzato, et al., 2010).

One important area of research to investigate is what moderates the allocation of affective or attentional bias. One such variable is familiarity, or contact. One specific variable of interest is familiarity, or contact. Allport (1954), in his conceptualization of contact theory, originally proposed that positive encounters with an outgroup member facilitate positive attitude changes towards members of those groups (Pettigrew & Tropp, 2005). Familiarity has been found to be negatively associated with implicit prejudice towards different social groups. For example, random assignment to live with a racial minority outgroup member improved implicit outgroup racial attitudes (Shook & Fazio, 2008). Additionally, research has also shown that those who report having more relationships with gay, lesbian, or bisexual individuals exhibit more favorable implicit and explicit attitudes toward gay men (Lemm, 2006). For example, imagining

an encounter with an outgroup member, referred to as imagined contact, has been shown to reduce implicit prejudice (Stathi & Crisp, 2008). Taken together, more outgroup familiarity is correlated with lower implicit evaluative biases of the outgroup (Dasgupta, McGhee, Greenwald & Banaji, 2000; Marques, Yzerbyt, & Leyens, 1988; Tajfel & Billic, 1974).

With respect to attention, previous work has demonstrated that familiarity with an outgroup, as measured by the number of outgroup friends participants have, moderates implicit attention. In a study conducted by Dickter, Gagnon, Gyurovski, & Brewington (2015), close contact with racial outgroup members moderated Whites' attentional bias to Black and Asian versus White targets during a dot probe task. Specifically, participants with a greater number of close Black and Asian friends showed less implicit attentional bias toward Black and Asian outgroup faces, respectively. Contact has also been shown to be associated with attention to sexual orientation. Dickter, Forestell, and Mulder (2015) found that familiarity with outgroup members (i.e. number of gay or lesbian friends) was a moderator of differences in implicit attention to homosexual versus heterosexual couples as reflected in early event related potential components of EEG thought to measure implicit attention.

Although this work has demonstrated that social contact and implicit biases are related, it is not yet clear what drives this relationship. One potential mechanism that may explain the relationship between contact and implicit bias is the perceived entitativity of a group. Entitativity reflects the degree to which group members share common values and pursue a common goal. One foundation of stereotype theories is that outgroups are perceived to be more entitative than ingroups (Crump, Hamilton, Sherman, Lickel, & Thakkar, 2010). One reason this may be the case is that a perceiver may have less experience with outgroup members and thus perceive them as having shared goals. Those who have many outgroup friends, however, may perceive the

outgroup members as less entitative because they have learned that members of this group vary widely and have many individual differences. Thus, it may be the case that familiarity results in lower perceived entitativity, and this may in turn result decreased outgroup bias. The present study seeks to examine the effect of perceived entitativity on outgroup affective and attentional biases.

The goals of the present work were twofold. The first goal was to examine whether a set of statements that varied in the degree to which they describe homosexuals' reliance on one another and pursuit of a common goal would affect participants' perceived entitativity of this group. The second was investigate whether manipulation of the perceived entitativity of homosexual couples affected implicit affect and attention to gay and lesbian couples. Both implicit affect and attention were measured using computer-based behavioral tasks. We hypothesized that heterosexual individuals would display less positive affect and more attentional bias toward homosexual couples than heterosexual couples. Additionally, we hypothesized that participants exposed to the low perceived group entitativity condition would show more implicit positive affect and less implicit attentional bias to homosexual couples than those exposed to high levels of perceived group entitativity.

Method

Participants

A total of 199 participants (96 male, 103 female) between the ages of 18 and 22 years (M = 18.94 years, SD = 1.61) were recruited for this study. All participants were undergraduates at The College of William & Mary, and completed the study in partial fulfillment for their introductory psychology courses. All procedures were approved by the William and Mary Protection of Human Subjects Committee, and written informed consent was obtained from each participant before participation.

Materials

Pilot Testing. A series of 24-statements were created in order to elicit entitative and non-entitative judgments about homosexual and heterosexual couples. Entitative statements were designed to portray goals and behavior consistent with the degree of entitativity of the group (i.e. "70% of homosexual couples advocate for gay-marriage law"), whereas non-entitative statements did not portray goal-directed behavior (i.e., "65% of heterosexual couples drink coffee"). The statements are further detailed in the next paragraph. All statements described banal behaviors such as recreational activities, political viewpoints, and living arrangements. To test the believability of these statements, 200 participants were recruited for an online pilot test. Using Amazon's Mechanical Turk, statements were tested for believability using a 5-type Likert scale from "definitely false" to "definitely true". Following testing, statements that had averages lower than 3.5 out of 5 were removed. This resulted in 10 entitative statements, which were used in the high and low entitativity fact sheets, and 7 non-entitative statements.

Entitativity "Fact Sheets." Two fact sheets were created that each contained 17 statements that presented statistics about homosexual ($n = 5$) and heterosexual couples ($n = 12$; 5 entitative and 7 non-entitative), as determined by the pilot test results. For the high entitativity fact sheet, the 10 entitative statements developed in the pilot test were presented with statistics that fell between 70-90% (e.g., "70% of gay couples advocate for gay-marriage law."). The low entitativity fact sheet contained the same 10 statements, but percentages for each of the statements fell between 10-30%. Additionally, the 7 non-entitative statements were presented in each fact sheet as controls, with the percentages in these statements averaging to 50% (e.g., "37% of straight couples use a satellite dish to view television at home."). The rationale for using these 7 statements was to disguise the extreme statistics of the manipulation so that the specific digits

did not prime an answer for high or low entitativity. Fact Sheets are presented in Appendix A and B.

Picture Stimuli of Couples. Fourteen sets of corresponding gay, lesbian, and heterosexual images from Cunningham, Forestell, and Dickter (2013) were selected and carefully in facial expression, physical appearance, pose, and emotionality. The images depicted only faces and upper torsos. The people in the pictures were white to ensure that differences in responses between pictures were due to differences in sexual orientation rather than race. Individuals in the pictures had no discernibly unusual features (e.g., unconventional hair styles or piercings) and differences in image color and brightness were through the use of black and white. These images were used during both behavioral tasks of the current study.

Affective Misattribution Procedure. The Affect Misattribution Procedure (AMP) consists of a presentation of a prime for 75 ms, followed by a blank screen for 125 ms, a Chinese pictograph for 100 ms, and a black and white masking screen. The masking screen remains on the monitor until a response from the subject has been made. In the current study, the primes were pictures of homosexual and heterosexual couples. Participants were instructed to indicate whether the pictograph was pleasant or unpleasant by pressing one of two keys on a computer keyboard. The participant was further instructed to ignore the image presented before the character, and to only focus on judging the character presented. This task was used to gauge implicit affective responses following exposure to images depicting couples of varying sexual orientation.

Dot Probe Task. In this behavioral task, two blocks of 40 trials were presented to each participant. Each trial began with a fixation cross in the center of the screen for 1000 ms. The pairs of stimuli, images of gay, straight, or lesbian couples, were then presented simultaneously on either side of the fixation cross. Combinations of stimuli (gay-straight and lesbian-straight)

were presented with equal likelihood in a randomized order. For half of the trials, the picture stimuli were presented for 200 ms, whereas for the remaining trials they were presented for 1000 ms. The short picture presentation served to capture initial attention and the long presentation captured sustained attention at 1000ms. Manipulating the interstimulus interval in this way is important to understand the nature of implicit behavioral measures (Bradley, Mogg, Falla, & Hamilton, 1998).

Following the picture pair, participants saw a visual mask for 433 ms. A black dot then appeared on the screen where one of the pictures had been, and remained there until the participant pressed a key denoting which side (left or right) the dot had appeared on the screen. The intertrial interval varied between 1500 and 3000 ms to ensure that reaction times were not affected by expectation of stimulus presentation. All images of couples were equally likely to be presented on either the left or right side of the screen across trials. The reaction time to the button press signified a measure of relative attention to one type of couple over another, such that faster responses to the dot are made when participants are attending to the stimulus on the side of the dot. This task is especially useful as an implicit measure of attentional bias because participants are not explicit engaging in preferential social categorization. More positive dot probe scores indicate more attention toward the image of the homosexual couples relative to the heterosexual couples.

Questionnaires. In addition to completing a demographic questionnaire in which participants indicated their gender, age, race, and sexual orientation (i.e., heterosexual, homosexual, bisexual, other), they also answered two questions which served as a manipulation check to ensure that the entitativity manipulation was successful. Using a 100-point sliding scale labeled "entitativity of homosexual or heterosexual couples," participants were asked "in general, to what extent do you

think that homosexual [or heterosexual] couples are dependent on one another and seek to pursue common goals?" and indicated how entitative homosexual and heterosexual couples are as a whole. The following questionnaires were also administered to assess explicit attitudes toward homosexuality and familiarity with sexual minorities (i.e., gays, lesbians).

Attitudes towards Lesbians and Gay Men scale (ATLG; Herek, 1988). The full form of the ATLG was used to assess attitudes towards homosexual individuals. This scale consists of 20 items, with half assessing attitudes towards gay men (ATG) and half assessing attitudes towards lesbian women (ATL). Participants reported the degree to which they agreed with statements such as "Homosexual behavior between two men is just wrong" and "Lesbians just can't fit into our society" using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). This scale has been shown to have adequate internal consistency ($\alpha = .97$). Responses were reverse coded where necessary and summed to create overall scores as well as ATL and ATG sub-scores, with higher scores indicating more negative attitudes towards homosexuality.

Familiarity with Sexual Minorities. To assess close contact with sexual minority group members, participants provided the initials of up to 20 close friends and then subsequently identified the sexual orientation of those individuals. The participant is asked "to look at your list of your 20 friends/acquaintances that you just generated. Indicate how many of those individuals are gay, lesbian, and straight." This measure was previously used by Greenwald, McGhee, and Schwartz (1998) to identify the proportion of close friendships with individuals of different social groups. For another measure of familiarity, participants were asked to report how many gay men and lesbian women they knew.

Modern Homophobia Scale for Gay Men (Raja & Stokes, 1998). Participants responded to two sets of questions (lesbian and gay men) that detail explicit prejudice to gays and lesbians

(e.g., "Marriages between two lesbians should be legal."). Responses ranged from strong disagree to strongly agree (5-point scale). Responses were reverse coded where necessary and summed to create overall scores, with higher scores indicating more positive attitudes towards homosexuality.

Biological Basis, Discreteness, and Informativeness scales (Bastian & Haslam, 2006). Participants responded to three scales that each dealt with quantification and qualification of person perception and behavior. The biological basis set investigated various perspectives of evolutionary psychology (e.g., "A person's attributes are something that can't be attributed to their biology."). The discreteness set investigated interpersonal identities (e.g., "A person either has a certain attribute or they do not."). Finally, the informativeness set was similar and asked questions such as "It is never possible to judge how someone will react in new social situations." Items from the three scales were randomly ordered and rated on a 6-point scale from 1 (strongly agree) to 6 (strongly disagree), some of which were later reversed. A sum was calculated of the three subscales to produce an Existentialism Index (EI), with higher scores indicating endorsement of innate or inherent explanations of identity.

Measure of Outgroup Contact (Walker et al., 2008). This questionnaire investigated the participant's consistent or inconsistent encounters with members of an outgroup (i.e. "I often talk to gay people in college."). Each question is rated on a 5-point scale from 1 (strong disagree) to 5 (strongly agree). Total scores were calculated, with higher scores indicating higher outgroup contact.

Procedure

Participants completed the study in groups of 2-4 participants in a computer lab with privacy screens separating the work stations. Before the participants arrived, they were randomly

assigned to the "Fact Sheet" condition (either high or low entitativity) and order in which they would complete the behavioral tasks (AMP and Dot Probe). The order of the behavioral tasks was counterbalanced. After completing the informed consent, participants were instructed to study the fact sheet for five minutes. Then, they completed the two behavioral tasks. The participant was allowed up to a minute of additional studying the 'Fact Sheet" while the second task was set up. Finally, the participants completed the questionnaires. When finished, they were debriefed, given credit for their participation, and dismissed from the laboratory. All participants completed the study within an hour.

Results

Participant Characteristics

Of the total 199 participants, data were excluded from participants who did not complete the entire experiment ($n = 9$). Participants who reported that they were not heterosexual ($n = 15$) were also excluded from the analysis. Finally, one participant was removed from the AMP analysis due to familiarity with the mandarin alphabet.

Analyses were thus conducted with 174 participants (103 females). Overall, participants were approximately 19 years old ($M = 18.97$ years, $SD = 1.63$). The majority of participants were White ($n = 105$), with 34 Asian, 22 Black, 13 Latino, and 1 Middle Eastern participant. Eighty-three of the participants were randomly assigned to the high entitativity condition, and ninety-two participants were randomly assigned to the low entitativity condition. As shown in Table 1, there were no between group differences for outgroup contact, attitudes toward lesbians and gay men, or the essentialism index. Only the measure of close familiarity showed marginal significance, $t(173) = 1.77$, $p < .07$, with the high entitativity group showing more familiarity

with minorities of sexual orientation (based on self-reported close friends) than the low

entitativity group.

Manipulation Check

In order to examine whether the Fact Sheets manipulated perceived entitativity, a t-test

was conducted to serve as a manipulation check. The perceived entitativity of homosexual

couples in the high entitative condition ($M = 70.91$ out of 100 points; $SD = 15.27$) was higher

than in the low entitative condition ($M = 53.21$; $SD = 22.47$), $t(157) = 5.729$, $p < .001$.

Measures of Affect

Scores on the Affective Misattribution Procedure were calculated based on the proportion

of images that were rated as pleasant separately for gay, straight, and lesbian images for each

participant (Payne et al., 2005). Prior to analysis, AMP scores were omitted from participants

whose proportion of pleasant scores for straight, gay, and lesbian stimuli were greater or less

than two standard deviations on either side of the mean. To test the hypothesis that implicit affect

toward homosexual versus heterosexual couples varied as a function of the entitativity

manipulation, two 2 (Sexual Orientation: Homosexual vs. Heterosexual) x 2 (Entitativity: Low

vs. High) mixed-model analyses of covariance (ANCOVA) with repeated measures on the first

factor, were conducted separately for lesbian versus straight and gay versus straight couples. The

essentialism index (EI) calculated from the Biological basis, Discreteness, and Informativeness

scales (Bastian & Haslam, 2006) was used as the covariate in this analysis to control for trait

essentialism. Those who are higher in essentialism tend to believe that people do not change; as

a result, the entitativity manipulation may be less effective on these individuals than those who

are low in EI.

These analyses revealed no significant main effects for sexual orientation nor for entitativity on the implicit affect directed toward lesbian and straight couples. However, a significant interaction was found between sexual orientation and entitativity, $F(1, 154) = 4.33$, $p < .05$ (Greenhouse-Geisser). As shown in Figure 1, simple main effects analyses demonstrated that participants in the low entitative group had more positive implicit affect toward the lesbian couples ($M = 12.74$, $SE = .75$) compared to the straight couples ($M = 11.35$, $SE = .71$), $t(155) = -2.027$, $p < .05$. There was no difference found in the high entitativity condition. As depicted in Figure 2, pleasantness did not differ as a function of sexual orientation, entitativity, or the interaction between these variables for the gay versus straight couples, $F(1, 156) = 1.380$, $p = .24$.

Measures of Attentional Bias

Only reaction times (RTs) from correct trials, where participants accurately identified the location of the dot as presented on the screen, were used for analyses. To examine the relative attention to homosexual images compared to heterosexual images, a difference score was calculated in which reaction times to trials in which the dot-probe appeared on the side of the homosexual picture were subtracted from the reaction times to trials in which the dot-probe appeared on the side of the heterosexual picture. As a result, positive difference scores indicated greater attention to the homosexual couple pictures relative to the heterosexual couple pictures. To assess whether effects differed as a function of time, separate means were calculated for the short ISI (200 ms) and long ISI (1,000 ms) trials.

To test the hypothesis that implicit attentional bias to the homosexual versus heterosexual couples varied as a function of the entitativity manipulation and the timing of the stimulus presentation, two 2 (Block: 200 ms ISI vs. 1,000 ms ISI) x 2 (Entitativity: Low vs. High) mixed-model analyses ANCOVAs with repeated measures on the first factor were conducted separately

for lesbian versus straight and gay versus straight couples. Again, EI was used as the covariate in this analysis.

As shown in Figure 3, for lesbian-straight attentional bias, statistical analyses showed no main effect for block $F(1, 143) = 1.36$, $p > .20$; no between-subjects main effect for entitativity $F(1, 143) = .84$, $p > .35$; nor any significant interaction for block by entitativity, $F(1, 143) = .16$, $p > .68$. As shown in Figure 4, for gay-straight attentional bias, statistical analyses showed no main effect for block $F(1, 145) = .01$, $p > .90$; no between-subjects main effect for entitativity $F(1, 145) = 2.26$, $p > .135$; nor any significant interaction for block by entitativity, $F(1, 145) = 1.67$, $p > .19$.

Discussion

As proposed by Allport's contact theory (1954), familiarity with an outgroup member has been shown to reduce implicit prejudice against members of different social groups (e.g., Pettigrew, 1998). Less work has examined why implicit prejudice against an outgroup decreases after social contact with outgroup members. In the current study, we proposed that when perceivers learn individuating information about outgroup members, their perceptions of entitativity of those groups will decrease. That is, instead of relying on judgments that members of an outgroup are very similar to and dependent on one another and have common goals (Bastian & Haslam, 2006), they will learn that homosexual couples are different from each other and not entitative. We proposed that this would subsequently affect their attentional bias and affect towards these groups. The current study supported our hypotheses to some extent; participants who were exposed to statements that were low in entitativity implicitly rated a higher proportion of the lesbian couples positively relative to those in the high entitativity group.

Previous work has demonstrated that those who had more contact with homosexuals demonstrated less implicit attentional bias toward lesbian couples (Dickter, Forestell, & Mulder, 2015). Although the previous study investigated attention rather than affect, the current study found a similar effect for implicit affect for lesbian couples as a function of perceived entitativity. This finding is important because it suggests that entitativity may serve as a mechanism for the relationship between familiarity and the implicit processing of outgroup members. Although this relationship was not tested directly, we propose that learning about intragroup differences, an important aspect of contact theory, may reduce affective bias, at least toward lesbian couples.

It is interesting that neither the previous work by Dickter, Forestell, & Mulder (2015) nor the current study reported differences as a function of familiarity or entitativity toward gay couples. A possible explanation for this is that although people may differ in their personal interactions with gay and lesbian couples, there tends to be more portrayals of gay couples in the media compared to lesbian couples. As a result, lesbian couples are underrepresented and misrepresented in the media with respect to their goals and challenges (Straayer, 1996). This may contribute to society's lack of understanding of and familiarity with lesbian couples. As a result, the entitativity statements pertaining to lesbians in the present study may have provided information about a relatively unknown group, and thus may have been more effective in changing implicit affective responses to lesbians compared to gays.

Despite the finding that familiarity was associated with differences in implicit attention in Dickter, Forestell, & Mulder (2015), the current study did not support our hypothesis that manipulating perceived entitativity would affect implicit attention directed towards homosexual versus heterosexual couples. One important difference between the previous work and the

current work was that during the EEG task, a spacebar task was used as an implicit measure of disgust (Dickter, Forestell, & Mulder, 2015). In the spacebar task, the participant pressed the button to remove a single photograph of a homosexual or heterosexual couple from sight. In the current study, relative attention directed to pictures of homosexual and heterosexual couples that were simultaneously presented was measured rather than attention to pictures of couples presented individually as in the previous study. It is important to present two couples (of differing sexual orientation) at the same time so that relative attention between the different stimuli (i.e. lesbian couples versus straight couples) across trials may be quantified. Unlike the methodology of Dickter, Forestell, & Mulder (2015), this measure forces a preferential looking of the participant at one of the two stimuli based on the resultant reaction time based on the placement of the dot (Salemink, van den Hout, & Kindt, 2007). In this case, the spacebar task used in the previous study is inefficient at recording relative attention across different stimuli since there is only one picture presented at a time.

Additionally, a behavioral paradigm was used in the present study to measure attentional bias, whereas Dickter, Forestell, & Mulder (2015) used a physiological measure in the form of event-related potentials. Behavioral measures that require reaction time measures are less sensitive to implicit processing than EEG measures because they require active decision making, as opposed to neural activation that is outside of the conscious control of the participant. Given the fact that studies in social neuroscience have found activation in just milliseconds, future research should use non-behavioral methodology that does not require active decision making to investigate whether implicit neural bias varies as a function of manipulated entitativity. We predict that those who are exposed to low entitativity statements will show reduced attentional bias to lesbian couples relative to straight couples, but not necessarily to gay couples.

Despite the lack of significant between-group differences in attentional bias, the current study was successful in showing that participants who passively read a series of only 10 entitative statements about homosexual and heterosexual couples resulted in explicit changes in perception of the entitativity of social groups. Moreover, this manipulation affected subsequent implicit affective ratings of lesbian couples. A strength of the current study was that we investigated gay and lesbian couples both simultaneously and separately, due to the versatility of the stimuli. Previous research tends to combine lesbian and gay stimuli into a broad category of "homosexual," which fails to recognize important differences in perceptions of homosexual couples that may occur between these two groups. In support of this, the current study found differences in responses to lesbian and gay couples, and future research should continue to tease apart these differences. Given the large numbers of participants in the high and low entitativity groups, this study also had adequate power to detect between group differences for the measures employed.

However, certain factors limited the generalizability and interpretability of our results. First, the sample used in the current study was recruited from a medium-size highly selective mid-Atlantic liberal arts university. As a result it is difficult to generalize the findings from the present study to the general population. Future research should aim for a more representative participant pool. Second, given the short time frame between reading the entitativity statements and the assessment of affect, it was impossible to determine how long the statements affected participants' responses toward the lesbian couples. Future research should test the participants' affect at various time points after reading the statements to determine how long this manipulation lasts. Third, the lesbian couple stimuli may have been perceived as a pair of "girlfriends," as opposed to romantic couples. This may have skewed the results. Finally, as mentioned above,

the use of the dot probe may not be sensitive enough to capture changes in early attention that may occur in response to entitativity manipulations.

To conclude, previous research has documented that heterosexual participants' implicit affective and attentional responses differ as a function of sexual orientation category (Dickter, Forestell, & Mulder, 2015). Although research has demonstrated that close contact with members of sexual minority groups can moderate how much implicit attention is directed towards homosexual couples (Dickter, Forestell, & Mulder, 2015), the current study suggests that manipulating entitativity affects the implicit pleasantness ratings of lesbian couples. This suggests that by manipulating entitativity, we may be able to change the way that lesbian couples are perceived. Although more research is needed to determine the longevity of these behavioral findings, the simplicity of this manipulation and its subsequent success suggests that "fact"-based corrective social education may be effective in changing people's responses to minorities. This possibility has important practical implications because it is not always possible to increase people's exposure to various outgroups. Additionally, this approach may be effective for other outgroups that differ according to their age, race, gender, professions, and other sexual orientations. As a result, this research may have implications for social and behavioral modification, and supports the value of educational processes geared toward reduction of implicit affect.

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Table 1.

Participant characteristics as a function of their manipulated entitativity.

| Characteristic	High Ent. (*n* = 83)	Low Ent. (*n* = 92)	Test Statistic
Age (in years)	18.97 + 1.63 (*SD*)	18.96 + 1.70 (*SD*)	$t(158) = .036, p > .90$
Gender (female)	59%	59%	$\chi^2(1) = .84, p > .25$
Race (Caucasian)	57%	63%	$\chi^2(4) = 3.12, p > .15$
Close contact and familiarity measures			
Contact: Gay	3.60 + 1.02	3.33 + 1.07	$t(172) = 1.69, p = .09$
Contact: Lesbian	3.18 + 1.01	2.95 + 1.00	$t(172) = 1.56, p > .10$
Contact: Straight	4.85 + 0.40	4.83 + 0.41	$t(172) = .331, p > .70$
Familiarity	7.30 + 0.10	4.90 + 0.09	$t(173) = 1.77, p = .07$
(% close friends)			
Perceptions about minorities of sexual orientation			
ATL Sub-score	17.07 + 8.23	16.23 + 6.98	$t(173) = .734, p > .40$
ATG Sub-score	18.00 + 9.39	17.70+ 8.47	$t(173) = .225, p > .80$
Essentialism Index	83.80 + 10.94	85.80 + 14.47	$t(173) = -1.03, p > .30$
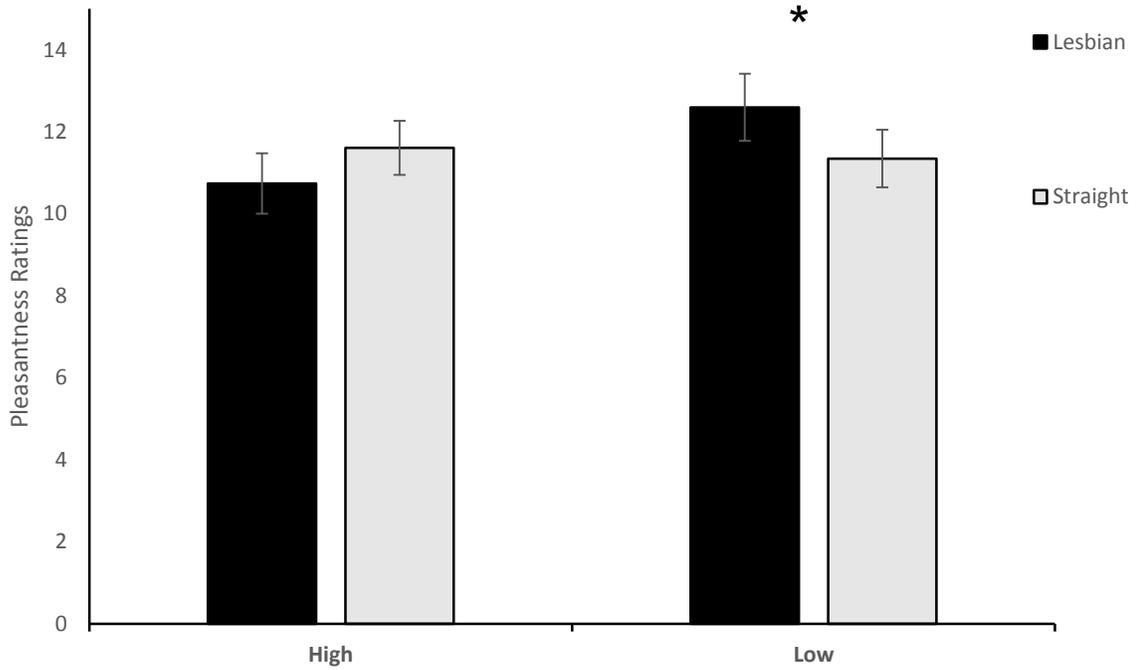
Figure 1. Lesbian couple pleasantness ratings (number of pleasantly-rated stimuli out of 30 total) as a function of sexual orientation and entitativity. * depicts significance at $p < 0.05$.
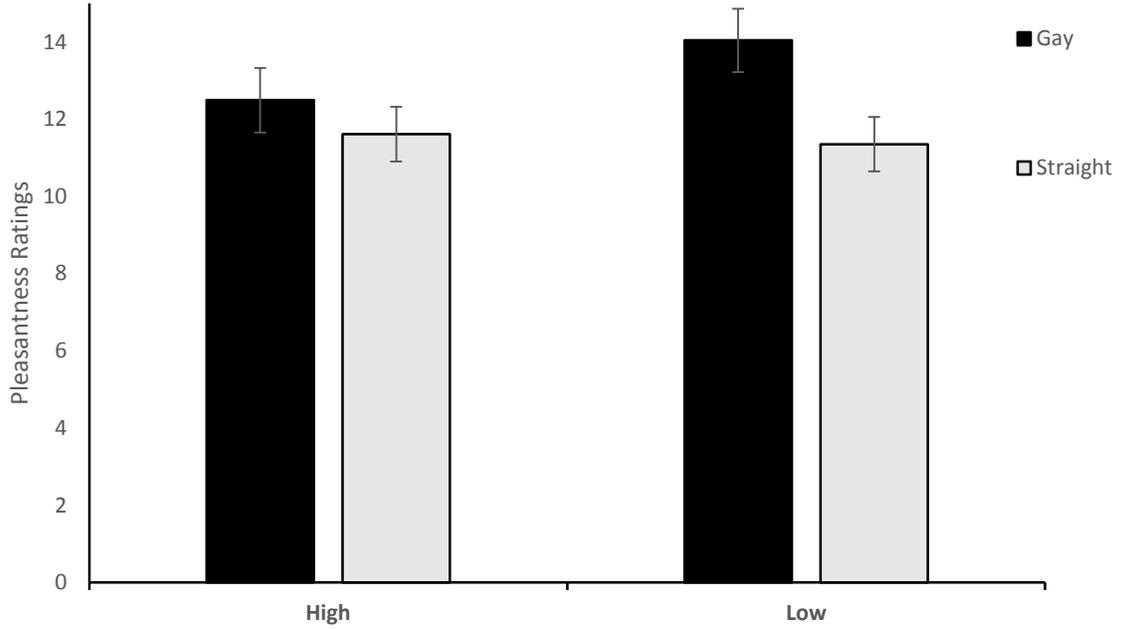
Figure 2. Gay couple pleasantness ratings (number of pleasantly-rated stimuli out of 30 total) as a function of sexual orientation and entitativity.
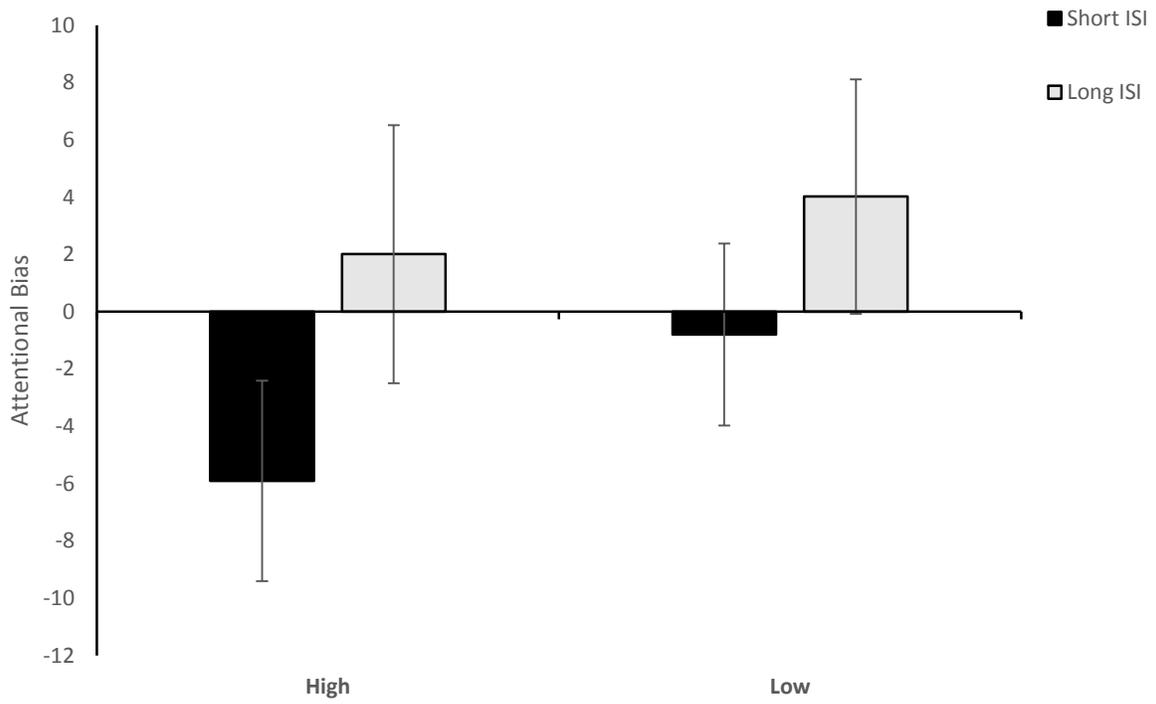
Figure 3. Lesbian-straight attentional bias as a function of block and entitativity. Note: attentional bias is a difference score.
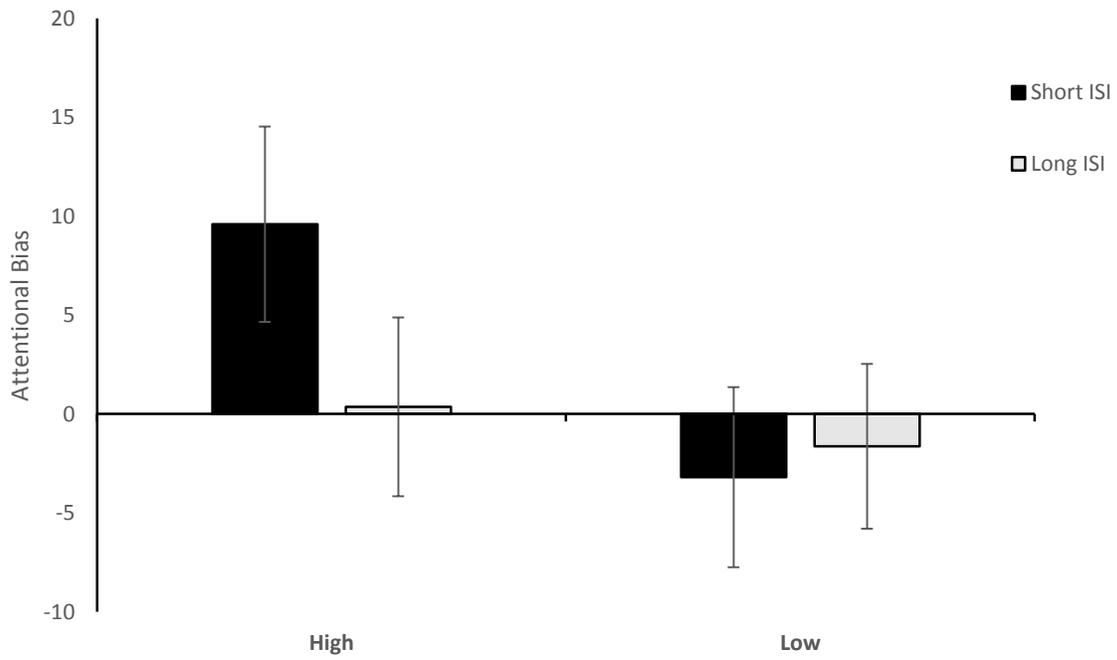
Figure 4. Gay-straight attentional bias as a function of block and entitativity. Note: attentional bias is a difference score.

Appendix A.

Fact Sheet

On the next page are a series of facts about social relationships that were collected by a national agency. Please read the statements carefully. At the end of the study, you will be asked questions about these statistics in a memorization task.

At the end of each computer task, you will be informed that it is time to study this Fact Sheet while the experimenter is setting up the next task for you. The memorization test is difficult so please make an effort to pay attention to these facts.

Please do not begin studying the next page until you are told to by the experimenter.

71% of **heterosexual** couples are motivated to have and raise multiple children.

70% of <u>homosexual</u> couples advocate for gay-marriage law.

88% of **heterosexual** couples advocate for insurance coverage for contraception.

47% of **heterosexual** couples work full-time.

65% of **heterosexual** couples drink coffee.

80% of <u>homosexual</u> couples actively pursue opportunities to be part of the LGBT community.

71% of <u>homosexual</u> couples are motivated to have and raise children.

40% of **heterosexual** couples recycle paper, plastic, and aluminum.

88% of <u>homosexual</u> couples are motivated to actively support businesses owned by other homosexual individuals in their community.

33% of **heterosexual** have a fire extinguisher in the house.

90% of **heterosexual** couples actively pursue friendships with homosexual couples.

60% of **heterosexual** couples set an alarm in the morning to wake up.

70% of **heterosexual** couples pursue active friendships with other heterosexual couples.

63% of **heterosexual** couples have a pet.

75% of <u>homosexual</u> couples actively pursue friendships with heterosexual couples.

37% of **heterosexual** couples use a satellite dish to view television at home.

77% of **heterosexual** couples are motivated to actively support small, local businesses in the community.

Appendix B.

Fact Sheet

On the next page are a series of facts about social relationships that were collected by a national agency. Please read the statements carefully. At the end of the study, you will be asked questions about these statistics in a memorization task.

At the end of each computer task, you will be informed that it is time to study this Fact Sheet while the experimenter is setting up the next task for you. The memorization test is difficult so please make an effort to pay attention to these facts.

Please do not begin studying the next page until you are told to by the experimenter.

29% of **heterosexual** couples are motivated to have and raise multiple children.

30% of homosexual couples advocate for gay-marriage law.

12% of **heterosexual** couples advocate for insurance coverage for contraception.

47% of **heterosexual** couples work full-time.

65% of **heterosexual** couples drink coffee.

20% of homosexual couples actively pursue opportunities to be part of the LGBT community.

29% of homosexual couples are motivated to have and raise children.

40% of **heterosexual** couples recycle paper, plastic, and aluminum.

12% of homosexual couples are motivated to actively support businesses owned by other

homosexual individuals in their community.

33% of **heterosexual** have a fire extinguisher in the house.

10% of **heterosexual** couples actively pursue friendships with homosexual couples.

60% of **heterosexual** couples set an alarm in the morning to wake up.

30% of **heterosexual** couples pursue active friendships with other heterosexual couples.

63% of **heterosexual** couples have a pet.

25% of homosexual couples actively pursue friendships with heterosexual couples.

37% of **heterosexual** couples use a satellite dish to view television at home.

23% of **heterosexual** couples are motivated to actively support small, local businesses in the

community.