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UNIVERSITY OF CALIFORNIA, MERCED

The Relationship of Adult Attachment Patterns and Intergroup Bias, using Minimal Groups

A Dissertation submitted in partial satisfaction of the requirements
for the degree of Doctor of Philosophy

in

PSYCHOLOGICAL SCIENCES

by

PAULINE E. LIGHT

Committee in Charge:
Dr. Jeff Gilger, Chair
Dr. Linda Cameron
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2014

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Pauline E. Light

The Dissertation of PAULINE E. LIGHT is approved, and it is acceptable
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University of California, Merced

2014

This Dissertation is dedicated to Christine Price,
my soul-mate, and my best friend.

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ABSTRACT

The Relationship of Adult Attachment Patterns and Intergroup Bias, using Minimal Groups

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PhD Psychological Sciences

University of California, Merced 2014

Dr. Jeff Gilger, Dissertation Committee Chair

The three studies in this dissertation explore the relationship of attachment patterns and inter-group bias using the minimal group paradigm. Participants were undergraduates from four main ethnic groups. Although not all analyses were significant across the three studies, the results did indicate that secure attachment does reduce intergroup bias in randomly created groups in the laboratory (minimal groups). To the author's knowledge, this is the first time that minimal groups have been used to investigate attachment patterns and intergroup bias.

In Study 1, securely attached participants and those with both high anxiety and high avoidance showed less intergroup bias towards their out-group in a Face Categorization Task. Securely attached subjects also showed more preference for their in-group. In Study 2, priming with the secure base of attachment was not effective. However, positive affect priming led to less negative reactions toward their out-groups in securely attached and anxiously attached subjects. All three studies showed a preference for the in-group and a stronger identification with the in-group. The strengths and limitations of all three studies are addressed.

CHAPTER 1: OVERVIEW OF PROPOSED STUDIES

As human beings, we need to belong with other people. Evolution has given us a strong, internal motive to form close relationships with other people in groups (Baumeister & Leary, 1995). John Donne, the English poet, described our human need very succinctly when he said "No man is an island" (Meditation 17, 1624), meaning that we are not meant to be alone.

However, here we meet with a conundrum: we want to form relationships with other people and belong with them. Yet, sometimes, when we meet new people who are different from ourselves (e.g. by way of color, race, gender, etc.), instead of wanting to pursue a relationship with them, our reaction is to draw back and become suspicious and judgmental. This reaction can then lead us to show intergroup bias, which has been defined as the "tendency to evaluate one's own membership group (the in-group) or its members more favorably than a non-membership group (the out-group) or its members" (Hewstone, Rubin, & Willis, 2002). When people are different from us, we make a distinction between them and us. Because of this distinction, we relegate them to the out-group and this is often followed by discrimination or prejudice being showed towards the members of the out-group.

Previous research has explored various ways of reducing intergroup bias (See Hewstone, Rubin, & Willis, 2002, for a review). More recently, researchers have investigated how attachment relationships are reflected in intergroup bias. Research exploring the effect of adult attachment patterns on intergroup bias has found that securely attached individuals show less intergroup bias towards people who are different from themselves (i.e. the out-group) (e.g. Mikulincer & Shaver, 2001). Securely attached individuals trust their partners, expect their partners to be responsive and available, experience comfort with closeness, and are able to cope with stressful events in a constructive manner (Mikulincer & Shaver, 2007). Further, researchers

have experimentally manipulated attachment style by using priming techniques to cognitively activate what Mikulincer and Shaver called “the secure base schema” or sense of the secure base of attachment. Overall, the experimental activation of the sense of a secure base leads participants to respond similarly to people who are securely attached which prompts them to show less intergroup bias towards the out-group (Mikulincer & Shaver, 2001).

Until now, this research into the relationship of attachment and intergroup bias has used real groups as the potential targets of bias e.g. Arabs, Orthodox Jews, homosexuals and Russian immigrants (Mikulincer & Shaver, 2001), and Muslims (Boag & Carnelley, 2012). However, problems may arise with using real groups because already-existing stereotypes may influence the level of intergroup bias shown towards the out-group and there is no way to identify when and how these stereotypes are present. In response to this potential confound of using pre-existing groups, researchers have used minimal groups created in the laboratory instead of real groups.

Minimal groups were first used by Henri Tajfel who, in the 1970s, attempted to find the minimal conditions necessary for subjects to show intergroup bias towards an out-group. His surprising discovery was that ad hoc groups could be created in the laboratory (i.e. minimal groups) on what seemed like an insignificant basis, such as a preference for either Klee or Kandinsky paintings (Tajfel, Billig, Bundy, & Flament, 1971). Further, the members of the “in-group” showed preference for their own group and intergroup bias towards their “out-group.” The interesting point was that these ad hoc groups were created arbitrarily by random assignment and their members never met one another. Consequently, there was no time for the members of each group to identify with one another or create any kind of relationship between themselves.

Because minimal groups have had no previous history with each other, the minimal group effect can avoid any potential problem of pre-existing bias.

This is the most important reason why the minimal group effect will be used in this research. This dissertation explores the relationship between adult attachment patterns and intergroup bias using minimal groups. By using minimal groups, it is hoped that any possible external influences on the level of bias towards the out-group is controlled for or minimized. In this way, a more accurate picture will be assembled of the effect that adult attachment patterns may have on attitudes of intergroup bias.

The following questions are therefore proposed:

First, do attachment patterns have an influence on intergroup bias in laboratory-created minimal groups? Second, when participants are experimentally primed with secure attachment, do anxious and avoidant participants show similar attitudes of intergroup bias as the secure participants? Third, when attachment patterns are experimentally manipulated in the lab, do subjects change their attitudes of intergroup bias? Fourth, do pre-existing attachment patterns modify how subjects react when they change groups and members of the in-group become members of the out-group? Fifth, is there a difference between participants' explicit and implicit attitudes of intergroup bias or are they the same? These questions will be explored in three studies described below, using the minimal group effect.

In the following chapters, I will introduce and describe attachment theory, intergroup bias, explicit and implicit attitudes, and the minimal group effect in more detail, and then explain why attachment theory can help in understanding intergroup bias more fully. These chapters will be followed by descriptions of the three studies, together with their results and analyses. This

paper will conclude with a discussion of the interpretation of the results, together with an account of any limitations revealed by the studies, and possible future implications for this research.

CHAPTER 2: ATTACHMENT THEORY AND RESEARCH

“No variables, it is held, have more far-reaching effects on personality development than a child’s experiences within the family: for, starting during his first months in his relation with his mother figure, and extending through the years of childhood and adolescence in his relation to both parents, he builds up working models of how attachment figures are likely to behave towards him in any of a variety of situations; and on those models are based all his expectations, and therefore all his plans, for the rest of his life” (Bowlby, 1973; p. 369).

The quotation above was written by John Bowlby (1907-1990), an English psychiatrist, who was interested in the nature of infants’ ties to their mothers. In the years following World War II, he developed attachment theory to describe the close emotional bond that is formed during the first three years of life between infants and their “attachment figures” (the infant’s primary caregiver), who is usually, but not always, the infant’s mother, (Bowlby, 1969/1982, 1973, 1980). Bowlby defined attachment in young children as “a strong disposition to seek proximity to and contact with a specific figure and to do so in certain situations, notably when frightened, tired or ill” (Bowlby, 1969/1982, p. 371).

Bowlby proposed that this need of infants to be close to their mothers or primary caregivers is an evolutionary drive to survive. Human babies are born with an innate biological system (the “attachment behavioral system”) that motivates them to seek proximity to an attachment figure when they feel threatened or in distress (Shaver & Cassidy, 2010, for a review). Infants will use their attachment figures as both a secure base from which to explore their world, and a safe haven to which they can retreat for comfort when distressed (Bowlby, 1969, 1982; Ainsworth, Blehar, Waters, & Wall, 1978). This close proximity to their mothers ensures infants’ continued survival, especially during the prolonged period of infancy when they are defenseless and unable to protect themselves from possible dangers (e.g. strangers).

Central to Bowlby’s theory of attachment is the concept of the internal working model of self and others. Bowlby believed that from repeated interactions with their mothers, infants form

an internal working model (i.e. a mental representation or unconscious expectations and beliefs) of how they will be treated by their mothers and the other people in their environment. If their mothers are emotionally available and appropriately responsive to them, infants learn that they can trust themselves and their environment, and they will learn to think of themselves as being lovable and worthy of their mother's care. These infants are said to be securely attached.

However, if their mothers are not consistent in being both available and responsive to their infants' needs, or if they reject their infants' emotional need for closeness, then infants will become insecure about themselves and the outside world. They will form unconscious expectations that they will be treated negatively by their mothers and others in the future. These expectations or internal working model may lead infants to become clingy and anxious of being left alone (insecure resistant) or they may learn to cope without their mothers' emotional support by avoiding specific contact with her (insecure avoidant) (Ainsworth, Waters, & Wall, 1978). These infants are said to be insecurely attached (Bowlby, 1973).

Although John Bowlby's research was originally confined to studying infant attachment, Bowlby argued that attachment theory is relevant throughout the lifespan, "from the cradle to the grave" (Bowlby, 1988, p.129). In the 1980s, Hazan and Shaver (1987) were the first researchers to apply attachment theory to adult romantic relationships. In their seminal article, they described adult attachment as the "nature of the close, emotional relationships between romantic partners and the influential effect of these relationships on our emotional security" (Hazan & Shaver). In their study, they found that adults possess similar attachment styles to infants: secure, anxious and avoidant. Further, when securely attached individuals in a romantic relationship feel threatened, their first reaction is to seek proximity to their partner, either in person or, when this is not possible, by mental representations of their partner.

These first studies in adult attachment were completed with adult attachment being measured by categorical attachment styles. Attachment styles are conceptualized as patterns of expectations and social behavior that result from the “interaction of an innate behavioral system and a particular history of attachment experiences” (Fraley & Shaver, 2000). However, subsequent studies (e.g., Bartholomew & Horowitz, 1991; Brennan, Clark, & Shaver, 1998) have focused instead on attachment styles as regions in a two-dimensional space, attachment anxiety and attachment avoidance (Brennan, Clark, & Shaver, 1998). Attachment anxiety describes an individual who fears rejection and abandonment and worries that a partner will not be available in times of need. These anxious individuals become very emotional when they feel threatened with social rejection or relationship loss. In contrast, attachment avoidance describes a person who tends to distrust his partner’s goodwill, is extremely independent, self-reliant, and emotionally distant. Avoidant individuals tend to disengage or distance themselves from emotional situations. Individuals who score low on these two continuous scales are termed securely attached. Securely attached adults are comfortable with closeness and being dependent on their partner for affection. Further, they are optimistic when they meet with a threatening situation, they react less defensively to others and they are more cognitively open to new situations and people (Mikulincer & Shaver, 2007, for a review).

According to Mikulincer and Shaver (2003), the two dimensions of attachment anxiety and attachment avoidance represent different ways of regulating the insecurity and distress that result from a failure to find suitable sources of support and comfort. Adults with attachment anxiety seek exaggerated comfort and support from their partners and also tend to be overly dependent on their partners. These individuals are also on constant alert for signs of partner unavailability. On the other hand, individuals with attachment avoidance downplay any need for

intimacy and dependence on their partner, while also overplaying their sense of not being vulnerable (Mikulincer & Shaver, 2003).

These attachment patterns are chronic (i.e. dispositional) but attachment patterns can also be experimentally manipulated, using well-validated techniques of priming (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996). Attachment priming refers to activating (either consciously or unconsciously) specific attachment representations in memory just before carrying out a particular task. It has been found that priming a sense of security in people who are chronically insecure leads to a reaction that is similar to that of people with a secure attachment pattern (Mikulincer & Shaver, 2001; Rowe & Carnelley, 2003).

For example, Baldwin (1994) found that exposing participants to the name of a supportive other led to more positive self-evaluation, and Pierce and Lydon (1998) found that the priming of proximity-related words increased reliance on support-seeking when people were coping with stress. Moreover, priming of memories of attachment security causes participants to increase cognitive openness in response to information that does not line up with their previous opinion (Mikulincer & Arad, 1999).

Research into adult attachment has found that attachment patterns identified in childhood do appear to be relatively stable over time. It is therefore generally assumed that continuity in attachment across development does exist (Hazan & Shaver, 1994). Further, there is considerable support for Bowlby's hypothesis that the working models of self and others, first developed as an infant, continue to influence and operate as prototypes for future adult relationships (Hazan & Shaver 1987, Bartholomew & Horowitz 1991), and also provide a design for how an individual experiences, expresses, and copes with distressing emotions (Cooper, Collins, & Shaver, 1998). In other words, as John Bowlby argued in the quotation at the beginning of this chapter, what

happens to the child during his initial attachment experience may have a substantial influence on him throughout his life.

CHAPTER 3: INTERGROUP BIAS

The world we live in is a complicated place. Sometimes, the amount of information that we need to process can be overwhelming. Somehow we have to make sense of it. One way of coping with all the information is to categorize people and things into groups, depending on their specific characteristics. For example, we call individuals who follow the Chargers football team “Chargers Fans” and call followers of the Padres baseball team “Padres Fans.” Individuals can also categorize themselves as belonging to certain groups, for example, “I am a Protestant” or “I am a Caucasian” or “I am Native American.”

This strategy of categorization simplifies our life but it also has consequences we might not have foreseen. One of these consequences is that, when we identify with a certain group, e.g. “I am a Chargers Fan,” we may not only perceive that group and its members as different from other groups but also go so far as believing that the group to which we belong (which becomes the “in-group”) is superior to and possesses more positive qualities than another group (the “out-group”). So, belonging to a particular group can lead us to believe that the people in our group are better than the people in another group. As a result, we may act more favorably toward those who belong to our group but act more negatively toward those who do not belong to our group.

This tendency to evaluate one’s own group or its members more favorably than a non-membership group or its members is called intergroup bias (Devine, 1995; Hewstone, Rubin & Willis, 2002). Intergroup bias can take the form of negative emotional responses towards the out-group (prejudice), negative cognitive labeling of the out-group (stereotyping) and specific negative behaviors toward the out-group (discrimination) (Mackie & Smith, 1998, Wilder & Simon, 2001).

There are several psychological theories to explain the prevalence of intergroup bias. These include Social Learning Theory (Bandura, 1977), Social Identity Theory (Tajfel & Turner, 1979; Tajfel & Turner, 1986), and Evolutionary Theory. First, Social Learning Theory focuses on learning in a social context by directly observing the behavior of other people and the outcomes of those behaviors. Social Learning Theory was first developed by Albert Bandura, whose research revealed that children exposed to aggressive models were more likely to imitate what they had seen and behave aggressively themselves.

Bandura and colleagues argued that the results they found supported the idea that children could rapidly acquire new behaviors through the process of observation and imitation (Bandura, 1961). In subsequent studies, Bandura and colleagues demonstrated that children imitated aggressive behavior witnessed on video, in addition to live observation, and children also imitated aggressive behaviors enacted by a cartoon character. (Bandura, Ross, & Ross, 1963). More recent studies have shown a positive relationship between viewing violent television and aggression later in life, as well as playing violent video games and aggressive behaviors (Anderson & Bushman, 2001).

Social Learning Theory relates to intergroup bias because human beings learn about members of different groups in a variety of ways, including how they are presented by the media or in a religious context. If certain groups and their members are consistently presented in a negative way (e.g. as immoral), then, if we meet people who belong to these groups, we may conclude that these individuals are also immoral and, having stereotyped them as such, we may go on to discriminate against them. However, Social Learning Theory cannot explain why intergroup bias appears in research on the minimal group effect in the absence of any social learning. This is discussed below.

The second possible explanation for intergroup bias is Social Identity Theory, which was originally developed by Henri Tajfel and John Turner (Turner & Reynolds, 2010). “Social identity” has been defined as “that part of an individual’s self-concept which derives from his knowledge of his membership of a social group ... together with the value and emotional significance attached to that membership” (Tajfel, 1981). Therefore, a key assumption of Social Identity Theory is that membership in a specific group confers a perception of positive self-identity which, in turn, encourages feelings of self-esteem and a sense of belonging to the social world (Tajfel, & Turner, 1979).

Further, in order to increase our self-image, we enhance the status of the group to which we belong. For example, a native of England might exclaim “England is the best country in the world!” We can also increase our self-image by discriminating against the out-group. In their most virulent form, prejudice and discrimination between cultures can result in racism, and, racism can lead to genocide, such as occurred in Germany against the Jews, in Rwanda between the Hutus and Tutsis and, more recently, in the former Yugoslavia between the Bosnians and Serbs.

Tajfel and Turner (1979) proposed that there are three mental processes involved in evaluating others as “us” or “them” (i.e. “in-group” and “out-group”). These take place in a particular order. First is social categorization. We categorize objects in order to understand them and identify them. In a very similar way we categorize people (including ourselves) in order to understand the social environment. We use social categories like black, white, Australian, Christian, Muslim, student, because they are all useful identifiers. If we can assign people to a category then that tells us important information about those people.

The second mental process involved in evaluating others is social identification. We adopt the identity of the group we have categorized ourselves as belonging to. If, for example, I have categorized myself as a student, the chances are I will adopt the identity of a student and begin to act as I believe a student acts. The final mental process is social comparison. Once we have categorized ourselves as part of a group and have identified with that group, we then tend to compare that group with other groups. If our self-esteem is to be maintained, our group needs to compare favorably with other groups. This is critical to understanding prejudice, because once two groups identify themselves as rivals they are forced to compete in order for their members to maintain their self-esteem. Although Social Identity Theory appears to be influential within the intergroup bias literature, strong empirical support is lacking for the claim that intergroup bias preserves self-esteem (Rubin & Hewstone, 1998).

A third possible reason for the existence of intergroup bias is that, through evolution, human beings have developed adaptive mechanisms that help them to form alliances with friendly groups and protect themselves against possible enemies. Our evolutionary past depicts our human ancestors as members of small groups, banded together for protection and survival. Living together in small groups gave these foragers and hunters the advantage of numbers to protect themselves against predators, to hunt large animals, and to develop a sense of security from other small bands who might wish to take over their space and resources (Cosmides, Tooby, & Kurzban, 2003). It would make sense for these people to use intergroup bias as a way to continue security and protection and to keep away potential enemies. There is not a wealth of research into the development of intergroup bias from an evolutionary view. However, for the purposes of this dissertation and the proposed studies, evolution is an interesting theory since

attachment is also considered an adaptive mechanism developed through evolution to protect the organism from danger. There may therefore be connections between both theories.

The Minimal Group Paradigm

In order to understand the psychological basis of intergroup bias, Henri Tajfel and colleagues developed the minimal group paradigm in the early 1970s. Tajfel's intention was to create groups with as little meaning as possible and then add meaning to discover at what point discrimination would occur. They were surprised to discover that simple random assignment of individuals into two distinct but totally ad hoc groups was sufficient to produce in-group favoritism. Experiments using this approach have revealed that even arbitrary and virtually meaningless distinctions between groups (e.g. the color of subjects' shirts, preference for a particular artist's paintings, and the day of a subject's birthday) can trigger a tendency to favor one's own group at the expense of another group.

Typically, minimal group experiments find that, where individuals are asked to allocate available resources to their in-group and out-group, although participants show a significant degree of fairness in their allocations, they also show a significant tendency to allocate higher rewards to members of their own group than to members of the out-group, even at the expense of any direct benefit to themselves (Tajfel, 1970; Tajfel, Billig, Bundy, & Flament, 1971). So, even in the most minimal group conditions, the in-group will still show favoritism to its own group over the out-group.

The main purpose of the procedure in the minimal group paradigm is to exclude external influences from the situation. One major problem of using real groups in studies of intergroup bias is that participants' prior experiences or expectations of individuals belonging to real groups (either personally or as part of their upbringing) may distort or bias their reactions. Therefore,

there is a likelihood of a previous history of stereotyping or discrimination that already exists for individuals when dealing with members of other groups. Ideally, in order to control for pre-existing biases, researchers need to remove the possibility of any such knowledge which may cloud the extent to which intergroup bias is shown. One way of doing this is anonymity. The random assignment of participants to minimal groups should exclude the influence of any favoritism between group members.

CHAPTER 4: EXPLICIT AND IMPLICIT ATTITUDES OF BIAS

Social psychology research has proposed that explicit and implicit attitudes are distinct concepts (Greenwald & Banaji, 1995). An explicit attitude is deliberate, controllable and made with awareness (e.g., I don't think gays should be allowed to marry). An implicit attitude is one that occurs automatically outside conscious awareness. The individual cannot consciously control when and how he shows the implicit attitude (Nosek, 2007). An implicit attitude has been defined as "traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects" (Greenwald & Banaji, 1995). The implication is that, using the example above, although individuals may consciously hold positive attitudes towards gays that they should be given the legal right to marry, nevertheless, their unconscious attitudes may reflect a diametrically opposite viewpoint.

The question of how implicit attitudes develop was addressed in a study by Baron and Banaji (2006) in which they measured both explicit and implicit race attitudes in three groups of white Americans who were 6 years of age, 10 years of age and adult. They found implicit bias for one's own social group present in all three groups, even in the 6-year old children. This implicit bias remained the same across the three groups. However, although implicit bias did not lessen in the 10-year olds and the adult participants, explicit race attitudes decreased considerably in the 10-year olds and completely disappeared in the adult subjects. Baron and Banaji concluded that the development of explicit and implicit attitudes show two distinct patterns. Both explicit, self-reported attitudes and implicit attitudes appear to form early in life, at least by the age of 6 years. However, while implicit attitudes remain fairly stable across different age groups, for explicit attitudes, the strong preference for one's own group diminishes by the age of 10 years until, by adulthood, the preference for one's own group and the out-group

is the same. This modification in explicit attitudes through life may be influenced by the need to conform to societal views and recent experience. In the three studies in this dissertation, I intend to test both explicit and implied attitudes of intergroup bias to see whether they result in the same levels of bias or not. The campus at the University of California, Merced, has a diverse, ethnic community, made up of four main ethnic groups: Caucasian, Asian American, Hispanic and African American. I want to investigate whether the explicit societal views of each of these four ethnic groups differ from their implicit attitudes.

Research has also investigated the different factors that influence explicit versus implicit attitudes. For example, Rudman, Phelan, and Heppen (2007) explored the idea that one specific factor influencing implicit attitudes more than explicit attitudes may be the emotional nature of early developmental factors, e.g. being raised by an overweight mother might influence unconscious attitudes in a pro-heavy direction (Rudman et al., 2007). They found that smokers' implicit attitudes were uniquely predicted by their early attitudes toward smoking while their explicit attitudes were predicted by their recent experiences with smoking. Rudman et al. (2007) concluded that each attitude reflected a particular aspect of an attitude. Therefore, the effects of explicit and implicit attitudes may be different.

If attachment theory is looked at in this context, we can see that attachment also describes the emotional nature of early developmental factors in the context of the mother-infant relationship and how attachment patterns developed in infancy are relatively stable throughout the lifespan. Thus, it might be the case that attachment patterns could affect implicit attitudes even more than explicit attitudes.

CHAPTER 5: ADULT ATTACHMENT AND INTERGROUP BIAS

Although adult attachment theory originally explored interpersonal relations, researchers began examining whether attachment could be a factor in helping to explain intergroup bias. Bowlby (1969/1982) stated that activation of the attachment behavioral system is closely related to an innate fear of strangers but that the availability and responsiveness of the attachment figure lessens this innate reaction and encourages a more tolerant attitude towards novelty and unfamiliarity. Therefore, it seemed possible that attachment theory might be helpful in mitigating the effect of intergroup bias. As a consequence, research applied adult attachment theory to the study of intergroup relationships (Mikulincer & Shaver, 2001; Rom & Mikulincer, 2003).

This research has shown that securely attached individuals are more open to new experiences (Nofle & Shaver, 2006), and make fewer stereotypical judgments of others than insecurely attached individuals. In other words, they are unwilling to endorse rigid beliefs and are more able to integrate new evidence into making social judgments (Mikulincer, 1997). Further, secure individuals are more tolerant of immigrants (Van Oudenhoven & Hofstra, 2006), and are low in both subtle and blatant prejudice towards out-group members (DiPentima & Toni, 2009). Securely attached individuals also trust others more than the insecurely attached (Feeney & Noller, 1990), show greater compassion than the insecure (Mikulincer, Shaver, Gillath, & Nitzberg, 2005), and greater empathy (Mikulincer et al., 2001) towards other people.

On the other hand, the insecurely attached are associated with greater hostility towards (Kobak & Sceery, 1988) and a general mistrust of others (Hazan & Shaver, 1987). Both attachment anxious and avoidant individuals use stereotype-based judgments (Mikulincer, 1997), and are high in prejudice (Hofstra, Van Oudenhoven, & Buunk, 2005), including subtle and blatant prejudice (DiPentima et al., 2009). Taken together, these findings suggest that securely

attached individuals will show less discrimination than insecure individuals. Further, research demonstrates that when secure attachment is primed, chronically insecure participants show less negative evaluations of out-groups (Mikulincer & Shaver, 2001), and also decreased aggressive behavior towards out-group members (assessed by hot sauce allocation (Mikulincer & Shaver, 2007)). It therefore appears that, overall, a sense of secure attachment leads to more positive attitudes and feelings towards out-group members.

Mikulincer and Shaver (2001) were among the first researchers to apply attachment theory to intergroup bias. In a set of five studies, they examined the secure base priming of attachment on explicit intergroup bias towards four different out-groups: Arab students, Orthodox Jews, Russian immigrants and homosexuals. Mikulincer and Shaver found several interesting results related to intergroup bias. First, they found that higher scores on a self-report measure of attachment anxiety were linked to more unfriendly responses towards the different out-groups. Second, when they activated the sense of attachment security by either subliminally presenting security-related words (such as love and proximity) to the participants, or asking subjects to visualize the faces of their security-promoting attachment figures, they also found reduced negative responses to the out-groups. The results of these five studies suggested that temporarily activating the secure base of attachment prompted even chronically insecure individuals to react to out-groups in a more accepting and tolerant manner.

Mikulincer and Shaver (2001) suggested several underlying mechanisms that could be responsible for these effects. These included increases in self-efficacy, positive social norms, cognitive flexibility, and reduction in threat appraisal. With regard to cognitive flexibility i.e. a greater tolerance and openness to other people, Bowlby had already described how securely attached individuals are more prone than insecure individuals to explore novel situations and

engage in risk-taking activities (Bowlby, 1988). Secure children also show higher cognitive flexibility than insecure children (Cassidy, 1986).

Moreover, Mikulincer (1997) found that securely attached individuals showed a greater degree of tolerance for unpredictable circumstances and ambiguity as well as a greater reluctance to accept beliefs that were rigid. In Mikulincer's study, participants rated target individuals after being exposed to new evidence that refuted either initial impressions or ethnic stereotypes about the targets. The results showed that securely attached individuals were less likely to be stuck with their initial impressions or rely on ethnic stereotypes following the presentation of new evidence (Mikulincer, 1997).

In a more recent study, Boag and Carnelley (2012) examined self-reported discrimination and discriminatory behavior towards Muslims. Participants were primed with either a secure base of attachment or a neutral prime. Subjects primed with the secure base of attachment were instructed to think about a close relationship indicative of attachment security (i.e., emotional closeness, and comfort with dependency on partner), and write about this relationship for 10 minutes. Participants in the neutral priming condition visualized and wrote about a shopping trip to the supermarket for 10 minutes. Participants were asked to choose a house-mate from four groups of people that included "Muslim versus non-Muslim persons." Behavioral discrimination was assessed as the distance between the Muslim participant's 'belongings' and the chair selected by the participant. Larger distances, assessed in the number of chairs, indicated greater discrimination. The results demonstrated that primed attachment security (versus a neutral prime) significantly predicted both the choice to discriminate against Muslims and subsequent discriminatory behavior towards a Muslim. As hypothesized, priming attachment security

(compared to a neutral prime) led to reduced self-reported preference to discriminate against a Muslim and reduced behavioral discrimination towards Muslims.

The studies described above suggest that when we meet new people who are different from ourselves, it is important that we keep an open mind and not jump to quick conclusions based on previously existing stereotypes or judgments. We also need to be able to consider the opinion and perspective of each side if we are to be fair and come to a just conclusion in any intergroup conflict. Greater cognitive flexibility and tolerance may increase perceived similarity and inclusiveness of one's group boundaries, factors which are known to reduce intergroup bias (Gaertner & Dovidio, 2000). Thus, increasing cognitive flexibility and tolerance may be an important mechanism through which a secure base of attachment may decrease intergroup bias. The results from Mikulincer and Shaver (2001) suggest that a sense of being loved and supported allows an individual to open himself to be more accepting and less negative of people who do not belong to his own group.

Group Attachment

Smith, Murphy, and Coats (1999) argued that adult attachment theory can help to explain processes underlying individuals' identification with social groups as well as romantic relationships. They developed a self-report measure of group attachment anxiety and group attachment avoidance called The Social Group Attachment Scale. Using this measure of group attachment, Smith et al. found that higher scores on both group attachment anxiety and group attachment avoidance predicted a lower involvement with group activities, more negative evaluations of social groups, and lower perceived support from groups. Further, group attachment anxiety was associated with stronger negative emotions toward groups, while group

attachment avoidance was associated with lower levels of positive affect toward social groups as well as lower identification with social groups.

Attachment theory influences how individuals act and react to other people when distressed or threatened. Individuals may be secure in the knowledge that they are lovable and can reach out for help to other people, or they may anxiously cling onto people for fear of being abandoned or keep a definite distance between themselves and others. These reactions to others based on attachment patterns may be important to how a person deals with members of an out-group. Attachment security is associated with higher self-esteem, a more balanced view of threatening situations and more constructive ways of dealing with distress. So, when individuals have a secure emotional foundation, they should find it less necessary to show negative reactions to out-groups and be more available to developing a more tolerant attitude towards unfamiliar situations and people.

CHAPTER 6: STUDY 1

Although attachment theory has already been shown to reduce inter-group bias (Mikulincer & Shaver, 2001, Saleem 2011), no one has yet used the minimal group effect in this context. By creating groups in the laboratory and then seeing if members of one randomly created group will show inter-group bias towards the other group can be very useful in assessing the bias that participants possess towards other people who are different from themselves. By also exploring if attachment patterns can have a significant effect on the bias shown by a minimal group, it is hoped that the studies described here can add to the existing research on how inter-group bias is initially created and what part individual differences such as secure attachment can play in reducing that bias. This is the primary goal of this study.

Study 1 uses a correlation design to explore whether attachment orientation influences intergroup bias, using the minimal group paradigm. First, participants will complete questionnaires on relationship attachment. Subjects will then take part in a computerized categorization task where they are required to identify previously seen pictures of faces as belonging to either the in-group or the out-group (Dunham, 2011; Hugenberg & Bodenhausen, 2004). Participants will also be asked to assess their express liking for and identification with their own groups and will complete an Implicit Association Test (IAT), to explore the differences between explicit and implicit preferences for their in-group versus their out-group (Greenwald, McGhee, & Schwartz, 1998).

The predictions are as follows:

1. More securely attached participants will show less inter-group bias toward the members of the (minimal) out-group by categorizing fewer angry faces into the out-group; more anxiously attached and avoidant participants will categorize more angry faces into the out-group.

2. With regard to explicit versus implicit attitudes of intergroup bias, more securely attached participants will show less negative explicit and implicit attitudes of bias than the insecurely attached.

Method

Participants

Participants will be undergraduates from an ethnically diverse Western public university who will receive credit as partial fulfillment of an introductory psychology course requirement. The number of subjects for the study was determined via an a priori power analysis with a two-tailed alpha at .05, and expected correlations of medium size (0.30). The analysis indicated that a sample of at least 134 participants would be required to detect this effect size.

The participants will range in age from 18 to 21 years, and consist of four main ethnic groups, Caucasians, Hispanics, Asian Americans, and African Americans, based on the university demographics. In 2007-2008, the ethnic makeup of university undergraduates included 33% Asian Americans, 30% Hispanic Americans, 24% Caucasians, and 6% African Americans.

Procedure

Participants will be tested on an individual basis, and will be told they are taking part in a study on memory and social perception. The total time of the experiment per subject will be approximately 40 minutes.

After providing informed consent, participants will be asked to complete two paper and pencil questionnaires: the Experience of Close Relationships (ECR; Brennan, Clark, & Shaver, 1998) Scale, and a demographics measure. After completing the questionnaires, in order to create the minimal groups, each participant will be asked if his or her birthday falls on an odd or an even date. Depending on the answer, participants will be told that they will be assigned to one of

two novel, color-labeled groups, either the Orange Group or the Green Group. In reality, participants will be randomly assigned to these groups and assignment will not depend on their birthday.

After being assigned to a particular group, participants will be asked to write down the name of their group on a piece of paper and will also be given either an orange or a green sticker to wear, indicating his or her group membership. Participants will be told that they will not meet the other members of their group. Each participant will then complete two computerized tasks, the Face Categorization task and the IAT.

Measures

Experience of Close Relationships (ECR; Brennan, et al., 1998) Scale.

The ECR Scale is a 36-item, self-report questionnaire that measures orientation of adult attachment. The scale contains two subscales or attachment dimensions, each containing 18 items. One dimension relates to attachment-related anxiety (ANXIETY), e.g. “I worry about being abandoned,” and the other dimension relates to attachment-related avoidance (AVOIDANCE), e.g. “I prefer not to show a partner how I feel deep down.” Participants will be asked to read each item in the ECR Scale and rate the extent to which it describes their general feelings in close relationships on a 7-point Likert scale, ranging from 1 (Disagree Strongly) to 7 (Agree Strongly). The score on each attachment dimension for each participant will be computed by using the formula supplied by Brennan, Clark, and Shaver (1998) in their original article. Higher scores on ANXIETY will indicate greater attachment anxiety while higher scores on AVOIDANCE will indicate greater attachment avoidance. Lower scores on each attachment dimension will indicate more securely attached participants.

In their original study with university undergraduates, Brennan, Clark, and Shaver (1998) reported that the ECR Scale had a high level of internal consistency with coefficient alphas of .91 for the ANXIETY subscale and .94 for the AVOIDANCE subscale. More recent studies administered to college students have also indicated a high level of internal consistency for the ANXIETY subscale (ranging from .89 to .92) and the AVOIDANCE subscale (ranging from .91 to .95) (e.g. Vogel & Wei, 2005; Wei, Mallinckrodt, Russell, & Abraham, 2004). Brennan, et al. also reported that test-retest reliability over a three-week period was .70 for both subscales, and Lopez and Gormley (2002) reported that test-retest reliability over a six-month period was .68 and .71 for ANXIETY and AVOIDANCE subscales respectively. The validity of the ECR Scale has also been supported: attachment anxiety and avoidance have been associated with depression (Zakalik & Wei, 2006), self-efficacy and emotional self-awareness (Mallinckrodt & Wei, 2005).

Demographics Survey

The second questionnaire will be a demographics measure, designed for this study and asking participants their age, sex, race, year in school, mother and father's level of education, and marital status. These variables will be used in secondary analyses or as covariates to determine their influence on the main variables.

Face Categorization Task

The Face Categorization Task is designed to assess how many angry as opposed to happy faces are categorized as belonging to the out-group and will be presented to the subjects as a study on "how quickly people categorize stimuli." The faces will be images from the NimStim Set of Facial Expressions (672 images; <http://www.macbrain.org/resources.htm>), which consist of naturally posed color photographs of 43 male and female professional actors in New York city, aged from 21 to 30 years old. The actors were African-American, Asian-American,

Hispanic, and Caucasian and each actor was instructed to pose in eight facial expressions: happy, sad, angry, fearful, surprised, disgusted, neutral, and calm. From the total number of faces in the NimStim Set, 16 faces will be selected, 8 faces for the in-group and 8 faces for the out-group. The in-group faces will include 4 males and 4 females with 2 faces representing each of the four main ethnicities found on campus. There will be three sets of these 16 faces: one set with neutral expressions, the same 16 faces with a happy expression and the same 16 faces with an angry expression (see Dunham, 2011).

Participants will first read the instructions on the computer screen indicating that they will be introduced to the members of two groups, their own group and one other group, and that it will be important that they try to remember who is in which group. They will then proceed to the Learning Phase of the task in which they will view the first set of 16 faces, one at a time (who represent the members of both the Orange and Green groups), presented in frontal headshots with neutral facial expressions. Each headshot will be 4 inches x 5 inches and will be labeled either “Orange Group” or “Green Group.” The headshots will represent the 8 individuals assigned to the in-group and the 8 individuals assigned to the out-group. Faces will be presented in random order for only 1.5 seconds each, the purpose being to make accurate encoding very difficult. The faces will have been judged equally attractive by undergraduates on a previous occasion.

Immediately after the learning phase, participants will be told that they will now be tested on their memory of the two groups. In the Memory Phase of the task, the same faces will be presented again, one at a time, in random order, but this time with either angry or happy expressions and without background color. Each face will appear twice, once in each emotional expression, and participants will categorize the faces as belonging to either their in-group or their

out-group by pressing one key designated as the in-group key or another key designated as the out-group key. The task will consist of 32 trials (16 faces \times 2 facial expression each). After each face is presented, participants will be asked to indicate, as fast as they can, whether this face belongs to the Orange or Green group. The procedure will be similar to that used by Dunham (2011) who found that participants categorized more angry faces into the minimal out-group than the minimal in-group.

Following the Memory Task, participants will complete several items to measure their explicit group attitudes, and identification with their group. First, participants will use a 7-point Likert scale (where 1 = Strongly Disagree to 7 = Strongly Agree) to respond to four items measuring group attitudes (“I like the Orange Group”, “I like the Green Group”, “The Orange Group is good”, and “The Green Group is good”). The two items for the Orange Group will be combined to create an attitude score for the Orange Group, and the two items for the Green Group will be combined to create an attitude score for the Green Group. A higher score will indicate greater group preference. Next, participants will use the same 7-point Likert scale to respond to four items measuring group identification (“I feel attached to the Orange Group”, “I feel attached to the Green Group,” “I identify with the Orange Group,” and “I identify with the Green Group”). The two items for the Orange Group will be combined to create an identification score for the Orange Group, and the two items for the Green Group will be combined to create an attitude score for the Green Group. A higher score will indicate greater group identification.

After completing the explicit attitudes and identification, participants will then go on to complete the IAT.

Implicit Association Test (IAT)

Implicit attitudes toward the in-group and out-group will be measured by a computerized IAT (Greenwald, McGhee, & Schwartz, 1998). The IAT will measure the relative strength of association between two concepts, the target concept (e.g., face: in-group versus out-group) and an attribute concept (e.g., evaluation: words with positive meanings versus words with negative meanings). When completing the IAT, participants will be asked to quickly classify individual stimuli that represent the target concept (face) and the attribute concept (word) into one of four distinct categories with only two responses.

The underlying assumption of the IAT is that, to the extent that the in-group is positively evaluated, participants' responses will be faster and more accurate when the faces of the members of their in-group are paired with positive words. The more closely associated the two concepts are, the easier it will be to respond to them as a single unit. So, if an in-group face and "rainbow" are strongly associated, it should be easier to respond faster when they are paired. On the other hand, if an out-group face and "rainbow" are not so strongly associated, it should be harder to respond faster when they are paired. The IAT will give a measure of how strongly associated the two types of concepts are.

Participants will complete two practice blocks. During the first practice block, participants will categorize faces of in-group and out-group members using two response keys on the computer (20 trials). During the second practice block, participants will categorize positive and negative words (20 trials) using the same two response keys. The faces of both the in-group and the out-group will be in the neutral expression and will be the same faces as used in the Learning Phase of the Face Categorization Task, approximately 5 inches by 4 inches. The two practice blocks will be followed by the first data collection block of 50 trials. This "compatible"

block of trials will involve participants categorizing in-group faces with positive words using one response key, and out-group faces with negative words using the second response key.

Next, additional practice will be given so that participants can learn to categorize concepts in an opposite combination to what they had learned before i.e. pair in-group faces with negative words, and out-group faces with positive words. They will then complete the second data collection block of 50 trials. In this "incompatible" block of trials, participants will categorize in-group faces with negative words using one response key, and out-group faces with positive words using the second response key.

The speed with which subjects press the response keys on the "compatible" block of trials will be compared to their speed on the "incompatible" block of trials. By looking at the speed differences, the IAT can reveal an automatic preference for the in-group as opposed to the out-group or vice versa. The revised scoring algorithm provided by Greenwald, Nosek, & Banaji (2003) will be used, with block order counterbalanced across participants.

The IAT has displayed good construct validity (Nosek, Greenwald, & Banaji, 2005) and internal consistency with test-retest reliability (Nosek, Greenwald, & Banaji, 2007). Further, Greenwald, Poehlman, Uhlman, and Banaji (2009) found that the IAT has greater predictive validity than self-report measures for intergroup behavior.

The positive and negative concepts will be taken from Greenwald, McGhee, and Schwartz (1998). The Positive concepts will be Rainbow, Gift, Paradise, Laughter, Peace, Freedom, Pleasure, Sunrise, Health, and Love. The Negative concepts will be Filth, Stink, Vomit, Rotten, Evil, Agony, Cancer, Hatred, Death, and Murder.

After completing the IAT, participants will be debriefed and the study will end.

Variables for Analysis

There are ten primary variables of interest that will be subjected to analysis and serve as dependent or independent variables. The eight demographic variables will be used in secondary analyses or as covariates. These include: age, sex, major, year of school, ethnicity, mother's and father's level of education, and marital status. The ten primary variables are:

1. ECR-Anxiety (ANXIETY): the dimension of relationship attachment anxiety from the Experience of Close Relationships Scale (ECR). The total possible score for all 18 items will range from 18 to 126. Each participant's score on the ANXIETY dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.
2. ECR-Avoidance (AVOIDANCE): the dimension of relationship attachment avoidance from the Experience of Close Relationships Scale (ECR). The total possible score for all 18 items will range from 18 to 126. Each participant's score on the AVOIDANCE dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.
3. Angry Categorizations (FACESA): the percentage of angry faces categorized into the out-group in the Face Categorization Task. This is a dependent variable.
4. Angry Categorizations (FACESH): the percentage of happy faces categorized into the out-group in the Face Categorization Task. This is a dependent variable.
5. Explicit Attitudes (ATTO) towards the Orange Group. There are two attitude questions, each ranging from 1 to 7. The total possible score for each participant will range from 2

to 14. This is a dependent variable used to assess the explicit attitudes of participants towards the Orange Group.

6. Explicit Attitudes (ATTG) towards the Green Group. There are two attitude questions, each ranging from 1 to 7. The total possible score for each participant will range from 2 to 14. This is a dependent variable used to assess the explicit attitudes of participants towards the Green Group.
7. Explicit Identification (IDO) towards the Orange Group. There are two identification questions, each ranging from 1 to 7. The total possible score for each participant will range from 2 to 14. This is a dependent variable used to assess participants' level of identification towards the Orange Group.
8. Explicit Identification (IDO) towards the Green Group. There are two identification questions, each ranging from 1 to 7. The total possible score for each participant will range from 2 to 14. This is a dependent variable used to assess participants' level of identification towards the Green Group.
9. Group. The name of the Group (either Orange or Green) to which each subject is randomly assigned. This is a dependent variable.
10. IAT Score (IAT): implicit relative preference for the in-group versus the out-group. Using the revised scoring algorithm, an effect size estimate for each participant will be obtained, indicating his or her relative preference for the in-group as opposed to the out-group (see Greenwald, Nosek, & Banaji, 2003). This is a dependent variable.

Statistical Methods

The general approach to analysis will include two steps: first, descriptive statistics, distribution checks and transformations, and, second, inferential statistics.

Descriptive statistics, distributions checks, and transformations:

Prior to completing inferential statistics, all data will be examined for errors and outliers and for their distributional properties (e.g., skewness). If the assumptions of normality are not met, appropriate transformations towards normalization will be considered, and the fit of the data to the assumptions of specific statistical tests will be evaluated. No major problems are foreseen in these areas.

Inferential Statistics:

The main types of inferential statistics will be mean comparisons (t tests), bivariate correlation and multiple regression models. The a-priori power analysis (see above) indicated that at least 134 subjects would be needed for basic two-group t test comparisons.

Post hoc analyses, will be obtained for two-group mean comparisons and multiple regression models looking at R^2 change for as many as 10 predictors (and effects sizes of .10 or greater) (Cohen, 1992). Thus, given the expected sample sizes, adequate power for large and medium effects, and in some cases small effects, should exist. This is a very basic approach to power analysis and several factors that can affect power are not considered, such as α rate corrections for multiple tests, and variance or reliability of the measures.

Analysis

The specific tests that will be carried out in the analysis are as follows:

Hypothesis 1: More securely attached participants will show less intergroup bias towards the members of the (minimal) out-group by categorizing fewer angry faces into the out-group; more anxiously attached and avoidant participants will categorize more angry faces into the out-group.

The main question to be explored will be whether relationship attachment patterns can predict intergroup bias toward the in-group or the out-group? To address this question, a multiple regression analysis will be used to explore whether ANXIETY and/or AVOIDANCE predict categorization of angry faces into the in-group versus the out-group and whether there is an interaction between the variables. A forced entry multiple R analysis will follow this general format:

$$\text{FACESA} = \text{ANXIETY} + \text{AVOIDANCE} + (\text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{FACESH} = \text{ANXIETY} + \text{AVOIDANCE} + (\text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

Hypothesis 2: More securely attached participants will show less inter-group bias for both explicit and implicit attitudes of inter-group bias than the insecurely attached participants.

Multiple regression analyses will explore the effect of attachment patterns on explicit attitudes towards the in-group versus the out-group and/or explicit identification towards the in-group and out-group, as well as implicit attitudes towards the in-group and out-group. These multiple regression analyses will also explore any interactions between the variables.

$$\text{ATT} = \text{ANXIETY} + \text{AVOIDANCE} + (\text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ID} = \text{ANXIETY} + \text{AVOIDANCE} + (\text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{IAT} = \text{ANXIETY} + \text{AVOIDANCE} + (\text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

Supplementary Analyses: A paired-samples *t* test will explore if there is a significant difference between the in-group and the out-group in terms of the number of angry faces categorized into either group (i.e. explicit intergroup bias). A correlation will show if there is a significant relationship between face categorization bias and implicit preference for the in-group versus the out-group. Independent-samples *t* tests will show if there is a significant difference between explicit attitudes and explicit identification with the in-group versus the out-group, and

also between explicit attitudes/ identification and implicit preference scores for the in-group versus the out-group.

CHAPTER 7: STUDY 1 ANALYSIS

Participants

Given the resources available, the actual sample obtained was 100 undergraduates (82 women; 18 men) from an ethnically diverse Western public university who received credit as partial fulfillment of an introductory psychology course requirement.

The participants ranged in age from 18 to 23 years, with a Mean and SD of 19.52 and 1.24, respectively. Most of the participants were sophomores (37%) and freshmen (30%), and the majority of subjects were studying Cognitive Science (32%) and Psychology (21%). With regard to ethnicity, participants consisted of four main ethnic groups, Hispanic (54%), Asian American (21%), African American (6%), and Caucasian (5%). These findings deviate somewhat from the 2007-2008 university demographics that reported fewer Hispanics (30%), more Asian Americans (33%), and more Caucasians (24%). The rate of African Americans in this study approximated university expectations. Eighteen subjects (14%) did not fall into the previous four ethnic categories: six subjects (6%) originated from India and the Middle East, and eight subjects (8%) were of mixed heritage that included two or more ethnicities (Caucasian, Hispanic, Asian American, and African American).

Thirty-one percent of participants' mothers did not graduate from High School, while 24% did possess a High School graduation. Thirty-four percent of fathers did not graduate from High School while 23% did possess a High School graduation. Fourteen percent of mothers and 11% of fathers went on to graduate from college. Most of the participants were single (78%), two were married, one subject was divorced, and 19 subjects were in a committed relationship. Fifty-nine percent of participants were in a romantic relationship, with 35% reporting being in a

relationship of more than one year. A more complete picture of all the demographic variables is presented in Table 1.

Table 1
Study 1 Demographic Information

Number of Subjects	100
Gender	18 Men; 82 Women.
Age	Mean Age 19.52 years, SD 1.24; Age Range 18 to 23 years.
Ethnicity	53 Hispanic; 18 American Asian; 6 African American; 5 Caucasian; 18 Other.
Year in School	13 senior; 20 junior; 37 sophomore; 30 freshman.
Major	21 Psychology; 32 Cognitive Science; 24 Biology; 6 Undeclared; 3 Political Science; 14 Other.
Mother's Education	31 No High School Graduation; 24 High School Graduation; 19 Some College; 14 College Graduation; 12 Graduate Degree.
Father's Education	34 No High School Graduation; 23 High School Graduation; 21 Some College; 11 College Graduation; 11 Graduate Degree.
Marital Status	78 Single; 2 Married; 1 Divorced; 19 Committed Relationship.
In a Relationship?	59 Yes; 41 No.
How Long?	15 Less than 6 months; 9 Less than 1 year; 35 More than 1 year.

Analysis

Preliminary Analysis and Data Preparation. All variables were checked for normality and outliers. No transformations of the raw data were indicated.

By following the formula given by Brennan, Clark, and Shaver (1968), the Experience of Close Relationships (ECR) Scale produced scores for the two dimensions of attachment anxiety

(ANXIETY; Mean = 3.89, SD = 1.02) and attachment avoidance (AVOIDANCE; Mean = 3.18; SD = 1.00) with lower scores on both dimensions indicating more securely attached participants. (These means are comparable to the means found in Mallinckrodt and Wei (2005) which were 3.72 for ANXIETY and 2.87 for AVOIDANCE). In this sample, the range for ANXIETY was 1.00 to 6.44 and for AVOIDANCE was 1.00 to 5.72, and the Cronbach alpha coefficient was .86. There was no significant gender difference within ANXIETY ($p = .79$, mean difference = $-.07$) or within AVOIDANCE ($p = .42$, mean difference = $-.21$), and also no correlation between the two dimensions ($-.09$, $p = .35$), supporting their orthogonal arrangement, as found by Brennan, Clark, and Shaver (1998).

The formula for the ECR Scale also produced information of attachment orientation as follows: 34% of subjects were fearful (high anxiety and high avoidance); 32% were preoccupied (high anxiety and high avoidance); 18% were dismissing (low anxiety and high avoidance); and 16% were secure (low anxiety and low avoidance). Therefore, 66% of participants were either fearful or preoccupied, both patterns indicating high anxiety in attachment. This result is interesting because past research has found that the majority of participants are usually securely attached, not anxious. For example, Hazan and Shaver (1987), in their original article looking at attachment patterns in romantic relationships, found a population with more secure participants (56%) than either avoidant (25%) or anxious (19%) participants. These differences in the present sample will be addressed later in this paper.

With regard to the IAT, the data were analyzed by following the scoring algorithm provided by Greenwald, Nosek, and Banaji (2003). Only the response latencies from the two test blocks were analyzed while the data from the practice blocks were discarded. A D score was

computed for each participant according to the scoring algorithm. A positive D score indicated a faster response to the in-group compared to the out-group.

Prior to the formal analysis, a check was made for potential covariates of sex, age, and ethnicity, but none were significant. Further, potential relationships were explored between the demographic variables and ANXIETY and/or AVOIDANCE. A one-way between-groups ANOVA was performed to explore the impact of ethnicity on attachment ANXIETY and AVOIDANCE. Although there was no statistical significance for AVOIDANCE, there was a statistically significant difference for ANXIETY ($F(4, 95) = 3.66, p = .008$) in the mean scores for Caucasians (Mean = 4.96, SD = .87) and Hispanics (Mean = 3.65, SD = .87). However, since ANXIETY was not significantly associated with either FACESA or FACESH, this relationship will not be considered in the main analyses.

Main Analyses. Fifty-two participants were randomly assigned to the Orange Group (52%) and 48 to the Green Group (48%). With regard to ethnicity, in the Orange Group there were 2 Caucasians, 28 Hispanics, 5 African Americans, 9 American Asians, and 8 Other, while in the Green Group there were 2 Caucasians, 26 Hispanics, 1 African American, 12 American Asians, and 6 Other. It was expected that participants would assign more Angry Faces (FACESA) into the out-group than Happy Faces (FACESH) (see Dunham, 2011; Hugenberg & Bodenhausen, 2004). The result of a two-tailed, paired samples t test, conducted for this purpose, was close to significance, $t(99) = 1.94, p = .055$, with a small effect size (.04). Although not traditionally significant, the mean indicated that subjects did assign more Angry Faces (Mean = 23.53, SD = 5.97) into the out-group than Happy Faces (Mean = 22.18, SD = 5.74).

Hypothesis 1: The main research question in Study 1 was whether attachment patterns are related to intergroup bias toward the out-group using the minimal group effect? First, a linear

multiple regression analysis was performed to determine if attachment anxiety (ANXIETY), attachment avoidance (AVOIDANCE) and their interaction (ANXIETY x AVOIDANCE) significantly predicted the percentage of angry faces categorized into the out-group (FACESA). These results are presented in Table 2. The overall multiple regression model was not significant ($R^2 = .07$, $F(3, 96) = 2.35$, $p = .077$), indicating that, taken together, ANXIETY, AVOIDANCE and their interaction did not explain significant variance in FACESA. However, AVOIDANCE and the interaction of ANXIETY and AVOIDANCE both significantly and independently predicted the percentage of angry faces (FACESA) assigned to the out-group, and explained enough variance in the model to be significant.

Table 2

Predictors of Percentage of Angry Faces assigned to Out-Group

Variable	Standardized Coefficients Beta	t	Sig.	Partial Correlations
(Constant)		1.94	.056	
ANXIETY	.55	2.08	.077	.18
AVOIDANCE	.77	1.79	.040	.21
ANXIETY x AVOIDANCE	-1.04	-2.31	.023	-.23

Further analysis of the interaction between ANXIETY and AVOIDANCE was conducted by first identifying those subjects who fell into the lower and upper quartiles of ANXIETY, and then running separate regressions within the three groups of anxiety to predict the percentage of angry faces by AVOIDANCE i.e., ANXIETY level was held constant while looking at the relationship between AVOIDANCE and angry face identification. The coefficients for each analysis can be seen in Table 3.

Table 3

Regression Coefficients for Low, Moderate, and High Attachment Anxiety predicting the Percentage of Angry Faces by Avoidance

Variable	Standardized Coefficients Beta	t	Sig.	Correlation ¹
<u>LOW ANXIETY:</u>				
(Constant)		3.90	.001	
AVOIDANCE	.22	1.05	.307	.22
<u>MODERATE ANXIETY:</u>				
(Constant)		10.51	.000	
AVOIDANCE	-.17	-1.18	.246	-.17
<u>HIGH ANXIETY:</u>				
(Constant)		7.09	.000	
AVOIDANCE	-.43	-2.17	.042	-.43

Further, as can be seen from the scatterplot in Figure 1, the High Anxiety group had the strongest and only statistically significant relationship to AVOIDANCE, and its direction was opposite to that of the Low ANXIETY group (i.e. more securely attached participants). Given the pattern of significance, slope sizes and directions, the significant interaction term likely represents the attachment avoidance-angry faces relationship differences between the High ANXIETY subjects and those subjects in the Moderate to Low ANXIETY groups.

More specifically, subjects who were low in attachment anxiety tended to assign fewer angry faces to the out-group if they were also low in avoidance (i.e. more securely attached), while subjects high in avoidance but low in anxiety (dismissing), and those high in anxiety but low in avoidance (preoccupied) assigned more angry faces to their out-group. However, participants who were both high in attachment anxiety and in attachment avoidance (fearful) tended to categorize fewer angry faces into the out-group. This was an unexpected result since

¹ In single predictor regressions we report Pearson correlations rather than partial correlations.

those participants high in both attachment anxiety and attachment avoidance were insecurely attached and, as insecurely attached, were expected to show *greater* intergroup bias not less.

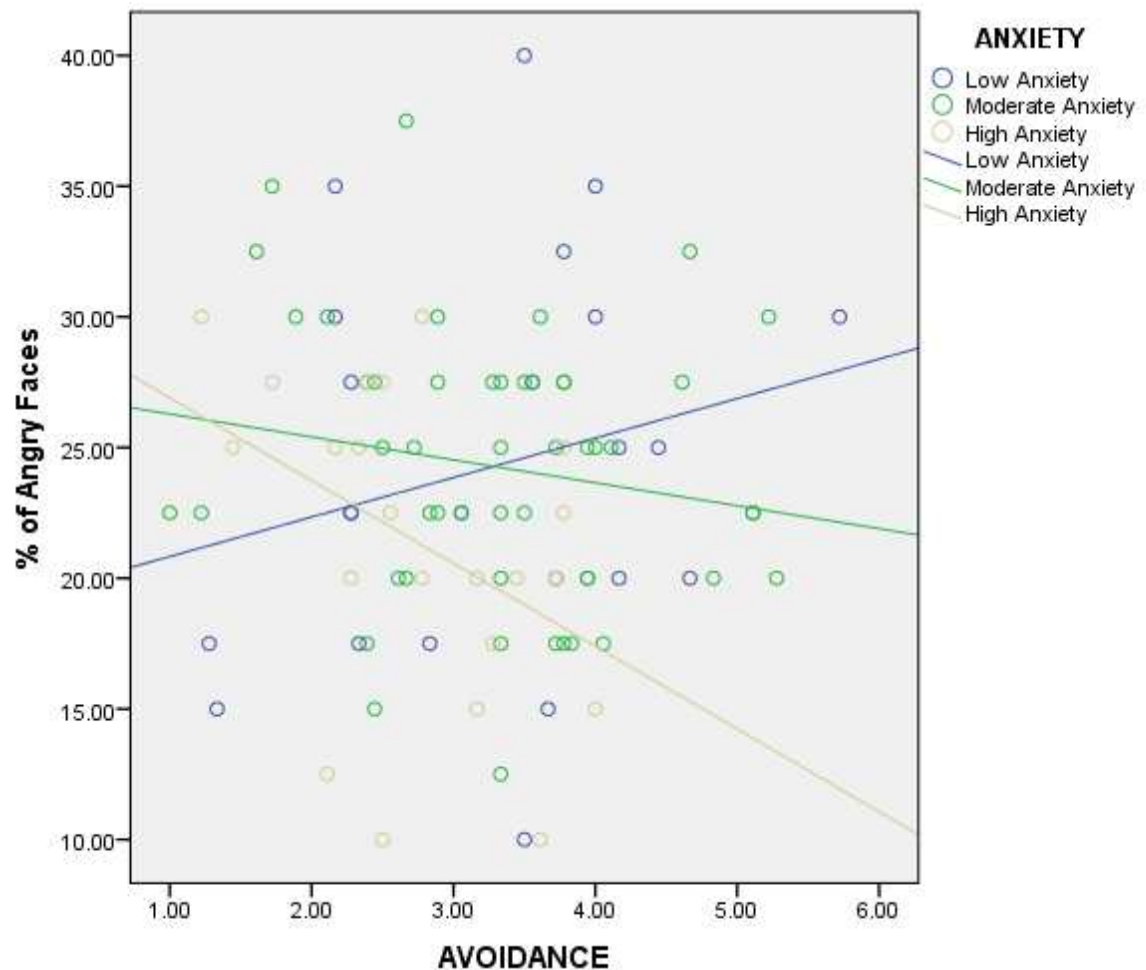


Figure 1. Scatterplot of Regression of Attachment Anxiety on Percentage of Angry Faces by Avoidance.

Hypothesis 2: The second hypothesis predicted that more securely attached participants would show less explicit and implicit attitudes of intergroup bias than more insecurely attached subjects. To explore Hypothesis 2, first, correlations were performed between all the explicit variables i.e. explicit attitudes towards the Orange Group (ATTO), explicit attitudes towards the Green Group (ATTG), explicit identification towards the Orange Group (IDO), and explicit

identification towards the Green Group (IDG) (see Table 4). Again, as described in the Method section, subjects responded to how positively they felt about both their in-group and out-group (attitudes) and also responded to how much they identified with their in-group and out-group (identification). As shown in Table 4, all the explicit attitudes were significantly related to one another. Attitudes towards the Orange and Green groups were negatively related to one another, as was Identification with the Orange versus Green groups. This was to be expected and it demonstrates that subjects had attitudinal and identification preferences for their in-group over their out-group and that the minimal groups design was therefore effective.

Further, attitudes towards the Orange Group were positively related to identification with the Orange Group and attitudes towards the Green group were positively associated with identification with the Green Group. Thus, subjects both identified and held explicit positive attitudes towards their own group. Although the attitude items and the identification items were similar in content, the correlation matrix showed that these items were in fact measuring something uniquely different.

Correlations of implicit attitudes (as measured by the IAT) with explicit attitudes revealed much weaker relationships. Implicit attitudes were significantly and inversely associated with both explicit attitudes towards and explicit identification towards the Green Group: as preference for and identification with the Green Group increased, implicit attitudes decreased. The relationship between implicit attitudes and explicit identification with the Orange Group was close to significance ($p = .058$).

Further correlations showed that in-group attitudes were positively related to in-group identification, $r = 0.52$, but inversely related to out-group identification, $r = -0.29$. In-group attitudes were also negatively related to AVOIDANCE, $r = -0.24$. Participants' AVOIDANCE

increased as their positive attitudes to their in-group decreased. The relationship of in-group attitudes and ANXIETY only approached significance ($p = 0.06$).

After the correlations, paired samples t tests were performed to see whether participants showed a greater preference towards their in-group versus their out-group. First, with regard to explicit attitudes, $t(99) = 5.05, p = .000$, participants showed a greater liking towards their in-group ($M=9.70, SD=2.33$) rather than their out-group ($M=7.91, SD=2.29$). Second, participants also showed a greater identification towards their in-group ($M=9.21, SD=2.98$) rather than their out-group ($M=6.24, SD=2.42$), $t(99) = 7.56, p = .000$.

Linear multiple regressions were then conducted to determine if ANXIETY, AVOIDANCE, and their interaction predicted explicit attitudes to the in-group (IGATT), and explicit identification towards the in-group (IGID). First, when in-group attitudes were looked at, the overall multiple regression model was significant, $R^2 = 0.11, F(3, 96) = 3.81, p = .013$. However, none of the individual predictors was significant: AVOIDANCE, $Beta = -0.47, p = 0.20$, ANXIETY, $Beta = -0.39, p = 0.20$, and AVOIDANCE x ANXIETY, $Beta = 0.27, p = 0.55$.

Second, when a multiple regression explored the effect of attachment patterns on in-group identification, the overall regression model was not significant, $R^2 = 0.01, F(3, 96) = 0.41, p = 0.75$, and none of the individual predictors were significant, AVOIDANCE $Beta = 0.29, p = .45$, ANXIETY $Beta = 0.12, p = .70$, and AVOIDANCE x ANXIETY $Beta = -0.25, p = 0.59$.

Linear multiple regressions were also performed to determine if ANXIETY, AVOIDANCE, GROUP and their interactions predicted explicit attitudes towards the Orange and Green groups (ATTO and ATTG), explicit identification towards the Orange and Green Groups (IDO and IDG) as well as implicit attitudes (IAT) towards the Orange and Green Groups.

The group name (GROUP) was necessarily included in this analysis, as attitudes would vary towards the out-group depending upon a subject's in-group assignment.

With three main effect variables, there were three two-way (ANXIETY x AVOIDANCE, ANXIETY x GROUP, AVOIDANCE x GROUP) interactions and one three-way interaction (ANXIETY x AVOIDANCE x GROUP) included in the analysis. The overall multiple regression model was significant ($R^2 = 0.24$, $F(7, 92) = 4.22$, $p = .000$), and the predictors together accounted for 24% of the variance in ATTO. These results are presented in Table 5.

Table 4
Correlations of Explicit Attitudes, Explicit Identification, and Implicit Preferences

	ATTO	ATTG	IDO	IDG	IAT
ATTO	1.00				
ATTG	-0.29**	1.00			
IDO	0.57**	-0.50**	1.00		
IDG	-0.28**	0.60**	-0.26**	1.00	
IAT	-0.06	0.20*	-0.19	0.35**	1.00

** $p = 0.01$ * $p = 0.05$

The model indicated that AVOIDANCE and ANXIETY significantly and independently predicted explicit attitudes towards the Orange Group. Specifically, participants assigned to the Orange Group showed more positive explicit attitudes towards the Orange Group. Furthermore, the analyses suggested that as attachment avoidance or attachment anxiety increased, explicit attitudes of positivity or liking towards the Orange Group decreased. In other words, participants who were low in attachment avoidance and anxiety (i.e. more securely attached participants),

showed a greater preference for the Orange Group overall. There was also a group effect in that members of the Green group preferred members of the Green Group to the Orange Group.

When a similar multiple regression was performed to explore whether ANXIETY, AVOIDANCE, GROUP, and their interactions predicted explicit attitudes towards the Green Group (ATTG), the overall model was again significant, $R^2 = 0.24$, $F(7, 92) = 4.04$, $p = .001$ and the predictors together again accounted for 24% of the variance in ATTG. However, this time none of the individual variables were statistically significant.

Linear multiple regressions were then performed to see if ANXIETY, AVOIDANCE, GROUP and their interactions could predict explicit identification towards the Orange and Green groups. The overall models for identification towards the Orange Group (IDO), $R^2 = 0.22$, $F(7, 92) = 3.71$, $p = .001$, and towards the Green Group (IDG), $R^2 = 0.35$, $F(7, 92) = 7.21$, $p = .000$, were both significant, although there was no significance for any of the individual variables in either regression.

Table 5
Predictors of Explicit Attitudes towards the Orange Group

Variable	Standardized Coefficients Beta	t	Sig.	Partial Correlations
(Constant)		4.05	.000	
ANXIETY	-1.76	-2.01	.047	-.21
AVOIDANCE	-2.26	-2.12	.037	-.22
GROUP	-2.76	-2.28	.025	-.23
ANXIETY x AVOIDANCE	1.80	1.39	.167	.14
AVOIDANCE x GROUP	2.80	1.54	.128	.16
ANXIETY x GROUP	2.52	1.60	.113	.17
AVOIDANCE x ANXIETY x GROUP	-2.06	-1.04	.303	-.11

The analyses described above of the percentage of angry faces assigned to the out-group (FACESA) in the Face Categorization Task dealt with a sort of implicit bias towards the out-group in that subjects assigned angry faces to the out-group quickly and without much thought. To test if this same expected pattern of implicit bias was present in the IAT (which is designed to tap participants' unconscious or automatic liking/ disliking of a particular group), a linear multiple regression was conducted to see if ANXIETY, AVOIDANCE, GROUP, and their interactions influenced implicit attitudes towards either the Orange or Green Groups. While the overall regression model was statistically significant, $R^2 = 0.24$, $F(7, 92) = 4.04$, $p = .002$, there was no significance in any of the individual variables.

Therefore, to sum up the results for Hypothesis 2, with regard to explicit and implicit attitudes and explicit identification towards the Orange and Green groups, only explicit attitudes towards the Orange Group had significant partial correlations.

CHAPTER 8: STUDY 1 DISCUSSION

There were two main hypotheses in Study 1: first, when the minimal group design was used, more securely attached participants were predicted to show less intergroup bias than insecurely attached subjects; and, second, more securely attached participants would show less intergroup bias than insecurely attached subjects in both their explicit and implicit attitudes of intergroup bias.

With regard to Hypothesis 1, although R^2 was very small (.07), and the overall model in the multiple regression was not significant, the interaction of ANXIETY and AVOIDANCE was significant. The results of Study 1 found that attachment patterns did reduce intergroup bias when using minimal groups. As was expected from previous research looking at face categorization tasks, the means indicated that participants assigned more angry faces than happy faces into their out-group.

When the relationship between these angry faces and attachment patterns was investigated, more securely attached participants assigned fewer angry faces into their out-group than insecurely attached participants. With regard to the insecurely attached subjects, it was found that subjects who were high in anxiety but low in avoidance (categorized as preoccupied) and those who were high in avoidance but low in anxiety (categorized as dismissing) assigned more angry faces into the out-group than happy faces.

To the author's knowledge, this is the first time that attachment patterns have been related to intergroup bias using the minimal group paradigm and shows that the more securely attached individuals are, the less biased they will be towards other people who are different from themselves when the minimal group effect is used.

An unexpected result was that participants who were both high in attachment anxiety *and* attachment avoidance (categorized as fearful) appeared to assign fewer angry faces into the out-group and, therefore surprisingly, showed less intergroup bias towards their out-group. It was expected from previous research that this fearful group would show more, not less, intergroup bias towards their out-group.

One possible reason for this result may be the large number of insecurely attached participants in this sample. Compared to 16% who were securely attached, 84% of participants were insecurely attached. Further, fearful participants comprised the largest percentage of subjects: 34% were fearful. This large number of insecure subjects together with the large number of fearful subjects could have influenced the results. Fearful individuals want to form relationships but their hesitation and lack of trust keep them apart from others. This anxiety versus avoidance may produce a tug of war in their reactions to situations: their low self-confidence and reliance on others for a positive view of themselves struggling against their fear of intimacy fear of rejection. It may be that the low intergroup bias shown by the fearful participants in this particular sample resulted from this conflict.

Also, the ethnic diversity of this particular sample could have had a major influence on the results. Previous research on attachment and intergroup bias has used predominantly white participants. The different findings here may be related to ethnic diversity, in particular to the large number of Hispanic students in this sample who formed the largest ethnic group (53%). Hispanic subjects have previously been found to be more likely to show highly anxious attachment patterns (Wei, Russell, Mallinckrodt & Zakalik, 2004). However, that study was not specifically designed to measure intergroup bias of Hispanics. So, unfortunately, ethnic diversity does not specifically answer the question of why those subjects with both high attachment

anxiety and high avoidance did not show a higher level of intergroup bias as did the other insecurely attached participants.

The second hypothesis in Study 1 predicted that more securely attached participants would show less intergroup bias in both their explicit and implicit attitudes of inter-group bias than the insecurely attached. This prediction was only partly supported. Linear multiple regressions found that participants who had been randomly assigned to the Orange Group and who were also more securely attached, showed a more positive attitude towards the Orange Group. In other words, they liked or preferred the Orange Group more than the Green Group. On the other hand, those participants who belonged to the Orange Group but were more anxious and/or more avoidant showed more negative attitudes towards the Orange Group than the Green Group.

This result is similar to the conclusions formed by Smith, Murphy, and Coats (1999) in their studies looking at group attachment patterns. They found that group attachment anxiety was associated with stronger negative emotions toward groups, while group attachment avoidance was associated with lower levels of positive affect toward social groups as well as lower identification with social groups.

There were no significant results for the relationship between attachment patterns and explicit attitudes towards the green Group, explicit identification towards both the Orange and Green Groups, and implicit preferences. It is not clear why there were no significant results in these regressions. Perhaps, with regard to the IAT, it may be that, after completing the Face Categorization Task, subjects found the variety of faces in the IAT somewhat confusing and could not properly distinguish the faces between the two groups.

Since this study was a correlation study, one of the possible limitations is that a third variable could be producing the reduction of intergroup bias and not attachment patterns.

Consequently, in Study 2, the intention is to use an experimental design in an attempt to find cause and effect.

CHAPTER 9: STUDY 2

Study 1 was correlational in design and therefore no causal conclusions could be made about the effect of secure attachment on intergroup bias, using minimal groups. It is possible that a third variable other than secure attachment could have been responsible for reducing intergroup bias. Study 2 therefore uses an experimental design to prime or activate the sense of a secure base. This activation of the sense of a secure base has resulted in participants responding in a similar way to individuals who are securely attached.

In this study, three different visualization tasks will be used to prime, first, the secure base of attachment, second, a positive affect condition, and, third, a neutral priming condition. The main goal of the study is to explore whether those individuals who are primed with the secure base of attachment show less intergroup bias (whatever their attachment pattern) than those in the positive affect priming condition or the neutral priming (control) condition. Study 2 will be identical to Study 1 except for the priming manipulation.

The predictions are as follows:

Hypothesis 1: All participants who are primed with the secure base of attachment will categorize fewer angry faces into the out-group than those participants in the positive affect priming condition or the neutral condition.

Hypothesis 2: Both explicit and implicit attitudes of intergroup bias will be less in participants who are primed with the secure base of attachment than in those primed with the positive affect condition or the neutral priming condition.

Method

Participants

Participants will be solicited from the same population as in Study 1. The number of subjects for the study was determined via an a priori power analysis with a two-tailed alpha at .05, and expected correlations of medium size (0.30). The analysis indicated that a sample of at least 128 participants would be required to detect this effect size.

Procedure

After providing informed consent, participants will be asked to fill out the same paper and pencil questionnaires as described in Study 1. Each participant will then be assigned to either the Green or Orange Groups by the same procedure as in Study 1, and primed before the Face Categorization Task. Before the priming procedure, participants will be told that this part of the study will examine how people visualize social situations and what kinds of thoughts and emotions these visualizations evoke. They will then receive written instructions on the computer for the guided imagination task and will be randomly divided into three priming conditions: secure base priming condition, positive affect priming condition, and neutral priming condition.

The procedure will be similar to that used by Mikulincer and Arad (1999) and Mikulincer and Shaver (2001). In the secure base priming condition, participants will receive the following instructions: "Imagine yourself in a problematic situation that you cannot solve on your own, and imagine that you are surrounded by people who are sensitive and responsive to your distress. They want to help you only because they love you, and they set aside other activities in order to assist you."

In the positive affect priming condition, the instructions will be as follows: "Imagine yourself receiving notification that you have won a large amount of money in the national

lottery, and imagine other students in your class hearing about this notice, approaching you, congratulating you, and telling others about your good fortune." In the neutral priming condition, the instructions will be as follows: "Imagine yourself going to a grocery store and buying products you need for your house, and imagine other people are there who are also buying products, talking among themselves about daily issues, examining new brands, and comparing different products."

In all three conditions, participants will be instructed to close their eyes and picture the faces of the people they imagine in the described situation. They will be given approximately two minutes to do this. Then they will be instructed to write about their visualization experience. After being primed, participants will then complete the Learning Task and Memory Task described in Study 1, together with the explicit attitude and identification items, and the IAT.

Variables for Analysis

There are ten primary variables of interest that will be subjected to analysis and serve as dependent or independent variables. The eight demographic variables will be used in secondary analyses or as covariates. These include: age, sex, major, year in school, ethnicity, mother's and father's level of education, and marital status. The ten primary variables are:

1. ECR-Anxiety (ANXIETY): the dimension of relationship attachment anxiety from the Experience of Close Relationships (ECR) Scale. The total possible score for all 18 items will range from 18 to 126. Each participant's score on the ANXIETY dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.

2. ECR-Avoidance (AVOIDANCE): the dimension of relationship attachment avoidance from the Experience of Close Relationships (ECR) Scale. The total possible score for all 18 items will range from 18 to 126. Each participant's score on the AVOIDANCE dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.
3. Angry Categorizations (FACESA): the number of angry faces categorized in the Face Categorization Task. This is a dependent variable used to assess the degree of negative attributions made towards the in-group versus the out-group members.
4. Explicit Attitudes (ATTO) towards the Orange Group. There are two attitude questions, each ranging from 1 to 7. The total possible score for each participant will range from two to 14. This is a dependent variable used to assess the explicit attitudes of participants towards the Orange Group.
5. Explicit Attitudes (ATTG) towards the Green Group. There are two attitude questions, each ranging from 1 to 7. The total possible score for each participant will range from two to 14. This is a dependent variable used to assess the explicit attitudes of participants towards the Green Group.
6. Explicit Identification (IDO) towards the Orange Group. There are two identification questions, each ranging from 1 to 7. The total possible score for each participant will range from two to 14. This is a dependent variable used to assess participants' level of identification towards the Orange Group.
7. Explicit Identification (IDO) towards the Green Group. There are two identification questions, each ranging from 1 to 7. The total possible score for each participant will

range from two to 14. This is a dependent variable used to assess participants' level of identification towards the Green Group.

8. Group. The name of the Group (either Orange or Green) to which each subject is randomly assigned.
9. IAT Score (IAT): implicit relative preference for the in-group versus the out-group.
Using the revised scoring algorithm, an effect size estimate (D score) for each participant will be obtained, indicating his or her relative preference for the in-group as opposed to the out-group (see Greenwald, Nosek, & Banaji, 2003). This is a dependent variable used to assess the implicit preferences towards in-group versus out-group members.
10. Three priming conditions: secure base, (SB), positive affect (PA), and neutral condition (NC). In the multiple regressions, the primes will be used in pairs: secure base and positive affect, secure base and neutral condition, and positive affect and neutral condition. These three pairs of primes are independent variables used to assess the effect of priming on the faces categorized into the out-group.

Statistical Methods

The general approach to analysis will include two steps: first, descriptive statistics, distribution checks and transformations, and, second, inferential statistics.

Descriptive statistics, distributions checks, and transformations:

Prior to completing inferential statistics, all data will be examined for errors and outliers and for their distributional properties (e.g., skewness). If the assumptions of normality are not met, appropriate transformations towards normalization will be considered, and the fit of the data to the assumptions of specific statistical tests will be evaluated. No major problems are foreseen in these areas.

Inferential Statistics:

The main types of inferential statistics will be mean comparisons (*t* tests) and bivariate correlation and multiple regression models. The a-priori power analysis (see above) indicated that at least 128 subjects would be needed (actual power obtained was .95) for basic two-group *t* test comparisons.

Post hoc analyses, assuming 128 subjects indicate adequate power ($>.80$), will be obtained for two-group mean comparisons and multiple regression models looking at R^2 change for as many as 10 predictors (and effects sizes of .10 or greater) (Cohen, 1992). Thus, given the expected sample sizes, adequate power for large and medium effects, and in some cases small effects, should exist. This is a very basic approach to power analysis and several factors that can affect power are not considered, such as α rate corrections for multiple tests, and variance or reliability of the measures.

Analysis

The specific tests that will be carried out in the analysis are as follows:

Hypothesis 1: All participants who are primed with the secure base of attachment will categorize fewer angry faces into the (minimal) out-group than those participants in either the positive affect priming condition or the neutral priming condition.

The main question to be explored will be whether priming the secure base schema can predict intergroup bias toward the in-group or the out-group when the minimal group effect is used? In other words, do participants in the secure base priming condition categorize fewer angry faces into the out-group than participants in either the positive affect priming condition or the neutral condition? To address this question, linear multiple regression analyses will be performed to see whether the three priming pairs predict categorization of angry faces into the in-group

versus the out-group and whether there is an interaction between the variables. A forced entry multiple R analysis will follow this general format:

$$\text{FACESA} = (\text{SB} + \text{PA}) + (\text{SB} \times \text{PA}) + \text{Intercept}$$

To explore whether SB and/or attachment patterns predict categorization of angry faces into the in-group versus the out-group and whether there is an interaction between the variables, a multiple regression will include three priming pairs, ANXIETY and AVOIDANCE as predictors, plus the interaction variables.

$$\text{FACESA} = (\text{SB} + \text{PA}) + \text{ANXIETY} + \text{AVOIDANCE} + ((\text{SB} + \text{PA}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{FACESA} = (\text{SB} + \text{NC}) + \text{ANXIETY} + \text{AVOIDANCE} + ((\text{SB} + \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{FACESA} = (\text{PA} + \text{NC}) + \text{ANXIETY} + \text{AVOIDANCE} + ((\text{PA} + \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

Hypothesis 2: Both explicit and implicit attitudes of intergroup bias of participants primed with the secure base will be less than those primed with either the positive affect condition or the neutral condition.

Multiple regression analyses will also investigate the effect of priming on explicit attitudes towards the in-group versus the out-group and/or explicit identification towards the in-group and out-group, as well as implicit attitudes towards the in-group and out-group. These analyses will include any interactions between the variables.

$$\text{ATT} = (\text{SB} + \text{PA}) + ((\text{SB} \times \text{PA}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ATT} = (\text{SB} + \text{NC}) + ((\text{SB} \times \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ATT} = (\text{PA} + \text{NC}) + ((\text{PA} \times \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ID} = (\text{SB} + \text{PA}) + ((\text{SB} \times \text{PA}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ID} = (\text{SB} + \text{NC}) + ((\text{SB} \times \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{ID} = (\text{PA} + \text{NC}) + ((\text{PA} \times \text{NC}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$\text{IAT} = (\text{SB} + \text{PA}) + ((\text{SB} \times \text{PA}) \times \text{ANXIETY} \times \text{AVOIDANCE}) + \text{Intercept}$$

$$IAT = (SB + NC) + ((SB \times NC) \times ANXIETY \times AVOIDANCE) + \text{Intercept}$$

$$IAT = (PA) + NC + ((PA \times NC) \times ANXIETY \times AVOIDANCE) + \text{Intercept}$$

CHAPTER 10: STUDY 2 ANALYSIS

Participants

Due to the availability of resources, data were collected from 116 undergraduates from an ethnically diverse Western public university who received credit as partial fulfillment of an introductory psychology course requirement. Five subjects did not complete the priming visualization and were removed from the sample leaving a total of 111 participants.

There were 33 men and 78 women. The participants ranged in age from 18 to 24 years, with a Mean and SD of 19.42 and 1.44, respectively. Most of the participants were freshmen (51.4%), and 26 subjects were studying Cognitive Science (23.4%). With regard to ethnicity, participants consisted of four main ethnic groups, 66 Hispanic (59.5%), 16 Asian American (14.4%), 12 Caucasian (10.8%), and 6 African American (5.4%). These findings deviate somewhat from the 2007-2008 university demographics that reported fewer Hispanics (30%), more Asian Americans (33%), and more Caucasians (24%). The rate of African Americans in this study approximated university expectations. Eleven subjects (9.9%) did not fall into any of these four ethnic categories: six subjects originated from India and the Middle East, four subjects were of mixed heritage that included two or more ethnicities, and one subject was a Pacific Islander.

Forty-one percent of participants' mothers and 42% of fathers did not graduate from High School, while 23% of mothers and 26% of fathers did graduate. Ten percent of mothers and nearly 10% of fathers received a graduate degree. Most of the participants were single (81.1%), two were married and one subject was divorced. Sixteen percent were in a committed relationship, with 24.3% reporting being in a relationship for more than one year. A more complete picture of all the demographic variables is presented in in Table 6.

Table 6

Study 2 Demographic Information

Number of Subjects	111
Gender	33 Men; 78 Women
Age	Mean Age = 19.42 years, SD = 1.44; Age Range = 18 to 24 years
Ethnicity	66 Hispanic (60%); 16 American Asian (14%); 12 Caucasian (11%); 6 African American (5%); 11 Other (10%)
Year in School	18 senior (16%); 17 junior (15%); 19 sophomore (17%); 57 freshman (52%)
Major	8 Psychology; 26 Cognitive Science; 16 Biology; 21 Undeclared; 9 Political Science; 31 Other
Mother's Education	46 No High School Graduation; 26 High School Graduation; 16 Some College; 12 College Graduation; 11 Graduate Degree
Father's Education	47 No High School Graduation; 29 High School Graduation; 14 Some College; 11 College Graduation; 10 Graduate Degree
Marital Status	90 Single; 2 Married; 1 Divorced; 18 Committed Relationship
In a Relationship?	48 Yes; 63 No
How Long?	14 Less than 6 months; 7 Less than 1 year; 27 More than 1 year

Preliminary Analysis and Data Preparation. All variables were checked for normality and outliers. No transformations of the raw data were indicated.

By following the formula contained in Brennan, Clark, and Shaver (1968), the Experience of Close Relationships (ECR) Scale produced scores for the two dimensions of relationship attachment anxiety (ANXIETY; Mean=3.86, SD=0.99) and relationship attachment avoidance (AVOIDANCE; Mean=3.13; SD=1.01) with lower scores on both dimensions indicating more securely attached participants. In this sample, the range for ANXIETY was 1.17

to 6.33 and for AVOIDANCE was 1.00 to 6.06. In the current study, Cronbach alpha coefficient for the ECR Scale was 0.86. There was no significant correlation between ANXIETY and AVOIDANCE ($r = -.14, p = .158$) supporting the orthogonal design of the two dimensions which was originally found by Brennan et al., 1998.

The formula for the ECR Scale also produced information of how many subjects were in each attachment pattern: 40 subjects were fearful (36%); 35 were preoccupied (32%); 19 were secure (17%); and 17 were dismissing (15%). Therefore, 68% of participants were either fearful or preoccupied, both patterns indicating high anxiety in attachment. As in Study 1, this result is interesting because past research has found that the majority of participants are usually securely attached, not anxious. As was cited in Study 1, Hazan and Shaver (1987), in their original article looking at attachment patterns in romantic relationships, found a population with more secure participants (56%) than either avoidant (25%) or anxious (19%) participants. These differences in the present sample will be addressed later in this paper.

With regard to the IAT, the data were analyzed by following the scoring algorithm provided by Greenwald, Nosek, and Banaji (2003). Only the response latencies from the two test blocks were analyzed while the data from the practice blocks were discarded. The standard exclusion criteria for participants with excessive long or short latencies on the IAT (Greenwald et al., 2003) resulted in the exclusion of data for only one participant who was dropped from the analysis of the IAT data. D scores were computed for participants according to the scoring algorithm. Thus, a positive D score indicated a faster response to an Orange + positive word association compared to a Green + negative word association.

Prior to the formal analysis, a check was made for potential covariates of sex, age, and ethnicity, but none were significant. Potential relationships were also explored between these three demographic variables and ANXIETY and/or AVOIDANCE. An independent samples *t* test was performed to compare ANXIETY and AVOIDANCE for men and women. There was a statistically significant sex difference for ANXIETY, $t(114) = -2.90, p = 0.004$. Women ($M = 4.02, SD = 0.97$) were more anxiously attached than men ($M = 3.45, SD = 0.94$). However, there was no significant sex difference for AVOIDANCE. There was also a significant correlation between AVOIDANCE and age ($r = -0.22, p = 0.019$) with older subjects showing less avoidance, but no significant relationship between ANXIETY and age. However, since sex and age were not significantly associated with either Angry or Happy faces, these relationships will not be included in the main analyses.

Analysis

At the start of the study, participants were randomly assigned to what would be their in-group: 59 subjects to the Orange Group (50.9%) and 57 subjects to the Green Group (49.1%). A paired samples *t* test indicated that participants allocated more Angry Faces ($M = 25.69, SD = 7.06$) to their out-group than Happy Faces ($M = 23.41, SD = 7.34$), $t(115) = 2.15, p = 0.03$. The eta squared statistic (.04) indicated a small effect size. As in Study 1, this result is consistent with Dunham (2011) who also found that more Angry Faces than Happy faces were assigned to the out-group.

Hypothesis 1: The main hypothesis in Study 2 was whether priming participants with the secure base of attachment would reduce the level of intergroup bias shown towards the out-group. Specifically, it was predicted that all participants who were primed with the secure base

of attachment would categorize fewer angry faces into the out-group than those participants in the positive affect priming condition or the neutral condition.

There were three priming conditions: secure base priming condition, positive affect priming condition, and the neutral priming condition. 39 participants were randomly assigned to the secure base priming condition; 38 subjects were assigned to the positive affect priming condition; and 34 subjects were assigned to the neutral priming condition.

The three primes were entered into separate multiple regressions in pairs, one pair of primes into each multiple regression: secure base and positive affect (SP), secure base and neutral condition (SN), and positive affect and neutral condition (PN). Linear multiple regressions were then performed to determine if the priming pair, attachment anxiety (ANXIETY), attachment avoidance (AVOIDANCE), and their interactions (ANXIETY x AVOIDANCE, PRIMING PAIR x ANXIETY, PRIMING PAIR x AVOIDANCE, and PRIMING PAIR x ANXIETY x AVOIDANCE) significantly predicted the percentage of Angry Faces (FACESA) assigned to the out-group. The two multiple regressions containing the priming pairs of secure base and positive affect, and secure base and neutral condition were not significant. However, the priming pair of positive affect and neutral condition was significant. The results of this multiple regression can be seen in Table 7.

In order to better understand the individual effects of AVOIDANCE and ANXIETY, participants were divided into three ANXIETY groups using the same technique as in Study 1, and the results shown in two separate scatterplots, Figures 2 (showing the Positive Affect prime) and 3 (showing the Neutral Condition prime). With regard to the Positive Affect prime, more securely attached participants, and those with high anxiety plus low avoidance (preoccupied) assigned fewer angry faces into their out-group. On the other hand, participants with high

avoidance and low anxiety (dismissing), and those with high avoidance plus high anxiety (fearful), assigned more angry faces into their out-group.

With regard to the Neutral Condition prime, participants who were securely attached again assigned fewer angry faces into the out-group, while those high in avoidance and low in anxiety assigned more angry faces into their out-group. These two results were the same as for the Positive Affect prime. The difference between the Positive Affect Condition and Neutral Condition in this pair was the reaction of those with high anxiety (preoccupied), and those with both high anxiety and high avoidance (fearful). In the Neutral Condition, those subjects with high anxiety assigned more angry faces, while those with both high anxiety and high avoidance assigned fewer angry faces to their out-groups.

Table 7

Regression of Positive Affect and Neutral Condition Primes and Attachment Patterns on Percentage of Angry Faces

	Standardized Coefficients	t	Sig.	Partial Correlations
	Beta			
(Constant)		1.913	.060	
Prime PN	-1.986	-1.417	.161	-.174
AVOIDANCE	-2.017	-1.393	.168	-.172
ANXIETY	-1.647	-1.525	.132	-.187
Avoidance x Anxiety	2.878	1.860	.067	.226
Avoidance x Anxiety x PN	-4.677	-2.315	.024	-.278
Anxiety x Prime PN	3.084	1.802	.076	.220
Avoidance x Prime PN	3.771	1.913	.060	.233

Hypothesis 2: The second hypothesis predicted that priming an individual with the secure base of attachment would have an effect on both explicit and implicit attitudes. Specifically, participants who were primed with the secure base of attachment were predicted to show less

explicit and implicit bias towards their out-group than those primed with either a positive affect or a neutral priming condition.

To explore Hypothesis 2, first, correlations were performed between all the explicit variables i.e. attitudes towards the Orange Group (ATTO), attitudes towards the Green Group

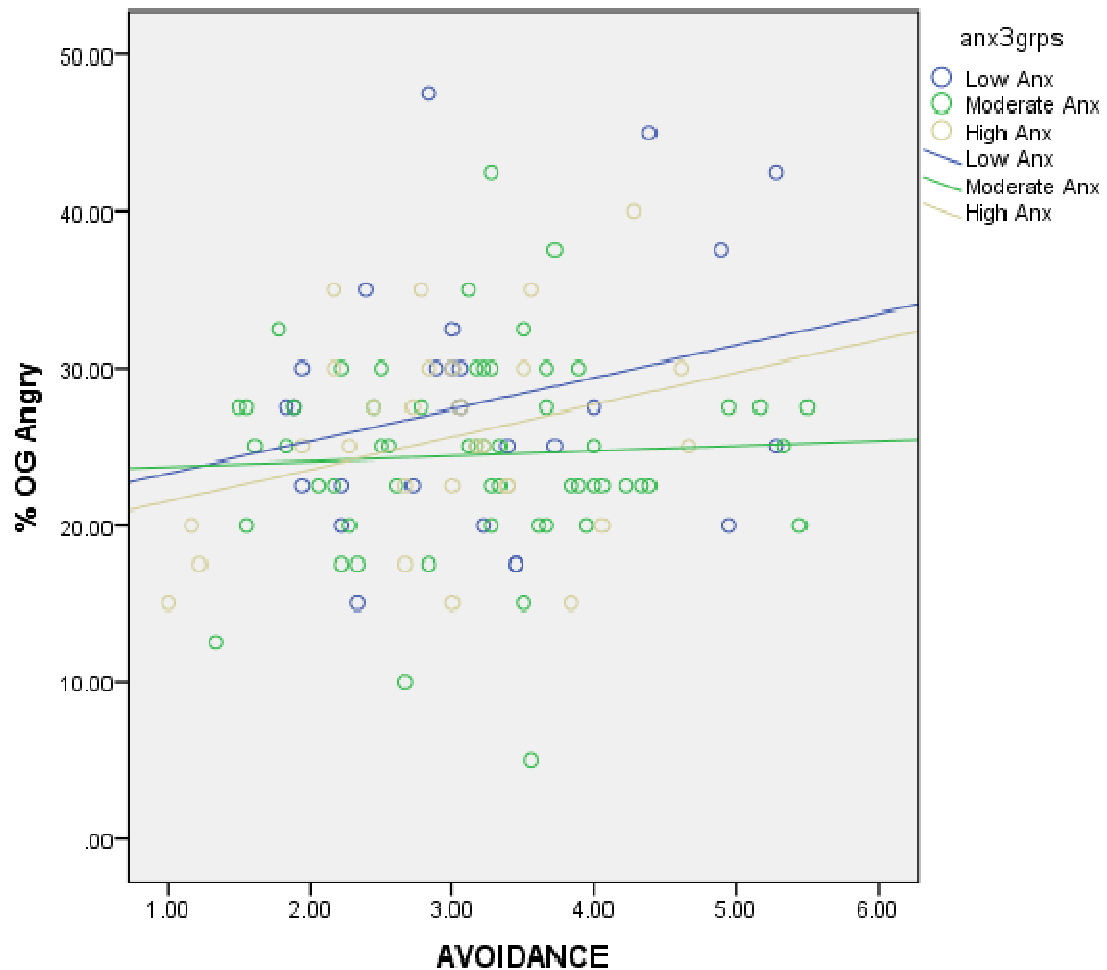


Figure 2. Scatterplot of Effect of Positive Affect Prime on Attachment Patterns showing Percentage of Angry Faces.

(ATTG), identification with the Orange Group (IDO), and identification with the Green Group (IDG), together with the implicit attitudes (IAT) (see Table 8).

As described in the Methods section, subjects responded to how positively they felt about both their in-group and out-group (attitudes) and also responded to how much they identified with their in-group and out-group (identification). As shown in Table 8, not all the correlations were significantly related to one another: explicit attitudes towards the Orange Group were significantly and positively related to explicit identification with the Orange Group. Attitudes towards the Orange Group were significantly and negatively related to identification with the Green Group. Further, attitudes towards the Green Group were significantly and positively related to identification with the Green Group. This was to be expected and it demonstrates that subjects had attitudinal and identification preferences for their in-group. Correlations of implicit attitudes with explicit attitudes and identification also revealed significant relationships: implicit attitudes and explicit attitudes and identification with the Orange Group both increased; however, as attitudes and identification with the Green Group increased, implicit attitudes decreased.

Further correlations were performed on in-group and out-group attitudes and in-group and out-group identification. In-group attitudes were positively related to out-group attitudes, $r = 0.28$ and to in-group identification, $r = 0.60$. Also, AVOIDANCE was positively associated with identification towards the in-group, $r = 0.26$. As in-group identification increased, so did AVOIDANCE. Paired samples t tests between in-group attitudes and out-group attitudes found that participants preferred or had a greater liking for the group they were randomly assigned to, $t(110) = 7.69, p = .000$, over their out-group. Similarly, participants also felt a greater sense of identification towards the group they were randomly assigned to versus their out-group, $t(110) = 9.26, p = .000$.

Following the correlations, paired samples t tests were performed to see if there was a significant difference between the in-group and the out-group with regard to explicit attitudes. The result, $t(110) = 7.69, p = .000$, showed that there was a significant difference between participants' attitudes towards their in-group versus their out-group. Attitudes towards the in-group were significantly stronger ($M = 9.34, SD = 2.28$) than towards the out-group ($M = 7.92, SD = 2.31$).

A second paired samples t -test was performed to see if participants felt a stronger sense of identification towards their in-group versus their out-group, $t(110) = 9.26, p = .000$. The t test indicated that subjects did identify more with their in-group ($M = 8.99, SD = 3.26$) than with their out-group ($M = 5.21, SD = 2.71$).

Linear multiple regressions were then conducted to see if ANXIETY or AVOIDANCE influenced explicit attitudes towards or identification with participants' in-group. With regard to explicit attitudes, the overall model was not significant, $R^2 = 0.02, F(3, 107) = 0.63, p = .600$, and none of the individual predictors was significant. With regard to subjects' explicit identification towards their in-group, the overall model was significant, $R^2 = 0.09, F(3, 107) = 3.57, p = .017$. However, none of the individual predictors was significant.

More linear multiple regressions were performed to explore attachment patterns' possible influence on the Orange or Green Groups. First, a multiple regression analysis was performed to determine if ANXIETY, AVOIDANCE and their interaction (ANXIETY x AVOIDANCE) predicted Explicit Attitudes towards the Orange Group (ATTO). The group name (GROUP) was necessarily included in this analysis, as attitudes will vary towards the out-group depending upon a subject's in-group assignment.

When a similar multiple regression was performed to explore whether ANXIETY, AVOIDANCE, GROUP, and their interactions predicted explicit attitudes towards the Green Group (ATTG), the overall model was again significant, $R^2 = 0.13$, $F(7, 108) = 2.38$, $p = .026$ and the predictors together accounted for 13% of the variance in ATTG. However, this time none of the individual predictors were statistically significant.

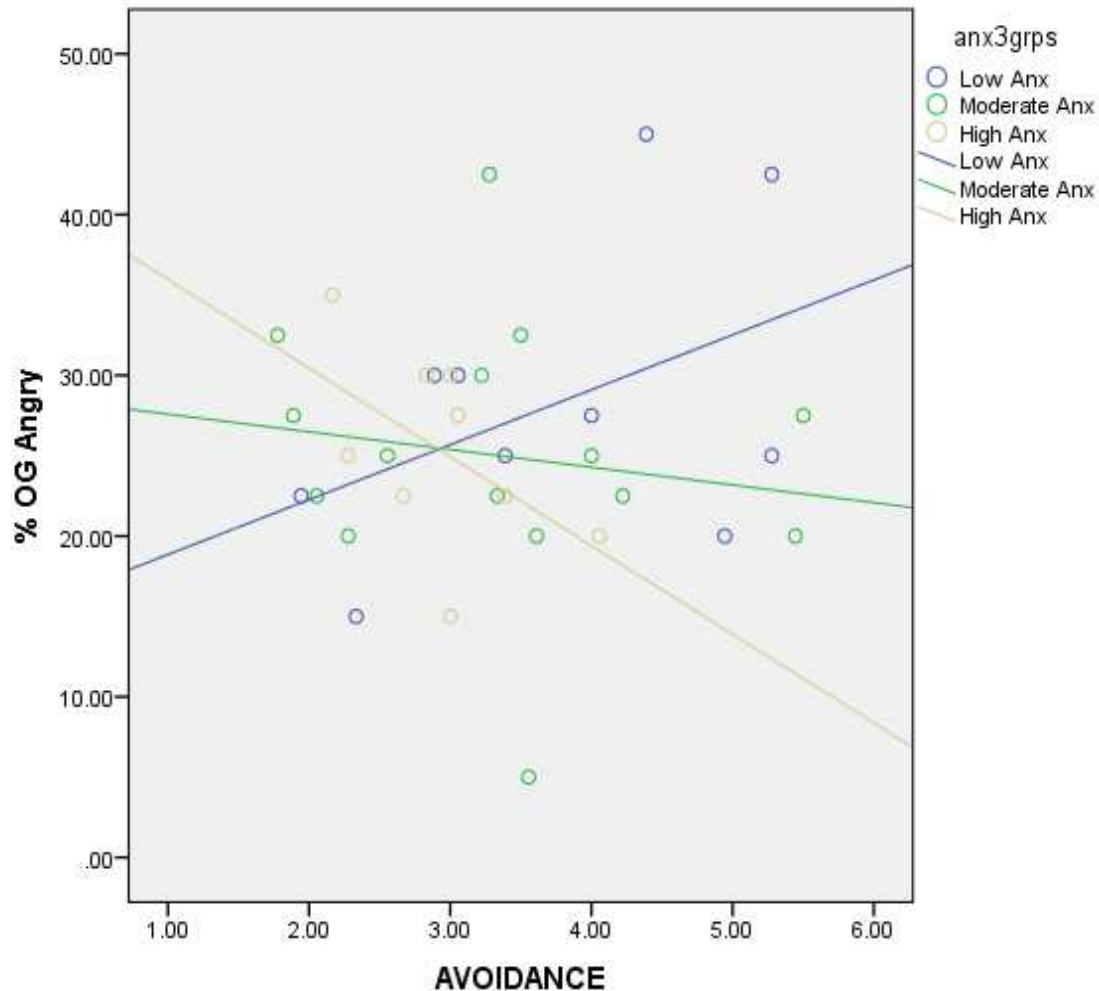


Figure 3. Scatterplot of Effect of Neutral Condition Prime on Attachment Patterns showing Percentage of Angry Faces.

Linear multiple regressions were then performed to see if ANXIETY, AVOIDANCE, GROUP and their interactions could predict explicit identification towards the two groups. The

overall models for identification towards the Orange Group (IDO), $R^2 = 0.47$, $F(7, 108) = 13.87$, $p = .000$, and towards the Green Group (IDG), $R^2 = 0.26$, $F(7, 108) = 5.53$, $p = .000$, were both significant, although there was no significance for any of the individual predictor variables in either regression.

Table 8
Study 2 Correlations of Explicit Attitudes, Explicit Identification, and Implicit Preferences

	ATTO	ATTG	IDO	IDG	IAT
ATTO	1.00				
ATTG	0.02	1.00			
IDO	0.64**	-0.12	1.00		
IDG	-0.35**	0.61**	-0.31**	1.00	
IAT	-0.30**	0.25**	-0.35**	0.28**	1.00

Correlation is significant at the 0.01 level (2-tailed)

The analyses described above of the percentage of angry faces assigned to the out-group in the Face Categorization Task (FACESA) dealt with a sort of implicit bias towards the out-group in that subjects assigned angry faces to the out-group quickly and without much thought. To test if this same expected pattern of implicit bias was present in the IAT (which is designed to tap participants' unconscious or automatic liking/ disliking of a particular group), a linear multiple regression was conducted to see if ANXIETY, AVOIDANCE, GROUP, and their interactions influenced implicit attitudes towards either the Orange or Green Groups. While the overall regression model was statistically significant, $R^2 = 0.27$, $F(7, 107) = 5.62$, $p = .000$, there was no significance in any of the individual predictor variables.

Last, linear multiple regressions were conducted to determine if AVOIDANCE, ANXIETY, and their interaction predicted explicit attitudes and identification towards

participants' in-group. With regard to both in-group attitudes and in-group identification, the overall models were not significant, $R^2 = 0.02$, $F(3, 107) = 0.63$, $p = .600$ (attitudes) and $R^2 = 0.09$, $F(3, 107) = 3.57$, $p = .664$ (identification), and no individual predictors were significant.

CHAPTER 11: STUDY 2 DISCUSSION

The main research question in Study 2 (Hypothesis 1) was whether priming participants with the secure base of attachment would reduce the level of intergroup bias shown towards their minimal out-group. Specifically, it was predicted that all participants who were primed with the secure base of attachment would categorize fewer angry faces into the out-group than those participants in either the positive affect priming condition or the control condition. The secure base priming manipulation was not effective.

Hypothesis 2 predicted that priming an individual with the secure base of attachment would have an effect on both explicit and implicit attitudes. Specifically, participants who were primed with the secure base of attachment were predicted to show less explicit and implicit bias towards their out-group than those primed with either a positive affect or a neutral priming condition. This prediction was not supported.

With regard to Hypothesis 1, only the priming pair of positive affect and neutral condition was significant. What could be the reason for the lack of success in the secure base priming? One possible explanation could be the large majority of insecure (i.e. anxious and avoidant) participants in our sample. Eighty-three percent of participants were insecurely attached. Overall, previous research into attachment theory has found a far more generous number of securely attached participants in its samples. For example, in the population used by Hazan & Shaver (1987), over half were securely attached (56%) with only 19% being anxious, and 25% being avoidant. Further, in the previous literature on priming the secure base, the samples appear to have included a majority of securely attached participants. Mikulincer and Shaver (2001), in their studies on intergroup bias and attachment, did not relate how many participants were

actually securely attached but, if their studies followed the norm, it seems likely that the majority of their participants were secure in their attachment orientation.

In this study, the same secure prime was used as described in Mikulincer and Shaver (2001) and Mikulincer and Arad (1999), but in this sample the prime failed to produce the desired effect. This result is interesting because it may be that priming the secure base is not as effective when the majority of participants are insecurely attached.

As in Study 1, our different findings may be related to the large number of Hispanic students in our sample who formed the largest ethnic group (58.6%). In previous studies, the samples have been largely Caucasian in ethnicity. In addition, Mikulincer and Shaver (2001) used a sample of Israeli Jewish undergraduates studying in Israel while the sample in this study included a very diverse mix of ethnic minorities living in the United States. Because of the obvious differences between these two sample populations, perhaps it is not so surprising that a very different result was achieved in our study: whereas the Israeli undergraduates who were primed with the secure base reduced their intergroup bias, the four ethnic minorities overall increased it.

Last, participants who were avoidant (50% either dismissing or fearful) may have failed to react to the secure base priming because they missed the suggestions contained in the priming procedure (Taubman-Ben-Ari & Mikulincer, 2007). In earlier studies, avoidant individuals have been found to misinterpret or miss suggestions of secure attachment because of their inclination to suppress emotion (Mikulincer, Shaver, & Horesh, 2006). On the other hand, the anxiously attached participants may have felt angry and threatened by visualizing a situation that may have caused pain (Taubman-Ben-Ari & Mikulincer, 2007). Consequently, these subjects may have reacted against the secure base prime by showing more intergroup bias not less.

The only significant prime was the pair of Positive Affect and Neutral Condition. For both primes, the securely attached showed lower intergroup bias while the dismissing (high avoidance, low anxiety) showed high intergroup bias. This was the same result as in Study 1. Also the same result as in Study 1 was the behavior of the fearful subjects with the neutral prime. They showed less intergroup bias. However, with the positive affect prime, the fearful subjects reacted in the opposite way and showed more intergroup bias while those high in attachment anxiety (preoccupied) showed less bias. The positive affect prime was about winning the lottery. The fearful subjects may have reacted to this visualization because part of the visualization included people coming up and congratulating the participant on winning. Fearful subjects' distrust in others may have contributed to their reaction against this scenario and produced more intergroup bias

Finally, this study suggests that contextual priming of attachment may have different effects on intergroup bias, both explicit and implicit, when a diverse ethnic sample is used and most of the subjects are insecurely attached. Further research need to be performed on similar samples in the future to determine if a majority of insecurely attached participants and/ or a diverse ethnic sample affects the behavior of secure base priming. It may be that insecurely attached individuals have a remarkably counter-intuitive response to secure base priming.

CHAPTER 12: STUDY 3

Studies 1 and 2 showed that attachment patterns do have a relationship with intergroup bias when using the minimal group effect and that securely attached participants show less bias towards their minimal out-group than insecurely attached individuals. However, what would happen to attachment orientation and intergroup bias if participants had to change their groups? Prior research has shown that when participants shift their group membership, their explicit attitudes may reverse but their implicit attitudes remain the same as their initial evaluation (Gregg, Seibt, & Banaji, 2006). If the minimal groups in this study were asked to change their membership from in-group to out-group, would the change of membership affect the level of bias each attachment pattern would display? It would be interesting to see what changes in bias (if any) might occur in the individual towards the new out-group when he or she is moved into a new group. Do securely attached subjects adapt more readily to a change of group membership? Do they show greater acceptance in their attitudes towards the new out-group? These were some of the questions that I hoped to address in Study 3.

In Study 3, the main goal is to explore the influence of attachment orientation on intergroup bias using minimal groups during a change of group membership from the in-group to the out-group. Specifically, will more intergroup bias will be shown to the new group, depending on whether the individual is securely or insecurely attached? It is expected that securely attached subjects will react to both groups in the same way but that insecurely attached individuals may react differently depending on whether they are anxiously attached or avoidant.

Study 3 will again use a correlation design. Participants will be asked to complete Study 1 (Time 1) and then be asked to change group membership from the in-group to the out-group and then to repeat Study 1, this time in the other group (Time 2).

The predictions are as follows:

1. Independent of which group they belong to, more securely attached participants will categorize fewer angry faces into both out-groups. However, both anxiously attached and avoidant participants will categorize more angry faces into both out-groups.
2. In both explicit and implicit attitudes, more securely attached participants will show less inter-group bias than insecurely attached individuals, even though they change group membership.

Method

Participants

128 participants will be drawn from the same subject pool as in Study 1.

Procedure

The procedure for the first part of the study will be identical to Study 1.

After completion of the IAT, the experimenter will explain to the participant that, due to an error on the part of the main researcher, the participant was assigned to the wrong group. After apologizing for the error, the experimenter will explain that the participant will be re-assigned to the correct group and be required to repeat the study. In reality, there will be no researcher error. The participant will then repeat the entire study, this time belonging to the other group (Orange or Green).

Variables for Analysis

There are eleven primary variables of interest that will be subjected to analysis and serve as dependent or independent variables. The eight demographic variables will be used in secondary analyses or as covariates. These include: age, sex, major, year in school, race, mother's and father's level of education, and marital status. The eleven primary variables are:

1. ECR-Anxiety (ANXIETY): the dimension of relationship attachment anxiety from the Experience of Close Relationships (ECR) Scale. The total possible score for all 18 items will range from 18 to 126. Each participant's score on the ANXIETY dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.
2. ECR-Avoidance (AVOIDANCE): the dimension of relationship attachment avoidance from the Experience of Close Relationships (ECR) Scale. The total possible score for all 18 items will range from 18 to 126. Each participant's score on the AVOIDANCE dimension will be computed by using the formula supplied by Brennan, Clark, & Shaver (1998). This will be an independent variable used to predict face categorization and in-group/out-group bias.
3. Angry Categorizations Time 1 (FACESA1): the number of angry versus happy faces categorized in the Face Categorization Task in Time 1. This is a dependent variable used to assess the degree of negative attributions made towards the in-group versus the out-group members.
4. Angry Categorizations Time 2 (FACES2). Same as above for Time 2.
5. Explicit Attitudes Time 1 (ATT1) towards the in-group versus the out-group in Time 1. There are four attitude questions, two questions relating to the in-group and two relating to the out-group and each ranging from 1 to 7. The total possible score for the two in-group questions and two out-group questions will each range from 2 to 14. This is a dependent variable used to assess the attitudes of in-group versus out-group members.
6. Explicit Attitudes Time 2 (ATT2). Same as above for Time 2.

7. Explicit Identification Time 1 (ID1) towards the in-group versus the out-group. There are four identification questions, each ranging from 1 to 7. The total possible score for the two in-group questions and the two out-group questions will each range from 2 to 14. This is a dependent variable used to assess the level of identification towards in-group versus out-group members.
8. Explicit Identification Time 2 (ID2). Same as above for Time 2.
9. IAT Score Time 1 (IAT1): implicit relative preference for the in-group versus the out-group. Using the revised scoring algorithm, an effect size estimate for each participant will be obtained, indicating his or her relative preference for the in-group as opposed to the out-group (see Greenwald, Nosek, & Banaji, 2003). This is a dependent variable used to assess implicit preferences towards in-group versus out-group members.
10. IAT Score Time 2 (IAT2). Same as above for Time 2.
11. GROUP: the specific Group to which each subject is randomly assigned.

Statistical Methods

The general approach to analysis will include two steps: first, descriptive statistics, Distribution checks and transformations, and, second, inferential statistics.

Descriptive statistics, distribution checks, and transformation:

Prior to completing inferential statistics, all data will be examined for errors and outliers and for their distributional properties (e.g., skewness). If the assumptions of normality are not met, appropriate transformations towards normalization will be considered, and the fit of the data to the assumptions of specific statistical tests will be evaluated. No major problems are foreseen in these areas.

Inferential Statistics:

The main types of inferential statistics will be mean comparisons (*t* tests) and bivariate correlation and multiple regression models. The a-priori power analysis indicated that at least 134 subjects would be needed (actual power was .95) for basic two-group *t* test comparisons.

Post hoc analyses, assuming 134 subjects indicate adequate power ($>.80$), will be obtained for two-group mean comparisons and multiple regression models looking at R^2 change for as many as 10 predictors (and effects sizes of .10 or greater) (Cohen, 1992). Thus, given the expected sample sizes, adequate power for large and medium effects, and in some cases small effects, should exist. This is a very basic approach to power analysis and several factors that can affect power are not considered, such as α rate corrections for multiple tests, and variance or reliability of the measures.

Analysis

The specific tests that will be carried out in the analysis are as follows:

Hypothesis 1. Independent of which group they belong to, more securely attached participants will categorize fewer angry faces into both out-groups. However, both anxiously attached and avoidant participants will categorize more angry faces into both out-groups.

First, the same multiple regressions will be carried out as described in Study 1 for both Times 1 and 2.

Second, further analyses will include independent-samples *t* tests to show if there are significant differences between the Orange and Green groups in Time 1 and Time 2. Also, paired-samples *t* tests will show if there are significant differences between the in-group and the out-group in terms of the number of angry faces categorized into either group (i.e. explicit intergroup bias) for Times 1 and 2.

Hypothesis 2: More securely attached participants will show less inter-group bias for both explicit and implicit attitudes of inter-group bias, even though they change group membership.

First, multiple regression analyses will explore the effect of both relationship and group attachment patterns on explicit attitudes towards the in-group versus the out-group and/or explicit identification towards the in-group and out-group, as well as implicit attitudes towards the in-group and out-group. Second, the same multiple regression analyses will be performed as described in Study 1 for both Times 1 and 2.

Further, supplementary analyses will include paired-samples *t* tests to also show if there is a statistically significant difference in the mean scores for the face categorizations, explicit attitudes, explicit identifications, and IATs for Time 1 and Time 2. Correlations will show if there are significant relationships between face categorization bias and implicit preference for the in-group versus the out-group for Times 1 and 2. Independent-samples *t* tests will show if there is a significant difference between explicit attitudes and explicit identification with the in-group versus out-group, and also between explicit attitudes/ identification and implicit preference scores for the in-group versus the out-group.

This will be followed by one-way repeated measures ANOVAs that will tell us if there is a statistically significant difference between the face categorization scores in Time 1 and Time 2, the explicit group attitudes and identification items in Times 1 and 2, and the implicit preference scores in Times 1 and 2. Multiple regression analyses will also explore the effect of both relationship and group attachment patterns on explicit attitudes towards the in-group versus the out-group and/or explicit identification towards the in-group and out-group, as well as implicit attitudes towards the in-group and out-group. These multiple regression analyses will also explore any interactions between the variables.

CHAPTER 13: STUDY 3 ANALYSIS

Participants

Due to availability of resources, participants were 93 undergraduates (68 women; 25 men) from an ethnically diverse Western public university who received credit as partial fulfillment of an introductory psychology course requirement.

The participants ranged in age from 18 to 25 years, with a Mean and SD of 19.57 and 1.36, respectively. There were 40 freshmen (43%), and 30 subjects were studying Biological Sciences (24.7%). With regard to ethnicity, participants fell into four main ethnic groups: there were 43 Hispanics (46.2%), 22 American Asians (23.7%), 6 Caucasians (6.5%), and 4 African Americans (4.3%). These findings deviate somewhat from the 2007-2008 university demographics that reported fewer Hispanics (30%), more American Asians (33%), more Caucasians (24%), and more African Americans (6%). Eighteen subjects (19.4%) did not fall into the four main ethnic categories: 14 subjects were of mixed heritage, 3 were from India and/or the Middle East, and one subject was Native American.

Twenty-seven percent of participants' mothers and 28% of fathers did not graduate from High School, while 17% of mothers and 15% of fathers had a Graduate degree. Most of the participants were single (77.4%), one was married and one subject was divorced. Fifty participants (54%) were in a romantic relationship, with 38 of these reporting being in a relationship for more than one year. A complete picture of the demographics can be seen in Table 10.

Analysis

Preliminary Analysis and Data Preparation. All variables were checked for normality and outliers. No transformations of the raw data were indicated. Prior to the formal analysis, potential covariates of sex, age, and ethnicity were checked, but none were significant.

Table 9

Study 3 Demographic Information

Number of Subjects	93
Gender	Male = 25; Female = 68
Age	Mean Age = 19.57 years; Age Range = 18 to 25 years
Ethnicity	43 Hispanic; 22 American Asian; 6 Caucasian; 4 African American; 18 Other
Year in School	11 seniors; 15 juniors; 27 sophomores; 40 freshmen
Major	30 Biology; 21 Cognitive Science; 13 Psychology; 7 Undeclared; 2 Political Science; 20 Other
Mother's Education	25 No High School Graduation; 21 High School Graduation; 19 Some College; 12 College Graduation; 16 Graduate Degree
Father's Education	26 No High School Graduation; 25 High School Graduation; 16 Some College; 12 College Graduation; 14 Graduate Degree
Marital Status	72 Single; 1 Married; 1 Divorced; 19 Committed Relationship
In a Relationship?	Yes = 50; No = 43
How Long?	5 Less than 6 months; 6 Less than 1 year; 39 More than 1 year

By following the formula given by Brennan, Clark, and Shaver (1968) for the Experience of Close Relationships (ECR) Scale, scores were produced for the two dimensions of attachment anxiety (ANXIETY; Mean=3.83, SD=0.98) and attachment avoidance (AVOIDANCE;

Mean=3.20; SD=0.97) with lower scores on both dimensions indicating more securely attached participants. In this sample, the range for ANXIETY was 1.33 to 6.22 and for AVOIDANCE was 1.00 to 5.78. There was no significant gender difference in either AVOIDANCE, $t = -.23$, $p = .822$ or ANXIETY, $t = -.55$, $p = .584$, and also no correlation between the two dimensions ($r = .13$, $p = .230$), which supported the orthogonal design of the two dimensions found by Brennan, Clark, and Shaver (1998).

The formula for the ECR Scale also produced the following information: 35 subjects were found to be fearful (high anxiety, high avoidance) (37.6%); 29 were preoccupied (high anxiety, low avoidance) (31.2%); 17 were secure (low anxiety, low avoidance) (18.3%), and 12 were dismissing (low anxiety, high avoidance) (12.9%). Therefore, 68.8% of participants were either fearful or preoccupied, both patterns indicating high anxiety in attachment. A similar result was observed in both Studies 1 and 2. Past research has found that the majority of participants are usually securely attached, not anxious. For example, Hazan and Shaver (1987), in their original article looking at attachment patterns in romantic relationships, found a population with more secure participants (56%) than either avoidant (25%) or anxious (19%) participants. These differences in the present sample will be addressed later in this paper.

With regard to the IAT, the data were analyzed by following the scoring algorithm provided by Greenwald, Nosek, and Banaji (2003). Only the response latencies from the two test blocks were analyzed while the data from the practice blocks were discarded. The standard exclusion criteria for participants with excessive long or short latencies on the IAT (Greenwald et al., 2003) resulted in the exclusion of data for only one participant who was dropped from the analysis of the IAT data. A D score was computed for each participant according to the scoring algorithm. A more positive D score indicated that the Orange Group was associated with more

positivity and the Green Group with more negativity i.e. a faster response to an Orange (in-group) + positive word association compared to a Green (out-group) + negative word association. On the other hand, a more negative score meant that subjects would be more likely to associate Green rather than the Orange Group with positivity.

Main Analyses. Forty-seven participants were randomly assigned to the Orange Group (50.5%) and 46 to the Green Group (49.5%).

Hypothesis 1 predicted that more securely attached participants would categorize fewer angry faces into out-groups at Time 1 and Time 2. On the other hand, both anxiously attached and avoidant participants would be expected to categorize more angry faces into the out-groups at both times.

First, paired samples *t* tests assessed whether there was a minimal group effect i.e. whether subjects assigned more Angry than Happy faces into the out-group, either at Time 1 or at Time 2. In this particular sample, there was no statistically significant difference between Angry and Happy Faces, either at Time 1 ($t(92) = .59, p = .56$) or at Time 2 ($t(92) = 1.45, p = .15$). However, even though not statistically significant, at both Time 1 and Time 2, the mean percentages for angry faces indicated that subjects assigned more angry faces into the out-group than happy faces. At Time 1, FACESA Mean = 23.47 (SD = 7.29) compared to FACESH Mean = 22.92 (SD = 6.04), and at Time 2, FACESA Mean = 24.57 (SD = 5.82) compared to FACESH Mean = 23.60 (SD = 5.40).

Second, linear multiple regression analyses were performed to determine if attachment anxiety (ANXIETY), attachment avoidance (AVOIDANCE) and their interaction (ANXIETY x AVOIDANCE) significantly predicted the percentage of angry faces (FACESA) assigned to the out-group either at Time 1 ($R^2 = .04, F(3, 89) = 1.18, p = .32$) or at Time 2 ($R^2 = .02, F(3, 89) =$

-.50, $p = .68$). There were no significant effects in either regression. With regard to Time 1, the Beta coefficients were: .33 for AVOIDANCE ($p = .43$), .44 for ANXIETY ($p = .19$), and -.46 for the interaction of AVOIDANCE and ANXIETY ($p = .408$). With regard to Time 2, the Beta coefficients were: -.10 for AVOIDANCE ($p = .81$), .09 for ANXIETY ($p = .80$), and .06 for AVOIDANCE x ANXIETY ($p = .92$).

A multiple regression was also performed on the difference in the percentage of angry faces (FACESA) between Time 1 and Time 2. Again, there was no significant effect, $R^2 = .01$, $F(3, 89) = .35$, $p = .79$. The Beta coefficients were as follows: 0.33 for AVOIDANCE ($p = .44$), .30 for ANXIETY ($p = .39$), and .41 for the interaction of AVOIDANCE and ANXIETY ($p = .47$).

Hypothesis 2 predicted that more securely attached participants would show less intergroup bias than the insecurely attached in both explicit and implicit attitudes of intergroup bias at Time 1 and Time 2.

To explore Hypothesis 2, first, paired samples t tests were performed to see if participants preferred their in-group versus their out-group with regard to explicit attitudes and explicit identification. At Time 1, subjects had a greater preference for their in-group ($M = 10.03$, $SD = 2.15$) than their out-group ($M = 8.01$, $SD = 2.11$), $t(92) = 5.44$, $p = .00$. At Time 1, subjects also had a stronger identification with their in-group ($M = 9.52$, $SD = 2.59$) versus their out-group ($M = 5.95$, $SD = 2.26$), $t(92) = 8.88$, $p = .00$. At Time 2, there was a similar preference for the in-group ($M = 9.44$, $SD = 2.08$) versus the out-group ($M = 8.28$, $SD = 2.19$) with regard to explicit attitudes, $t(92) = 3.27$, $p = .001$ as well as a stronger identification for the in-group ($M = 8.83$, $SD = 2.57$) versus the out-group ($M = 7.40$, $SD = 2.74$), $t(92) = 3.14$, $p = .002$.

When Time 1 was compared to Time 2 with regard to explicit attitudes, there was a significant difference between in-group attitudes, $t(92) = 2.05, p = .04$, with subjects preferring their in-group more at Time 1 ($M = 10.03, SD = 2.15$) than at Time 2 ($M = 9.44, SD = 2.08$). There was also a stronger identification with the in-group at Time 1 ($M = 9.52, SD = 2.59$) than at Time 2 ($M = 8.83, SD = 2.57$), $t(92) = 2.07, p = .042$.

Second, correlations were performed between all the explicit variables' scores (i.e. Orange Attitudes, Green Attitudes, Orange Identification, and Green Identification), and the implicit attitudes scores at Time 1 and Time 2 (see Tables 11 and 12). Again, as described in the Methods section, subjects responded to how positively they felt about both their in-group and out-group (attitudes) and also responded to how much they identified with their in-group and the out-group (identification). As shown in Table 11, all the explicit attitudes at Time 1 were significantly related to one another. Attitudes towards the Orange and Green groups were negatively related to one another, as was identification with the Orange versus Green groups. This was to be expected and it demonstrates that subjects had attitudinal and identification preferences for their in-group. Attitudes towards the Orange Group were positively related to identification with the Orange Group and attitudes towards the Green group were positively associated with identification with the Green Group. Thus, subjects both identified and held explicit positive attitudes towards their own group.

Correlations of implicit attitudes with explicit attitudes at Time 1 revealed weaker relationships that were still significant. Implicit attitudes were negatively related to both explicit attitudes towards and identification with the Orange Group: as the relative implicit preference for the Orange Group increased, both explicit attitudes towards and identification with the Orange Group decreased. Also, as explicit attitudes towards the Green Group increased, so did the

relative implicit preference for the Green Group. However, as explicit identification towards the Green Group increased, the relative implicit preferences decreased.

With regard to Time 2, there were no significant correlations between implicit preferences and explicit attitudes and identification towards either the Orange Group or the Green Group. Further, the correlations between the explicit attitudes and identification of the two groups were much weaker. A complete picture of the correlations for Time 2 are presented in Table 12.

Following the correlations, linear multiple regressions were conducted to see if ANXIETY or AVOIDANCE influenced explicit attitudes towards or identification with either the Orange or Green Groups at Time 1 and/or Time 2. First, a multiple regression analysis was performed to determine if ANXIETY, AVOIDANCE, GROUP, and their interactions predicted explicit attitudes towards the Orange Group at Time 1 (ATTO1), Time 2 (ATTO2) or the difference between the two scores (DIFFATTO).

The overall regression model for ATTO1 was significant, $R^2 = 0.22$, $F(7, 85) = 3.36$, $p = .003$ but the variables did not reach significance. The overall regression model for the difference scores was also significant, $R^2 = .28$, $F(7, 85) = 4.77$, $p = .000$, and although no variables were significant, both AVOIDANCE ($p = .079$) and ANXIETY ($p = .067$) approached significance as did their interaction ($p = .086$).

With regard to ATTO2, the overall regression model was not significant ($p = .25$). However, the main effects of AVOIDANCE ($p = .057$) and ANXIETY ($p = .065$) approached significance and the interaction of AVOIDANCE x ANXIETY was significant, $Beta = 3.51$, $p = .05$. The scatterplot in Figure 4 shows that both securely attached and anxiously attached participants showed greater explicit preference for the Orange Group at Time 2, while subjects

who were more avoidant, plus those more avoidant and anxious (fearful), showed lower explicit attitudes for the Orange Group at Time 2.

Table 10.

Correlations of Explicit Attitudes, Explicit Identification, and Implicit Preferences at Time 1.

	IAT1	ATTO1	ATTG1	IDO1	IDG1
IAT1	1.00				
ATTO1	-0.32**	1.00			
ATTG1	0.39**	-0.52**	1.00		
IDO1	-0.43**	0.68**	-0.58**	1.00	
IDG1	-0.46*	-0.39**	0.61**	-0.51 **	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Table 11.

Correlations of Explicit Attitudes, Explicit Identification, and Implicit Preferences at Time 2.

	IAT2	ATTO2	ATTG2	IDO2	IDG1
IAT2	1.00				
ATTO2	-0.07	1.00			
ATTG2	0.12	-0.33**	1.00		
IDO2	-0.15	0.67**	-0.37**	1.00	
IDG2	-0.20	-0.41**	0.74**	-0.41 **	1.00

** Correlation is significant at the 0.01 level (2-tailed)

Similar regressions were performed on explicit attitudes towards the Green Group at Times 1 and 2 and the difference in their scores. The overall regression models for attitudes towards the Green Group at Time 1, $R^2 = 0.18$, $F(7, 85) = 3.86$, $p = .001$, and the difference in scores between Times 1 and 2, $R^2 = 0.32$, $F(7, 85) = 5.66$, $p = .000$, were both significant, while the regression model for attitudes towards the Green Group at Time 2 was not significant ($p = .067$). However, no variables were significant in any of these three regressions.

Regressions were then performed on Identification towards the Orange Group at Times 1 and 2 and the difference in their scores. The overall model for identification towards the Orange Group at Time 1 was significant, $R^2 = .41$, $F(7, 85) = 8.41$, $p = .000$, but none of the predictors were significant. The overall model for the difference in scores was also significant, $R^2 = 0.42$, $F(7, 85) = 8.65$, $p = .000$ but, again, none of the individual predictors was significant.

The regression model for identification towards the Orange Group at Time 2 was not significant, $R^2 = .13$, $F(7, 85) = 1.88$, $p = .08$ but several individual predictors in the regression were significant. These can be seen in Table 12. Of particular interest was the two-way interaction between AVOIDANCE x ANXIETY. Figure 4 shows a scatterplot of this interaction. Both securely attached participants (low anxiety, low avoidance) and those subjects characterized as preoccupied (high anxiety, low avoidance) displayed a higher level of identification towards the Orange Group at Time 2. On the other hand, participants characterized as dismissing (high avoidance, low anxiety) and fearful (high avoidance, high anxiety) both showed less identification towards the Orange Group at Time 2.

Table 12.

Regression of Attachment Anxiety and Avoidance on Explicit Identification towards the Orange Group at Time 2

	Standardized Coefficients	t	Sig.	Partial Correlations
	Beta			
(Constant)		-1.234	.220	
AVOIDANCE	3.080	2.086	.040	.221
ANXIETY	2.279	1.751	.083	.187
AVOIDANCE x ANXIETY	-4.193	-2.127	.036	-.225
GROUP	2.738	1.987	.050	.211
GROUP x AVOIDANCE x ANXIETY	5.330	2.238	.028	.236
GROUP x AVOIDANCE	-4.334	-2.186	.032	-.231
GROUP x ANXIETY	-3.512	-1.866	.065	-.198

Last, multiple regressions were conducted on identification towards the Green Group at Time 1 and Time 2 and on the difference scores between both times. The overall regression models for Time 1, $R^2 = .35$, $F(7, 85) = 6.58$, $p = .000$, and the difference scores between Times 1 and 2, $R^2 = .39$, $F(7, 85) = 7.82$, $p = .000$ were significant, while the regression for Time 2 was not ($p = .292$). None of the regression variables were significant.

Following the regressions on all the explicit variables, multiple regression analyses were performed to determine if ANXIETY, AVOIDANCE, GROUP, and their interactions predicted the IAT scores at Time 1, Time 2, or the difference score between Times 1 and Time 2.

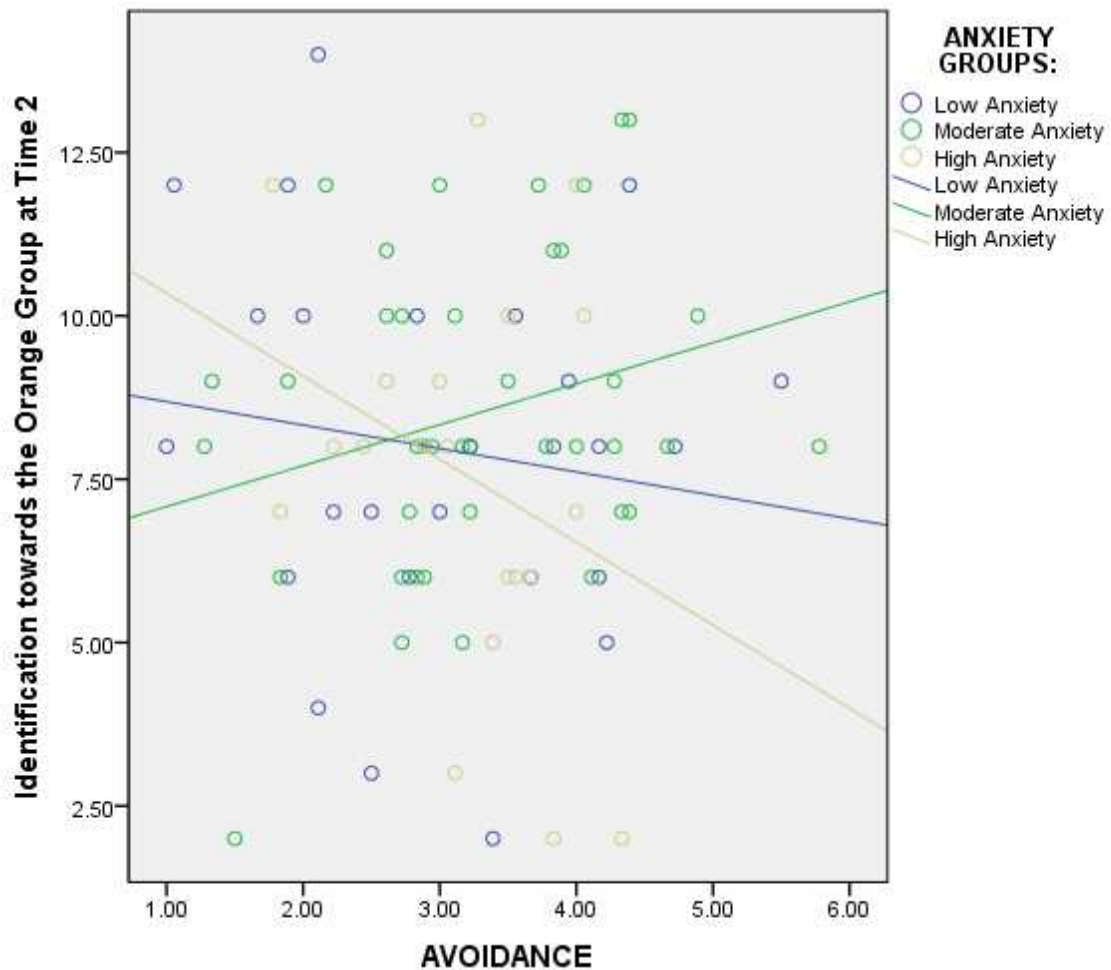


Figure 4. Scatterplot showing Explicit Identification towards Orange Group at Time 2.

With three main effect variables, there were three two-way (ANXIETY x AVOIDANCE, ANXIETY x GROUP, AVOIDANCE x GROUP) interactions and one three-way interaction (ANXIETY x AVOIDANCE x GROUP) included in the three analyses. The overall multiple regression models for the IAT at Time 1 ($R^2 = 0.36$, $F(7, 84) = 6.81$, $p = .000$) and for the difference score between Times 1 and 2 ($R^2 = .30$, $F(7, 84) = 5.09$, $p = .000$) were significant. The regression model for the IAT at Time 2 was not significant ($p = .550$). Only the regression on the difference scores showed any variables that were significant: there was a main effect for

ANXIETY, $Beta = -2.52$, $p = .035$, and the interaction of AVOIDANCE and ANXIETY significantly and independently predicted the difference scores ($Beta = 3.58$, $p = .048$). The scatterplot in Figure 5 reveals that more securely attached participants (low anxiety, low avoidance) and preoccupied subjects (high anxiety, low avoidance) showed a higher score difference than dismissing subjects (high avoidance, low anxiety) or fearful subjects (high avoidance, high anxiety).

Last, linear multiple regressions were performed to explore the influence of attachment patterns on explicit attitudes and identification towards the in-group at Time 1 and at Time 2. First, at Time 1, the overall model for in-group attitudes was not significant, $R^2 = 0.003$, $F(3, 89) = 0.10$, $p = .96$, and none of the individual predictors was significant. The overall model for in-group identification was also not significant, $R^2 = 0.02$, $F(3, 89) = 0.62$, $p = .61$. At Time 2, the overall model for in-group attitudes was not significant, $R^2 = 0.02$, $F(3, 89) = 0.71$, $p = .55$, while none of the individual predictors was significant. The overall model for in-group identification at Time 2 was also not significant, $R^2 = 0.05$, $F(3, 89) = 1.60$, $p = .20$.

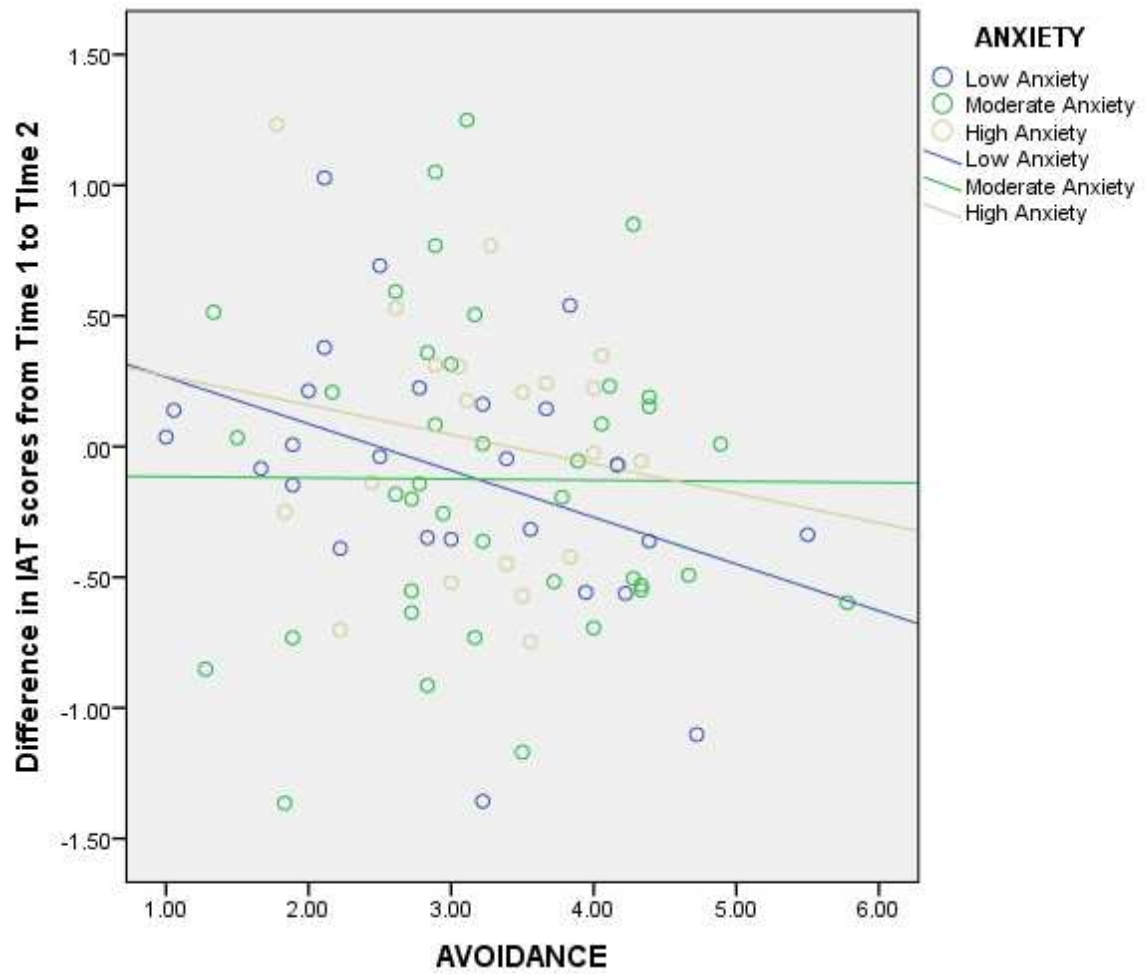


Figure 5. Scatterplot showing Difference Scores for IAT from Time 1 to Time 2.

CHAPTER 14: STUDY 3 DISCUSSION

In Study 3, the main goal was to test participants' reactions to a shift of group membership in relation to the level of intergroup bias they would show to their out-group at Time 1 and Time 2. Hypothesis 1 predicted that the more securely attached participants would categorize fewer angry faces into their out-groups at both times. On the other hand, both anxiously attached and avoidant participants were predicted to categorize more angry faces into their out-group at both times. This Hypothesis was not supported. Unlike both Studies 1 and 2, there was no significant minimal group effect. However, although the difference between angry and happy faces was not significant, the results did suggest that participants assigned more angry faces than happy faces into the out-groups at both Time 1 and Time 2.

This may indicate that, at Time 2, subjects learned which face belonged in each group and consequently they were more accurate in recognizing the faces in their own and the other group. This accuracy, if too high, may have led to less uncertainty and less room for bias to affect participants' assignment of angry faces into their out-group.

Further, the multiple linear regressions that were conducted to explore if attachment anxiety (ANXIETY), attachment avoidance (AVOIDANCE) and their interaction (ANXIETY x AVOIDANCE) significantly predicted the difference in the percentage of angry faces (FACESA) assigned to the out-group either at Time 1 or at Time 2 were also not significant.

Hypothesis 2 predicted that the more securely attached participants would show less intergroup bias than the insecurely attached for both explicit and implicit attitudes of inter-group bias, even though they changed group membership. This hypothesis was partly supported by the results. Only the interactions between AVOIDANCE and ANXIETY were significant for explicit attitudes towards the Orange Group at Time 2, explicit identification towards the Orange Group

at Time 2 (IDO2), and the difference of implicit attitudes between Time 1 and Time 2 (DIFFIAT). All three interactions showed a similar result with regard to attachment patterns for explicit attitudes and identification towards the Orange Group at Time 2 and for the difference in implicit attitudes from Time 1 to Time 2: both securely attached participants and those with high anxiety (preoccupied) showed a higher level of preference for and identification towards the Orange Group at Time 2 than participants with high avoidance (dismissing) and high avoidance and anxiety (fearful).

As was predicted, securely attached subjects did show a higher level of bias, and subjects with high avoidance (dismissing), and high anxiety and avoidance (fearful) also showed lower levels of preference for and higher identification towards the Orange Group. However, those subjects with high anxiety (preoccupied) were also expected to show lower levels of preference for and identification towards the Orange Group, but, in fact showed the opposite.

Smith, Murphy, and Coats (1999) found that avoidant attachment was associated with lower levels of positive affect toward social groups as well as lower identification with social groups. It may be that this characteristic of the avoidant participants stopped them from showing a preference for and identification with their in-group in our sample. Smith, et al. also found that attachment anxiety was associated with stronger negative emotions toward groups. This was not found in our sample. On the contrary, anxiously attached participants showed more liking and identification towards their in-group at Time 2.

Again, this study, like Studies 1 and 2, had a very large proportion of insecurely attached participants. These rather confusing results and the lack of significance may have been further influenced by the fact that attachment orientation is a stable personality trait and, consequently, participants might have been expected to react in a similar way to both groups.

CHAPTER 15: GENERAL DISCUSSION

The three studies in this dissertation explored the relationship of attachment orientation and intergroup bias, using the minimal group paradigm. Although not all analyses were significant, the results indicated that secure attachment does reduce intergroup bias in randomly created groups in the laboratory. The basis of all three studies was to look at the attachment behavioral system which is an evolutionary response that predisposes an infant to attach to a caregiver. Once an attachment relationship is formed between infant and caretaker, the corresponding attachment orientation created by this relationship could then influence in-group preferences that the growing child will display. In this way, a secure attachment orientation could have an important influence in reducing children's thinking and behavior about bias towards those individuals not the same as them. As the child develops into an adult, these early formed forms of bias will continue to be an influence.

As this bias relates to the minimal group paradigm, Dunham, Baron, and Carey (2011) have suggested that minimal group preferences may represent a "default response" to how social differences can be experienced. That is, when a child first perceives that he or she is different from others (e.g. when the child first distinguishes herself to be a "Girl" and this is different from the group called "Boys") the minimal group bias first appears. This initial bias will then lead to an increasing favoritism towards the in-group (Girls) and a corresponding negative response towards the out-group (Boys). Individual differences e.g. cultural norms, are then built upon this default bias. It is possible that the attachment orientation is an example of such an individual difference.

Looking at Study 1, the purpose was to see if more securely attached participants showed less intergroup bias to their minimal out-group and greater preference for their minimal in-group

than more insecurely attached subjects. The results of Study 1 showed that more securely attached participants did show less intergroup bias towards their out-group than both the avoidant and anxious subjects. Also, with regard to explicit attitudes of liking towards the in-group, the results suggested that as attachment avoidance or attachment anxiety increased, explicit attitudes of positivity or liking towards the in-group decreased.

From the results, it is clear that secure attachment does reduce intergroup bias in the context of minimal groups. To the author's knowledge, this is the first time that attachment has been used in such a minimal group context. How could minimal groups be helpful in investigating the possible relationship between attachment patterns and intergroup bias? In this research, minimal groups were used primarily to get rid of any pre-existing bias in participants so that a truer picture could be produced of the effect of attachment on bias.

Turning to Study 2, the goal was to prime participants with three different primes: a secure base prime, a positive affect prime, and a neutral condition prime using three different visualizations previously used in Mikulincer and Arad (1999). The secure base prime was intended to activate representations of participants' secure attachment figures, and these would lead participants to behave more like securely attached individuals and show less bias. Surprisingly, using the particular sample in study 2, the secure base prime was not successful, and there was no significant difference between either the secure base prime and the positive affect prime, or the secure base prime and the neutral condition prime. This finding was not expected, since the priming visualizations had been successfully used in previous research. It was hoped that a causal explanation could be given for less intergroup bias shown to the minimal out-group due to a secure attachment pattern. The lack of significance of the primes denies this

causal explanation, and opens up the possibility of a third variable being responsible for the results in the three studies.

The positive affect and neutral condition primes also produced some unexpected results. These were the only pair of primes found to be significant. In the positive affect prime group, the anxiously attached (preoccupied) showed less intergroup bias towards their minimal out-group than the avoidant, while in the neutral condition prime group, the anxious/avoidant (fearful) subjects also showed less intergroup bias. Why would the anxiously attached show less bias in the positive affect group. It is possible that whereas the avoidant attached might be pushing down their emotions, the anxiously attached could be responding emotionally to people's congratulations on winning the lottery. In the same way, the anxiously attached could have responded to being in a supermarket scenario with a positive emotion and this led to less bias towards their out-group. With regard to the primes, the only difference between this study and previous research was the actual sample studied. In the previous research, the participants were all undergraduates from an Israeli university. In Study 2, the participants were not all from one cultural background but from a diverse ethnic background and in this sample the Hispanics and Asian Americans ranked in the majority above the Caucasians and African Americans. This particular ethnic mix appears to have reacted in a totally unexpected way to the different primes and their interpretation of the three primes deviated somewhat from the predicted reactions of a majority white sample. Specific to priming, future research should look with greater scrutiny at the possible reactions of different ethnic groups.

With regard to Study 3, I explored the adaptability of subjects when asked to change from one group to another in relation to their attachment patterns and the level of intergroup bias shown to their minimal out-group. Specifically, will more intergroup bias be shown to the new

group, depending on whether the individual is securely or insecurely attached? Participants completed Study 1 (Time 1) and were then asked to repeat the study after changing groups (Time 2). The results indicated that attachment patterns were not significantly associated with reducing intergroup bias either at Time 1 or at Time 2. Perhaps the change of group membership was not an effective strategy. After the study was completed, participants were not probed as to whether they believed the story of an error being the reason for repeating the study so it is not clear whether the deception worked or not. It is also possible that the change of membership and repeating the study may have been too complicated for participants to cope with.

However, with regard to explicit attitudes and identification towards their in-group at Time 2, both securely attached and anxiously attached participants revealed a greater liking for their in-group while avoidant subjects and those with both high anxiety and high avoidance showed less liking and less identification towards their in-group at Time 2. This was an unexpected finding since I had expected the results to show that anxiously attached subjects behaved in the same way as the other insecurely attached participants and liked their in-group less and identified less with their in-group than the securely attached. This anomalous result does not fit in with previous research on attachment patterns and group reactions (Smith, Murphy, & Coats, 1999). In this particular sample, the anxiously attached subjects (31.2%) appeared to have reacted to changing groups in a positive way and their preference for and identification with their new in-group followed these positive emotions.

In considering all three studies, several possible factors could have influenced the results and produced a lack of significance. These include the ethnic diversity of the participants, the attachment orientation of participants, the sample size, the pictures of the faces used in the two groups, and the colors of the groups. First, previous research into attachment orientation has been

usually conducted either with only White samples or with samples where Caucasians are in the majority. In this set of studies, Hispanics and Asian Americans formed the majority of the participants in all three studies. In a previous study looking at attachment and ethnic groups, Wei, Russell, Mallinckrodt & Zakalik (2004) compared adult attachment in four ethnic groups living in the United States: Hispanic Americans, Asian Americans, African Americans, and Caucasians. The authors of that study looked at the Experience of Close Relationships Scale and the way these four ethnic groups interpreted this scale. They used structural equation modeling techniques to examine whether the latent variables of the ECR's attachment anxiety and attachment avoidance dimensions are represented in similar ways across the four groups. They found that the two dimensions in the ECR Scale assessed the same underlying constructs and was therefore equivalent across the four ethnic groups of college students.

Wei et al. (2004) also found that Asian American and Hispanic American participants reported higher attachment anxiety than their African American and Caucasian peers. They suggested that this attachment anxiety could be caused by the Asian and Hispanic cultures which value interdependence and family connectedness. Adults in these societies often meet their needs by relying on others and by seeking acceptance from others in order to maintain social harmony. This reliance on others and seeking acceptance are both features of attachment anxiety in Western society. In addition, Asian Americans also reported greater attachment avoidance than Caucasian subjects. Wei et al. argued that it may be a culturally accepted practice for Asian Americans to restrain their emotions to maintain social harmony and this may resemble the characteristics of attachment avoidance from a Western viewpoint.

According to Wei, et al., the ECR Scale is a valid scale for measuring attachment patterns of different ethnicities, and Hispanics and Asian Americans can show greater attachment anxiety

and avoidance, there is still a possibility that certain members of ethnic minorities may interpret some of the items in the ECR Scale in a different manner to Caucasians. For example, is it more culturally appropriate for some ethnic communities to push people away in certain contexts, or care for families in other contexts? The ECR Scale may not be sensitive enough to discern these cultural nuances and perceptions and, because of this, the scale may categorize more members of ethnic minorities as insecurely attached when they are securely attached.

Second, as has been previously described, most of the past research into attachment has included mainly secure participants with smaller percentages of both avoidant and anxiously attached subjects. However, in the samples included in this set of studies, it is clear that the insecurely attached far outnumbered the securely attached. Because of this uneven distribution of attachment patterns across the samples, it may be that the securely attached participants did show more of a decrease in bias, but that there were not enough securely attached participants to statistically confirm this effect (indeed, inspection of the raw means supports this possibility).

Third, a larger sample size in each study would have resulted in more data from securely attached subjects being collected and greater power to produce more balanced findings. It was not possible to collect data from the total number of participants recommended in the power analyses performed at the start of each study and this lack of power may have been reflected in the lack of significance.

Fourth, there were only eight faces were in each group. It might therefore have been possible for some participants to learn which face belonged to each group, and because of this greater accuracy, it would have been more difficult for subjects to show random bias as hoped for. Also, each group of faces included a representation of male and female from the four ethnic groups studying on campus. The reason for including all four groups was to try and equalize out

any overt negative perception of the groups. However, instead of helping the situation, including different ethnicities in each group might have confused participants and made it harder for them to feel part of a particular group or show bias towards their out-group.

Lastly, mention needs to be made of the colors used in the studies, Orange and Green. When talking informally to participants after each study was completed, the researcher discovered that many participants appeared to be happier when assigned to the Orange group rather than the Green group. This may have had a bearing on the ability of subjects to “own” their assigned group. Orange is a warm and stimulating color while green appears to evoke calm and balance. Perhaps the undergraduates who participated in these studies were more drawn to the cheerfulness of the orange color than the calm of the green color?

Despite the possible limitations in all three studies described above, the significant results do indicate that secure attachment reduces intergroup bias in the context of minimal groups. To the author’s knowledge, this is the first time that attachment has been used with minimal groups. Further research should continue to explore the effect of using minimal groups with attachment patterns, and also the specific interpretation of the attachment relationship by different minority ethnic groups. It is hoped that this research makes a meaningful contribution to the relationship of attachment theory and interpersonal relationships, using the minimal group paradigm. There is still much to be learned about the way attachment theory relates to intergroup bias, and about the theory’s enduring and influential contribution to how we treat others who are different from ourselves.

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APPENDICES

Appendix 1: EXPERIENCE OF CLOSE RELATIONSHIPS (ECR) SCALE

The following statements concern how you generally feel in close relationships (e.g., with romantic partners, close friends, or family members). Respond to each statement by indicating how much you agree or disagree with it. Write the number in the space provided, using the following rating scale:

1	2	3	4	5	6	7
Disagree Strongly	Disagree Slightly	Disagree	Neutral/ Mixed	Agree Slightly	Agree	Agree Strongly

- ___ 1. I prefer not to show a partner how I feel deep down.
- ___ 2. I worry about being abandoned.
- ___ 3. I am very comfortable being close to romantic partners.
- ___ 4. I worry a lot about my relationships.
- ___ 5. Just when my partner starts to get close to me I find myself pulling away.
- ___ 6. I worry that romantic partners won't care about me as much as I care about them.
- ___ 7. I get uncomfortable when a romantic partner wants to be very close.
- ___ 8. I worry a fair amount about losing my partner.
- ___ 9. I don't feel comfortable opening up to romantic partners.
- ___ 10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.
- ___ 11. I want to get close to my partner, but I keep pulling back.
- ___ 12. I often want to merge completely with romantic partners and this sometimes scares them away.
- ___ 13. I am nervous when partners get too close to me.
- ___ 14. I worry about being alone.
- ___ 15. I feel comfortable sharing my private thoughts and feelings with my partner.
- ___ 16. My desire to be very close sometimes scares people away.
- ___ 17. I try to avoid getting too close to my partner.
- ___ 18. I need a lot of reassurance that I am loved by my partner.
- ___ 19. I find it relatively easy to get close to my partner.

- ___ 20. Sometimes I feel that I force my partners to show more feeling, more commitment.
- ___ 21. I find it difficult to allow myself to depend on romantic partners.
- ___ 22. I do not often worry about being abandoned.
- ___ 23. I prefer not to be too close to romantic partners.
- ___ 24. If I can't get my partner to show interest in me, I get upset or angry.
- ___ 25. I tell my partner just about everything.
- ___ 26. I find that my partner(s) don't want to get as close as I would like.
- ___ 27. I usually discuss my problems and concerns with my partner.
- ___ 28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.
- ___ 29. I feel comfortable depending on romantic partners.
- ___ 30. I get frustrated when my partner is not around as much as I would like.
- ___ 31. I don't mind asking romantic partners for comfort, advice, or help.
- ___ 32. I get frustrated if romantic partners are not available when I need them.
- ___ 33. It helps to turn to my romantic partner in times of need.
- ___ 34. When romantic partners disapprove of me, I feel really bad about myself.
- ___ 35. I turn to my partner for many things, including comfort and reassurance.
- ___ 36. I resent it when my partner spends time away from me.

Appendix 2: DEMOGRAPHIC INFORMATION

Please answer the following demographic questions.
Where you are given a choice, please circle your answer.

- | | |
|--|--|
| 1. What is your gender? | Male Female |
| 2. How old are you? | _____ years |
| 3. What year are you? | Senior
Junior
Sophomore
Freshman |
| 4. What is your ethnicity? | Caucasian
Latino/Latina
African American
American Asian
Native American
Other- please specify:
_____ |
| 5. What is your major? | _____ |
| 6. What is your mother's level of education? | No High School graduation
High School graduation
Some College courses
College graduation
Graduate degree |
| 7. What is your father's level of education? | No High School graduation
High School graduation
Some College courses
College graduation
Graduate degree |
| 11. What is your marital status? | Married
Single
Divorced
In a committed monogamous relationship |

Appendix 3: EXPLICIT ATTITUDES AND IDENTIFICATION

1	2	3	4	5	6	7
Strongly						Strongly
Disagree						Agree

Explicit Group Attitudes:

I like the Orange Group
 I like the Green Group
 The Orange Group is good
 The Green Group is good

Explicit Group Identification:

I feel attached to the Orange Group
 I feel attached to the Green Group
 I identify with the Orange Group
 I identify with the Green Group

Appendix 4: POSITIVE AND NEGATIVE WORDS USED IN IMPLICIT ASSOCIATION
TEST

Positive Words:

Rainbow

Gift

Paradise

Laughter

Peace

Freedom

Pleasure

Sunrise

Health

Love

Negative Words:

Filth

Stink

Vomit

Rotten

Evil

Agony

Cancer

Hatred

Death

Murder

Appendix 5: VISUALIZATION PRIMES

SECURE BASE PRIME:

"Imagine yourself in a problematic situation that you cannot solve on your own, and imagine that you are surrounded by people who are sensitive and responsive to your distress. They want to help you only because they love you, and they set aside other activities in order to assist you."

POSITIVE AFFECT PRIME:

"Imagine yourself receiving notification that you have won a large amount of money in the national lottery, and imagine other students in your class hearing about this notice, approaching you, congratulating you, and telling others about your good fortune."

NEUTRAL CONDITION PRIME:

"Imagine yourself going to a grocery store and buying products you need for your house, and imagine other people are there who are also buying products, talking among themselves about daily issues, examining new brands, and comparing different products."