CULTURE AND DETECTION OF PATERNAL INVESTMENT
THROUGH FACIAL CUES

A thesis submitted in partial fulfillment of the requirements
For the degree of Master of Arts in Psychology
in General-Experimental

By
Donna Tadle

May 2012
The thesis of Donna Tadle is approved:

__________________________________________  _________________________
Debbie Ma, Ph.D.                               Date

__________________________________________  _________________________
Que-Lam Huynh, Ph.D.                           Date

__________________________________________  _________________________
Sun-Mee Kang, Ph.D., Chair                     Date

California State University, Northridge
ACKNOWLEDGMENT

I would like to thank my committee members who supported my efforts in undertaking this thesis. Without your assistance, guidance, and support, this thesis would not have been the product it is today.

To my chair, Dr. Kang, I am so grateful for your mentorship throughout this entire process, from the formulation of this thesis to its completion. Thank you for your patience as I learned more about the research and writing process. Your constant support, feedback, and encouragement have taught me to work hard with dedication and perseverance, and I truly appreciate all your help with this project as well as my personal endeavors.

To Dr. Huynh, thank you for reading my thesis and providing your suggestions and constructive feedback. Your friendly advice and encouragement has given me more confidence in presenting this project.

To Dr. Ma, thank you for your feedback as well, especially for data analyses and presentation of my hypotheses. Your suggestions have helped strengthen my ideas and have guided me in taking different approaches toward this topic.

I would like to thank the members of the Emotion, Culture, and Social Adaptation Lab. They have been valuable members of my research team, and I thank them for their help in leading experiments and entering data.

Lastly, I would like to thank Emily Wu Hsuan Shih for her friendship, support, and collaboration from the early stages of this project and throughout my graduate career at CSUN. Sharing this process with you has given me the courage to push through and succeed. Thank you, and congratulations on your hard-earned achievement.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature Page</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgment</td>
<td>iii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vi</td>
</tr>
<tr>
<td>Abstract</td>
<td>vii</td>
</tr>
<tr>
<td>SECTION I – INTRODUCTION</td>
<td></td>
</tr>
<tr>
<td>Nonverbal Cues of Paternal Investment</td>
<td>1</td>
</tr>
<tr>
<td>The Emergence of an In-Group Advantage</td>
<td>4</td>
</tr>
<tr>
<td>Why the In-Group Advantage: The Role of Motivation</td>
<td>7</td>
</tr>
<tr>
<td>Detecting Paternal Investment: Another Form of Nonverbal Communication</td>
<td>9</td>
</tr>
<tr>
<td>Factors Influencing African American Females’ Ability to Detect Paternal Cues</td>
<td>10</td>
</tr>
<tr>
<td>Overview of the Current Study</td>
<td>16</td>
</tr>
<tr>
<td>SECTION II – METHOD</td>
<td></td>
</tr>
<tr>
<td>Participants</td>
<td>17</td>
</tr>
<tr>
<td>Materials</td>
<td>17</td>
</tr>
<tr>
<td>Creation of the Photograph Stimuli</td>
<td>17</td>
</tr>
<tr>
<td>Interest in Infants Test (Maestripieri &amp; Pelka, 2002)</td>
<td>19</td>
</tr>
<tr>
<td>Interact with Baby Measure (Maestripieri &amp; Pelka, 2002)</td>
<td>20</td>
</tr>
<tr>
<td>Procedure</td>
<td>20</td>
</tr>
<tr>
<td>SECTION III: RESULTS</td>
<td></td>
</tr>
<tr>
<td>Women’s General Ability to Detect Cues of Paternal Investment</td>
<td>22</td>
</tr>
</tbody>
</table>
Assessing the Presence of an In-Group Advantage

SECTION IV: DISCUSSION

Summary of Results

Limitations of the Current Study

Considerations for Future Studies

Conclusion

REFERENCES

APPENDIX

Appendix A: Images from the Interest in Infants Measure

Appendix B: Interest in Infants Measure Answer Sheet

Appendix C: Adult/Infant Questionnaire (Interact with Baby Measure)

Appendix D: Rating Questionnaire for Female Raters

Appendix E: Rating Questionnaire for Independent Female Raters
LIST OF TABLES

Table 1 – Intercorrelations among the Main Variables 50

Table 2 – Correlations among Average Ratings of “Likes Children” and the Interact with Baby (IWB) Measure by Female Rater Ethnicity 50

Table 3 – Mean IWB Z-Score Differences Based on Female Rater and Male Sender Ethnicity 50
ABSTRACT

CULTURE AND DETECTION OF PATERNAL INVESTMENT THROUGH FACIAL CUES

By

Donna Tadle

Master of Arts in Psychology in General-Experimental

This study examined whether the “in-group advantage” (Elfenbein & Ambady, 2002a) exists in Caucasian American and African American women’s ability to detect cues of paternal investment from photographs of males with neutral facial expressions (Roney, 2006). It was hypothesized that 1) females would display a general ability to detect cues of paternal investment from photographs of neutral male faces and 2) Caucasian American females would more accurately predict interest in infants of males in their own respective ethnic group, thus displaying the in-group advantage. The third hypothesis took a bidirectional approach, proposing that either 1) African American females, as opposed to Caucasian American females, would display this ability to a higher degree, or 2) African American females would be less accurate at determining interest in infants in either of these groups, including their own. Sixty-two Caucasian American females and 51 African American females served as judges in the study. They viewed one of two versions of a PowerPoint presentation wherein 15 Caucasian
American and 15 African American male photographs were presented in succession and were asked to rate each target in terms of his affinity for children. Average judge ratings were correlated with targets’ scores on a measure of affinity for children (Maestripieri & Pelka, 2002) to assess the accuracy of judges’ ratings. The results of the current study did not support either hypothesis. The absence of significant findings was attributed mainly to methodological differences between this study and that of Roney et al. (2006).
INTRODUCTION

The main objective of this study is to replicate and expand Roney and colleagues’ study (2006) by applying it to a cross-cultural setting with two different cultural groups. In their study, it was found that females have the general ability to detect cues of paternal investment from photographs of males assuming a neutral facial expression. In the current study, it is investigated whether an “in-group advantage” (Elfenbein & Ambady, 2002a) exists in this detection of paternal investment with two distinct ethnic as well as cultural groups: Caucasian American and African American. Of particular interest is the African American ethnic group because this group has a unique profile in terms of representation in the marriage market and a distinct perception by other and cultural groups.

The question of whether an in-group advantage exists in women’s detection of paternal quality may rise from the perceived effects that mate availability has on their ability to select mates. Depending on the availability of mates from which to choose from, females may be given fewer opportunities to successfully choose a male who will invest in their offspring. How this and related factors may influence women’s ability to detect paternal quality are discussed and serve as the basis of this study’s main hypotheses.

Nonverbal Cues of Paternal Investment

A recent study by Roney and colleagues (2006) has found that women can track possible cues of paternal investment in men from photographs of neutral faces. By using men’s scores on an interest in infants test as an indicator of paternal quality (Maestripieri & Pelka, 2002), they found that female perceivers accurately and reliably judged these
men’s affinity for children by simply looking at their photographs in which they assumed a neutral facial expression. Though the exact process of how this can be achieved is not well understood, it seems that women can pick up on subtle cues indicating paternal investment in a male’s neutral facial expression.

Finding this ability in women is not surprising, considering that they would be both naturally and socially motivated to detect such cues when selecting for potential mates. After all, unlike many other mammals, human males provide some direct investment in their offspring, and as found in pre-industrial societies, this investment greatly increases child survival (Clutton-Brock, 1989, 1991; Hurtado & Hill, 1992). In modern, more developed societies where infant mortality is lower, paternal investment beyond physical protection and resource providing can be seen in other aspects of offspring survival and success; a male’s investment in his children may improve their psychological well-being and future cultural success and social competitiveness (Geary, 2000). On the female’s part, a woman in the current age must assess a potential mate’s “reproductive potential,” or the heritable, material, and/or social resources he can invest in their progeny, as well as his “reproductive investment,” or the actual use of these resources, in order to determine whether he would be a successful father in helping to raise their offspring (Geary, Vigil, & Byrd-Craven, 2004). Therefore, it is just as advantageous now for modern women as it was for ancestral women to select mates that are likely to provide strong investment in offspring.

Although Roney et al.’s (2006) study provided great insight on women’s general ability to detect cues of potential paternal investment, it leaves the question of whether the level of sensitivity to these cues is the same for all women. This question could then
consider ethnic and/or cultural influences that may have an effect on a woman’s ability to detect such cues. This has strong implications for an increasingly multicultural global society, where modern women must not only compete for mates with women from their own region and ethnic group, but a larger number of women from a variety of other ethnic groups as well. Women provide more parental investment in their offspring than men and experience greater reproductive cost in having children, making them more competitive with each other for mates, especially when well-resourced men (typically viewed as successful marriage partners and fathers) are in short supply (Campbell, 2004; Geary, Vigil, & Byrd-Craven, 2004). Thus it would be beneficial for a woman seeking a mate to have an advantage in competing within and choosing from a particular social niche such as an ethnic in-group.

Though we live in a more inclusive world culture, we still tend to identify with and gravitate toward meaningful in-groups, which provide a sense of loyalty, conformity, security, and cooperation, and hold certain collective goals and concerns (Brewer, 2007). This preference and positivity for one’s in-group can already be seen in young children (Bennett, Sani, Lyons, & Barrett, 1998; Enesco, Lago, Purificacion, & Guerrero, 2011). By identifying with an in-group, people achieve a level of “optimal distinctiveness,” wherein the group identification satisfies the counterbalancing needs for assimilation and inclusion as well as differentiation from others. Having an in-group bias also serves self-esteem needs as well as the need for cognitive closure, such as the need for self-enhancement or social consensus (Shah, Kruglanski, & Thompson, 1998). By gravitating toward her ethnic in-group, a woman would be more likely to be in contact with men who share common ideas and values, which would facilitate her ability to choose quality
mates from a pool of men who are already predisposed to be interested in her because of her in-group status. Therefore, it would be interesting to see whether women experience any special ability or advantage in detecting cues of paternal investment in men from a particular group, such as their ethnic in-group. Such a finding would have many implications for relationships and interactions among men and women living in multicultural societies.

**The Emergence of an In-Group Advantage**

The ability to recognize and distinguish faces seems to develop at an early age for humans, and even signs of preferences for faces from one’s racial or ethnic in-group are found (Kelly et al., 2005; Pezdek, Blandon-Gitlin, & Barrett, 1998; Sangrigali & de Schonen, 2004). Studies by Sangrigali and Schonen (2004) and Kelly et al. (2005) have shown that infants at the age of three months already show preferences for faces from their own ethnic group, and even better recognition of such faces. Further, the inability to find these behaviors in newborns suggests that these preferences and ability to differentiate among faces of different ethnic groups are developed through a child’s experience, i.e., how much exposure a child has had to faces of a particular ethnic group (such as that of his or her parents). These tendencies then continue to develop as a child gains more experience with such faces. For example, Pezdek, Blandon-Gitlin, and Barrett (1998) found that Caucasian American and African American kindergartners, third graders, and adults had better face recognition memory for faces from their own racial group, with this ability being better with age. Thus, children learn to distinguish faces from their racial and ethnic in-group from frequent exposure to such faces, and this ability becomes more refined with age and experience.
Stemming from the ability to recognize different faces, the ability to recognize different facial expressions is a useful skill in communication, especially when formal language is not available or has not been learned. This ability can be found not only in humans, but other primates as well. For instance, rhesus monkeys have been shown to differentiate between familiar and novel images of facial expressions posed by other rhesus monkeys (Gothard, Erickson, & Amaral, 2004; Parr & Heintz, 2009). In addition, chimpanzees seem to process and distinguish chimpanzee facial expressions in the same manner as humans with human expressions (Parr, Waller, & Heintz, 2008). In Parr and Heintz’s (2009) study, chimpanzees were able to discriminate among different chimpanzee expressions by focusing on unique features among the faces that were otherwise identical. As with humans processing human faces, it was found that both configuration of the face and component movements were essential for the chimpanzees to be able to process and differentiate among the facial expressions. Interestingly, a lot of focus was placed on the mouth and lower face, as chimpanzees have fewer upper face movements than humans.

For humans, who have the ability to form a wider range of facial expressions, the ability to distinguish among them can be seen at a young age. Infants aged as young as three months have been found to discriminate among facial expressions of emotions such as happiness and anger, and even recognize the meanings associated with them (Barrera & Maurer, 1981; Montague & Walker-Andrews, 2001). Furthermore, this ability can be generalized to strangers (e.g., experimenters), though in Walker-Andrews et al.’s (2011) study, this was only the case when the expressions were first familiarized with those of a parent (Nelson & Dolgin, 1985). That being the case, it may be that our ability to
recognize facial expressions stems from our familiarity with different expressions during childhood – we first learn the expressions and their meanings from parents and family members before generalizing to others. It may not necessarily be the actual faces, but the expressions as well as norms of expressing emotions that differ within our culture and help us to develop such skills in recognition.

In general, emotional facial expressions have been found to be accurately identified across cultures, but there appears to be an in-group advantage in emotion recognition in which the identification of an emotion is generally more accurate when the individual expressing the emotion (the sender) and the individual interpreting the expression (the perceiver) belong to the same national, regional, or cultural group (e.g., Gray, Mendes, & Denny-Brown, 2008; Marsh, Elfenbein, & Ambady, 2003; Matsumoto, 1989; Wickline, Bailey, & Nowicki, 2009). One possible explanation for the existence of this advantage is the presence of “nonverbal accents” in facial expressions of emotion among cultures, which result in cultural differences in emotional expression and its identification beyond static characteristics such as the physical configuration of facial features (Marsh, Elfenbein, & Ambady, 2003). Each culture has its own manner of expressing different emotions through subtle nonverbal cues in facial display, and by learning and becoming familiar with these cues, a perceiver can recognize expressions of members from his or her culture easier than those from other cultures (Elfenbein & Ambady, 2002b).

Several studies have explored this possibility and have found evidence supporting this notion (e.g., Dailey et al., 2010; Elfenbein, Beaupre, Levesque, & Hess, 2007; Marsh, Elfenbein & Ambady, 2003; Wickline, Bailey, & Nowicki, 2009). For example,
Japanese students reared in Japan were found to be more accurate at identifying Japanese-style emotional expressions than American-style expressions, even when both styles were expressed by Japanese senders (Dailey et al., 2010). In a similar fashion, African American, European American, and European international students, who typically have more exposure to and familiarity with American culture, were found to be more accurate than African international students at interpreting emotions from American-style facial expressions (Wickline, Bailey, & Nowicki, 2009).

For those who have more exposure to members of ethnicities other than their own (such as people living in the U.S.), a different cognitive process seems to be used when recognizing faces of unfamiliar out-groups (Maclin et al., 2004). This notion is further supported by the Iidaka et al.’s (2008) finding that the same areas of the brain were activated in Japanese participants when judging the affect of neutrality or happiness in Japanese and other Asian faces, but not Caucasian faces. This in-group advantage in emotion recognition suggests that although emotional expressions may serve as a universal form of communication, there exist cultural accents and culturally specific emotional behavior that enable an in-group advantage in emotion recognition via facial cues (Elfbenbein & Ambady 2002a; Elfbenbein & Ambady, 2003a).

**Why the In-Group Advantage: The Role of Motivation**

After finding the in-group advantage in emotion recognition with mere social category distinctions, Young and Hugenberg (2010) suggested that motivation was a possible influence on the in-group advantage in emotion recognition. In their study, participants were divided into two arbitrary social groups – the “Red” group and the “Green” group – based on bogus feedback from a personality questionnaire they had
completed. Holding sender race and culture constant, it was found that expressions of color in-group members were more reliably and accurately recognized than those of the color out-group. Results showed that when a perceiver viewed a sender as a member of their same color group (their in-group), they were more motivated to better analyze their emotional expression and in turn used a different processing technique (in this case, holistic encoding in facial processing) for the expression itself. In other words, participants exerted more time and effort into encoding the emotional expressions of those they perceived as members of their in-group. Similar findings resulted when other minimal social categories such as university affiliation were used, and when race and culture were held constant (Hugenberg & Corneille, 2009; Bernstein, Young, & Hugenberg, 2007). Thus, the in-group advantage in emotion recognition depends on the kinds of groups present, the salience of that group (which is dependent on contextual cues), and as mentioned earlier, experience discriminating among faces one has been exposed to in the past (Hugenberg, K., Young, S.G., Bernstein M.J., & Sacco, D.F., 2010). Taking those factors into consideration, a perceiver may or may not be motivated to utilize certain processing abilities when judging faces and their emotions.

It makes sense then that the ability to better recognize facial expressions from one’s in-group relates to the basis of the perceiver’s social categorization scheme. Elfenbein and Ambady (2003b) found that cultural familiarity is related to the accuracy of emotion recognition within and across cultures. Increased exposure to other cultures was associated with a decrease in the in-group advantage, suggesting that learning of different emotional “dialects” can overcome cultural barriers in emotion recognition and the ethnic bias. Matsumoto (1992) also suggested that people from more heterogeneous
and/or individualistic cultures exhibit less ethnic bias as a result of more frequent practice in interpreting emotions of senders from different cultures. Thus one’s culture influences motivation and emotion recognition in terms of cultural variations of emotional display, rather than the simple identification or label of the culture itself (Elfenbein & Ambady, 2002b).

This has strong implications for multicultural societies, where different ethnicities and cultures are frequently encountered, and what defines a particular group can differ among persons, settings, and situations, as in Young and Hugenberg’s (2010) study. It can be said then that one’s perceived social categorization, resulting from ethnic familiarity and identification, influences motivation, which influences the strategy used and ability to accurately identify emotional expression. With understanding of the culture-specific differences in facial gestures and with enough motivation to attend to in-group expressions, emotion recognition within cultures is facilitated.

**Detecting Paternal Investment: Another Form of Nonverbal Communication**

Emotion recognition via facial expressions may not be the only form of nonverbal cue detection in which a perceiver may be motivated to use different processing styles or accurately judge some characteristic of a sender. For example, altruism, which is more of an abstract and internal characteristic than an emotion which can be expressed externally, has been shown to be detected from judgment of sender faces (Brown, Palameta, & Moore, 2003). Other information, such as intergroup anxiety has also been found to be picked up on when watching race-matched and mismatched interviews, and in this particular case an in-group advantage has been found in recognizing intergroup anxiety (Gray, Mendes, & Denny-Brown, 2008). Such findings suggest that nonverbal cues other
than explicit emotional expressions can be detected by perceivers, and thus serve as a motivation to pursue the current study. Much like emotion recognition can be one form of nonverbal communication using facial cues, detecting paternal quality via facial cues can be another form of nonverbal communication.

The current study is being conducted to replicate and expand Roney and colleagues’ study (2006) by adding a cultural component and investigating whether an in-group advantage exists in the detection of paternal investment. Seeking to replicate the findings of Roney’s (2006) study, this study’s first hypothesis posits that the general ability of women to detect these cues is present. By studying females from two distinct ethnic groups (Caucasian American and African American), this study also seeks whether the degree to which women can detect cues of paternal investment differs according to ethnicity. Specifically, the second hypothesis posits that the level of accuracy differs according to ethnicity, and investigates whether African American females possess a similar degree of accuracy as Caucasian American females when detecting cues from in-group males.

**Factors Influencing African American Females’ Ability to Detect Paternal Cues**

African American females’ ability to better detect cues of paternal investment from African American males (as opposed to males of other cultures or ethnicities) can be assessed in terms of mate availability. One would imagine that the availability of eligible mates would have an effect on the available choices of paternally-investing males and a woman’s ability to use her skills in detecting cues of paternal investment – in other words, her ability to be “picky.” Compared to Caucasian women, African American women have been exposed to a unique situation for the past forty years. There has been a
severe imbalance in gender ratio among African Americans who are eligible for marriage, mainly due to high incarceration rates among African American men (Charles & Luoh, 2010).

Male incarceration, and in turn the availability of potential mates, has its effects not only on women’s choices of potential paternally-investing mates, but also on male employment and in turn their ability to provide for their offspring, and these effects can especially be seen in the African American community. Based on recent data, African American males have the highest incarceration rates, with about 4,749 African Americans held in custody in state or federal prisons or in local jails per 100,000 U.S. residents in 2009 (U.S. Bureau of Justice Statistics, 2010). It can also be seen that African American males have been increasing in their incarceration rates over the last few decades, while Caucasian American incarceration rates have more or less stabilized (Holzner, Offner, & Sorensen, 2005).

In their analysis, Holzner, Offner, and Sorensen (2005) examined the continuous decline in employment and labor force participation of less-educated African American men aged 16 to 34 from 1979 to 2000, and its relationship to their incarceration rates. What they found was that African Americans experienced a decline in employment and a steep upward trend in incarceration over this period, and that their employment rates were consistently lower and incarceration rates were consistently higher than those of Caucasian Americans, whose rates began to stabilize during the 90s. Furthermore, their findings supported the notion that previous incarceration limits employment opportunities and activity. This would suggest that a large number of African Americans males, who have the highest incarceration rates and the highest unemployment rates, have limited
opportunities to work and in turn provide the financial and material resources for potential offspring. Thus, high incarceration rates put a strain not only on the number of available African American males, but the number of available African American males with the means to provide for a family.

High African American incarceration also has a large impact on African American marriage rates, reproductive strategies, and family structure (Fosset & Kiecolt, 1993; Geary, Vigil, & Byrd-Craven, 2004). The resulting limited mate availability leads to an imbalanced African American operational sex ratio, or OSR (the proportion of marriage-age men to marriage-age women in the local population), where any imbalance affects how males and females select mates and how families are formed and function. In this instance, having African American females looking to marry outnumber African American males available to marry allows the males to pursue their reproductive preferences (i.e., having more partners and fathering more children) and allows them to possess lower levels of paternal investment. In addition, this type of ratio for African Americans results in their high divorce rates, increased out-of-wedlock births, and more families headed by single African American women. For example, from the 1970s to the early 1990s – around the same time frame studied by Holzner, Offner, and Sorensen (2005) – the African American divorce rate was consistently increasing and consistently higher than that of the Caucasian American population, whose divorce and separation rates were roughly constant (Sweeney & Phillips, 2004).

Not only was African American male unemployment high, but so was African American marital disruption. In addition, African Americans have the highest rate of never-married persons, due to factors such as high male incarceration, high
unemployment, and an increase in cohabitation among couples (Chambers & Kravity, 2011). Mass incarceration of African American males seems then to remove men from the marriage market and decrease their ability to commit to and provide in a marriage and a family, leaving a limited number of eligible and paternally-investing males for African American females from which to choose. That being the case, if African American women are not marrying and not having a paternally investing man in the lives of their children, there may be pressure to be “picky” when it comes to potential African American mates. The smaller pool of desirable potential mates would then bolster the need and ability to detect cues of paternal investment in males since an African American woman (as opposed to a woman of another ethnic group) is more likely to be the only one providing for her offspring.

Alternatively, other unique sociocultural factors may actually override an African American female’s biological predisposition to accurately detect cues of paternal investment and thus hinder her ability to display the in-group advantage. For African American females, it may be a matter of that they cannot be picky when choosing a mate. African Americans, as found in previous studies, have the lowest rates of interracial marriage when compared to other racial minorities, with males more likely to interracially marry than females (Batson, Qian, & Lichter, 2006). According to a report by the Pew Research Center (2010), a survey of African American, Hispanic American, Asian American, and White Americans asking their feelings on intermarriage in their family showed that openness to a family member marrying an African American ranked the lowest, though African Americans were the most accepting of intermarriage. It was also reported that 22% of all African American male newlyweds in 2008 married outside
of their race, with only 9% of African American female newlyweds marrying outside of their race. In comparison, Caucasian Americans and Hispanic Americans showed no such gender differences in interracial marriage trends.

These data suggest that it is not a matter of African American females not wanting to marry outside of their race, but that it is difficult for them to do so. With the unpopularity of African Americans as mates in general and more African American men marrying outside of their race, this puts African American women at a disadvantage when it comes to finding a desired mate. The growing trend for African American males to venture outside their group for marriage partners, added on to the already limited number of available African American males, makes it more difficult for African American females to be selective of mates, especially when it comes to selecting for specific characteristics as paternal quality.

Several studies (though completed on online data) have attempted to examine the dating practices of different ethnic groups, and have found African American females to be the least popular mate choice (e.g., Robnett & Feliciano, 2011; Rudder, 2009). Robnett and Feliciano (2011) used data from 6,070 Yahoo Personals dating profiles of males and females claiming African American, White, Asian, or Hispanic ethnicity, and found that African American females (as well as Asian men) were more open to dating other ethnicities than other ethnicities were to dating them. It was also found that all men, with the exception of African American men, exclude African American females as dating partners in general.

Another analysis of internet dating data, conducted by an analyst and blogger for the online dating site OKCupid (Rudder, 2009), looked at the messaging trends of the
site’s users, particularly in terms of first-contact attempts and subsequent responses. It was found that although African American females reply to first-contact attempts the most, all men (regardless of race) write back to African American females the least. Even as a dating partner, African American females are the least popular choice, as they are generally excluded by all races as potential mates in the online dating world. They are less willing to date outside of their race than their male counterparts, who have been found to be more willing to interracially date if they were interested in having children (Wilson, McIntosh, & Insana II, 2007). With that being the case, even if an African American female found a male in which to date and potentially have a child with, they would either not be interested in dating her (if they were of a racial out-group) or would be more likely to date someone of another race if they had a high affinity for children (if they were of her racial in-group).

African American women would thus have fewer opportunities to assess their potential mates for paternal qualities, even from within their racial in-group; in this sense, may not be up to them to choose their mates, but for their potential mates to choose them. With little room to be selective of their mates, African American females may be more likely to accept mates who may or may not be the ideal candidate when it comes to paternal investment in offspring, which would make the ability to detect cues of paternal investment unnecessary if it does not help them get the “ideal” mate in the end.

In summary, the ability of African American females to successfully detect cues of paternal quality in males, particularly from their cultural in-group, may be influenced by factors dealing with mate availability and their desirability as mates for the opposite sex. For the past 40 years in the U.S., more African American males have been
incarcerated than any other race, particularly for males in the 18-49 age range (Oliver, 2001; U.S. Bureau of Justice Statistics, 2001, 2010). With such high African American male imprisonment, the likelihood of marriage for African American females decreases, as does spousal quality because a) there are fewer available males from which to select, and b) it is more beneficial for men to have several mates, therefore decreasing the amount of investment per offspring (Charles & Luoh, 2010). This limited mate pool and reduced commitment in African American males may pressure African American females to be more selective of their mates, and in turn heighten the accuracy of African American females, as opposed to other cultural groups, to detect paternal quality. In contrast, African American females tend to be the least popular mate choice for males, regardless of race, and this may compound their problem of finding a desired mate from an already limited mate pool, disabling them from effectively using the ability to detect cues of paternal investment from within their in-group.

This uninvestigated cultural factor thus provides the basis for the current study. The first hypothesis posits that females will display a general ability to detect cues of paternal investment from photographs of neutral male faces. The second hypothesis posits that Caucasian American females will more accurately predict interest in infants of males in their own respective ethnic group, thus displaying the in-group advantage. Lastly, the third hypothesis takes a bidirectional approach, proposing that either 1) African American females, as opposed to Caucasian American females, will display this ability to a higher degree, or 2) African American females will be less accurate at determining interest in infants in either of these groups, including their own.

**Overview of the Current Study**
In order to examine whether a cultural in-group advantage exists in detecting cues of paternal investment from photographs of neutral faces, Caucasian American and African American students were chosen to participate. To develop the male photograph stimuli that were judged by female participants ("raters"), an initial study (Phase 1) was conducted in which male participants ("senders") had their photograph taken while assuming a neutral facial expression. In addition, they were asked to complete two written measures as well as an interest in infants measure (see below). In Phase 2 of the study, female raters viewed these photographs and rated each male face on the degree to which they are kind and the degree to which they like children.

METHOD

Participants

One hundred thirteen female participants ranging in age from 18 to 27 (M = 19.17, SD = 1.59) were recruited from the Human Subject Pool in the Psychology department at California State University, Northridge. Sixty-two Caucasian American females aged 18 to 27 (M = 19.23, SD = 1.89) served as judges, with 34 females (M = 19.39, SD = 2.15) viewing stimulus PowerPoint 1 and 28 females (M = 19.03, SD = 1.55) viewing stimulus PowerPoint 2. Fifty-one African American females aged 18 to 22 (M = 19.12, SD = 1.14) also served as judges, with 28 females (M = 19.18, SD = 1.22) viewing stimulus PowerPoint 1 and 23 females (M = 19.04, SD = 1.07) viewing stimulus PowerPoint 2.

Materials

Creation of the Photograph Stimuli. Eighty-seven male participants aged 18 to 30 (M = 19.45, SD = 2.32) were recruited from the Human Subject Pool in the
Psychology department at California State University, Northridge. In order to assess the presence of an in-group advantage in assessing paternal investment from male photographs, Caucasian American and African American students were selected to be senders in the study. The Caucasian American sample consisted of 42 males ($M = 19.77$, $SD = 2.70$) and the African American sample consisted of 45 males ($M = 19.18$, $SD = 1.94$). Male participants were invited to a 30 minute one-on-one individual session with the experimenter, where they were first informed that the study was simply to assess ethnic differences in facial cue detection in order to understand their feelings and interactions with others. They were then seated in a chair situated in a set location against a wall, where a gray poster board was placed. The experimenter then instructed them to look directly at the camera, which was placed in a standardized position directly in front of them, and to assume a neutral facial expression when the photograph was being taken. Afterward, they were given the interest in infants measure followed by adult/infant questionnaire (discussed below) and a demographic questionnaire.

Each male participant had his photograph taken with a digital camera placed at a uniform distance of about three and a half feet from where he was seated; attached to the wall directly behind him was a gray poster board which was used to prevent any glare from the lighting or camera flash. Before their photograph was taken, they were instructed to look toward the camera while assuming a neutral facial expression. Adobe Photoshop was then used to correct for any red-eye present in a photograph and to crop each photograph in order to standardize the appearance of all male photographs; each photograph was placed on a black background and an oval placed over the photograph which covered the appearance of the neck, clothing, and hairstyle. The edited
photographs were then randomly ordered and used to create one of two versions of a stimulus PowerPoint presentation. Each version contained 15 male photographs representing each of the two ethnic groups, for a total of 30 photographs per version. Twenty-seven of the total 87 photographs were thus not used in the stimuli; the senders in the photos did not meet the ethnicity requirement (e.g., were Middle Eastern, did not specify their ethnicity), did not complete all of the written measures, indicated themselves as being homosexual, or did not consent to the use of their photograph in the study. Some of the photos were also excluded due to low quality (e.g., blurry, low lit).

**Interest in Infants Test (Maestripieri & Pelka, 2002).** Males were also given an interest in infants measure, as in Roney et al. (2006 – see Appendix A for examples of images). Their affinity for children was assessed with a visual preference test in which they were given a packet containing 20 pairs of images (one pair per page) and asked which image in each pair they preferred. An answer sheet was provided to mark their preference by checking the corresponding box for each image (see Appendix B). The first 10 pairs depicted silhouettes: the first five pairs contained silhouettes of adult humans (3 male, 2 female) matched with corresponding human infant silhouettes. The next five pairs contained silhouettes of adult animals matched with corresponding animal infant silhouettes. The second 10 pairs contained color photographs: the first five pairs of this set contained color photographs of adult animals matched with corresponding infant animals. The next five pairs contained photographs of adult humans (3 male, 2 female) matched with five infant equivalents. All adult and infant images were alternated for left and right placement to ensure a balanced design. These photographs were obtained from private collections, magazine ads, or the Internet and were edited to be the same size.
They depicted neutral expressions and were rated as very attractive by an independent observer. Lastly, all faces were of Caucasian adults and infants.

**Interact with Baby Measure (Maestripieri & Pelka, 2002).** An additional written measure assessing interest in infants (the adult/infant questionnaire) was administered (see Appendix C). The first section asked two questions that participants responded to by indicating why they chose the photographs/silhouettes that they did in the interest in infants measure. The next section consisted of 10 hypothetical situations involving a baby, and participants were to circle a “true” or “false” response to indicate whether they would act in the manner that was described. For example, one hypothetical situation listed stated that if the participant was at a party and there was a baby in the room that they did not know, they would ask to hold the baby. If that action described something the participant would do in that situation, they would circle “true.” This section of the questionnaire is thus referred to as the Interact with Baby (IWB) measure.

**Procedure**

Female raters were invited to group sessions consisting of eight females from the same ethnic group. Sessions were conducted in this manner in order to maximize the amount of data collected in every 30 minute session, under the assumption that the ability to detect cues of paternal investment has been acquired through females’ evolutionary history and can thus be generalized to various settings. They viewed one of the two versions of the PowerPoint presentations (which were randomly assigned per experimental session) on a projector screen and completed the photograph rating measure. Each PowerPoint presentation showed each set of 30 photographs, displaying each photograph for 15 seconds before advancing to a two-second slide advising raters to
prepare for the next photograph, which was displayed for another 15 seconds. This was the nature of the entire presentation.

Female raters were asked to complete a questionnaire packet in which they rated each of the 30 photographs that they viewed on different characteristics (see Appendix D). The first section of the measure instructed them to rate each photograph relative to other young adult men on a scale of 1-7, where 1 was far below average and 7 was far above average. The traits rated on (and reviewed in this study) were “kind” and “likes children.” Before each rating section, they were given a practice session in which they rated two different practice photos. Similar to what was done in Roney et al. (2006), an additional measure was employed wherein independent female raters (five Caucasian American and five African American, $M = 22.3, SD = 5.77$) assessed the degree of positive expression in the men’s faces, with the addition of three other traits: babyfaceness, threat, and healthiness (see Appendix E).

**RESULTS**

Similar to what Roney and colleagues (2006) found, internal reliability for infants chosen from the animal stimuli in the interest in infants measure was low (for silhouettes, $\alpha = .44$; for photos, $\alpha = .33$; for all animal stimuli combined, $\alpha = .49$). For the human stimuli, reliability was relatively higher, though not high enough to indicate an adequate internal consistency (for silhouettes, $\alpha = .57$; for photos, $\alpha = .49$; for all human stimuli combined, $\alpha = .62$). As for the 10 true/false items of the IWB portion of the adult/infant questionnaire, its reliability was modest but acceptable ($\alpha = .70$). Furthermore, the IWB measure had a negative, though non-significant, correlation with the human portion of the interest in infants measure ($r = -.15, n = 60, p = .253$). With the lack of a significant
correlation between the interest in infants measure and IWB measure, the IWB measure was chosen to be the indicator for male affinity for children in this study because its reliability was higher and the males’ responses as to why they chose the images that they did in the interest in infants measure did not all relate to any preference for infants. For example, many responses discussed a preference for certain images because of their level of detail or use of certain colors. Therefore, the 10 pairs of human stimuli were used only to assess whether the results of the current study replicate Roney et al.’s (2006) findings.

**Women’s General Ability to Detect Cues of Paternal Investment**

As with Roney et al. (2006), women’s overall accuracy in judging males’ affinity for children was analyzed using ratings averaged over the female raters’ scores. In addition, these ratings were averaged over both versions of the presentation, which showed no significant difference from each other in terms of “likes children” ratings ($t = 1.14, df = 58, p = .259$). The female raters’ average ratings of the degree to which the men like children showed a significant negative correlation with men’s scores the interest in infants measure ($r = -.36, n = 60, p = .005$), which is contrary to Roney et al.’s findings that indicated a significant positive correlation of about the same magnitude ($r = .38, n = 39, p = .039$). Females’ ratings, in addition, did not significantly correlate with men’s scores on the IWB measure ($r = .19, n = 60, p = .155$).

The female raters’ mean “kind” ratings were also correlated with men’s scores on the IWB measure (which, of the two measures, had greater internal reliability). The mean “kind” ratings shared a marginally significant positive correlation with the IWB scores ($r = .25, n = 60, p = .052$). They also strongly correlated with women’s average ratings of “likes children” ($r = .95, n = 60, p < .001$). The association between the “kind” ratings
and scores on the IWB measure changed little after controlling for mean “likes children” ratings (partial $r = .24$, $n = 60$, $p = .062$). As for the association between “likes children” ratings and scores on the IWB measure, no change in significance occurred after controlling for mean “kind” ratings (partial $r = -.18$, $n = 60$, $p = .185$).

As for the independent raters, their mean ratings of degree of emotion expression as well as level of babyfaceness, threat, and health in each man’s face were correlated with men’s scores on the IWB measure. All four traits were significantly related to one another (“threat” held negative correlations with the other traits). Men’s scores on the IWB held no significant correlations with any of the trait ratings. As for the average “likes children” ratings, they were all strongly predicted by the four traits (emotion expression, $r = .77$; babyface, $r = .43$; threat, $r = -.67$; health, $r = .45$; $ns = 60$, $ps < .01$).

**Assessing the Presence of an In-Group Advantage**

The ratings of “likes children” were again averaged over all females, but were used to produce separate averages for either Caucasian American females or African American females. These average ratings were then correlated with men’s scores on the IWB measure (which had the highest reliability). Overall, the correlation between Caucasian American females’ ratings of “likes children” and men’s scores on the IWB measure was marginally significant ($r = .25$, $n = 60$, $p = .052$). However, correlations with either Caucasian American or African American males’ scores on the measure were not (for Caucasian American males, $r = .25$, $n = 30$, $p = .175$; for African American males, $r = .23$, $n = 30$, $p = .222$). For African American females, the correlation of their ratings with men’s IWB scores was much lower, and the correlation was not significant ($r = .08$, $n = 60$, $p = .532$). The correlations between their ratings and either Caucasian
American or African American males’ scores were also not significant (for Caucasian American males, $r = -.01, n = 30, p = .976$; for African American males, $r = .16, n = 30, p = .392$). See Table 2 for these values.

These correlations were subsequently converted into z-scores using Fisher’s r to z transformation in order to examine whether correlations between females’ ratings and men’s IWB scores differed significantly for either judge or sender ethnicity. Overall, Caucasian American and African American males were not judged differently by females in general, as the subsequent z-test using the difference between their z-scores resulted in a value within the range of one standard deviation ($z = 0.17$). Looking only at correlations of Caucasian American females’ ratings with men’s scores, it was found that neither ethnicity was judged differently, or in other words, more accurately than the other by Caucasian American female raters ($z = -0.04$). This finding was similar to that of African American females’ ratings of Caucasian American and African American males, respectively ($z = 0.27$).

An additional analysis was conducted wherein each female’s “likes children” rating per male and each male’s IWB score was converted into a z-score. The difference between these two z-scores was then calculated for every female on each of their 30 judgments (for 15 Caucasian American males and 15 African American males). These 30 z-score differences were then averaged for each female rater to provide three values indicating how closely their ratings of “likes children” matched men’s IWB scores overall, for Caucasian American males in general, and for African American males in general. A 2x2 mixed ANOVA was employed, with rater ethnicity as a between-subjects factor and male target ethnicity as a within-subjects factor (since repeated measures were
taken over the two ethnicities of male targets). Results again did not support either hypothesis 1 or 2, as there was no significant effect of female rater ethnicity or male target ethnicity, and no significant interaction. Means are displayed in Table 3.

Lastly, any possible order effects in the presentations were assessed. Averaging the “likes children” ratings for Caucasian American and African American males over both PowerPoints, a possible order effect was observed, as evidenced by a negative correlation between order of presentation and average “likes children” rating ($r = -.393, n = 30, p = .031$). This may be supported by the observation that female raters finished rating each photo in decreasing amounts of time as the presentation progressed.

**DISCUSSION**

**Summary of Results**

Roney et al. (2006), using a visual preference test as a measure of males’ interest in infants, found that women were able to detect cues of paternal investment from looking at photographs of males assuming a neutral facial expression. The current study sought to replicate these findings using the same measure, as well as another tool used to assess males’ interest in infants (the IWB measure, Maestripieri & Pelka, 2002). In addition, this study sought to apply Roney et al.’s study to a cross-cultural setting by assessing whether an in-group advantage (Elfbenbein & Ambady, 2002a) in detecting cues of paternal investment existed for Caucasian American and/or African American individuals.

Employing the same analyses as Roney et al. (2006) to assess whether females could indeed accurately judge males’ affinity for children from simply looking at photographs of their neutral facial expressions, similar results did not emerge, for neither
the interest infants test nor the additional IWB measure. In fact, a significant negative correlation was found between females’ ratings and men’s scores on the interest in infants test, suggesting that the women in general were rating men on the degree to which they like children higher for those who actually scored low on the test, and rating them lower when they actually scored high on the test. This was the only significant relationship in the analyses, and was surprising because it suggests the complete opposite of what Roney and colleagues found. From this result, it suggests that women actually do not have an ability to detect cues of paternal investment from men’s photographs of their neutral faces, and that they are more likely judge them as liking children more when in fact they like them less.

However, it should be pointed out that, unlike in their study, the interest in infants test did not produce reliable scores in terms of the number of infant stimuli endorsed. This was still the case when only the human stimuli were used for analysis, as in Roney et al. The construct validity of the measure may also be questioned, as examination of men’s responses as to why they chose the images that they did revealed that only few men did so because they liked or were interested in infants. In fact, a common response related to them liking the greater detail found in the silhouettes or the color of the photos. Whatever the case may be, the interest in infants test may not have been a good measure of men’s affinity for children as posited (e.g., Maestripieri & Pelka, 2002; Roney et al., 2006). This is supported by the lack of a significant correlation with the IWB measure, which has also been used to assess males’ interest in infants. It is thus difficult to compare the results from this study with those of Roney et al.’s because of the discrepancies in internal consistency of the way male targets completed the measure.
Unfortunately, scores on the IWB measure were not significantly correlated with women’s “likes children” ratings, though they did display an adequate degree of reliability in terms of how males were endorsing infant stimuli. Neither the interest in infants test nor IWB measure showed a correlation with females’ ratings, thus not replication Roney et al.’s findings. The first hypothesis was not supported.

In terms of whether an in-group advantage in females’ ability to detect cues of paternal investment exists, the lack of any significant difference between r-to-z scores from females of either ethnicity with IWB scores of males of either ethnicity suggests that this study could not provide significant support for either the presence or absence of the advantage. Further, the absence of any significant differences in the 2x2 mixed ANOVA using z-score differences between female ratings and men’s scores reiterates this notion.

Despite the inability to replicate Roney et al.’s findings and to find any clear evidence supporting whether the in-group advantage in detecting cues of paternal investment exists, some interesting patterns did appear in the analyses. Based on ratings averaged over all females, the effect of female ethnicity on ratings of “likes children” was found to be marginally significant. Looking at correlations between Caucasian American and African American females’ ratings and men’s IWB scores, there is a noticeable (though not significant) difference between correlations, depending on the raters’ ethnicity. For Caucasian American females, the correlations between their ratings and men’s IWB scores appeared to be similar in magnitude for both Caucasian American and African American men (reinforced by the fact that these correlations were not
significantly different from each other). However, for African American females, there was a difference between the correlation with Caucasian American males ($r = -0.01$) and the correlation with African American males ($r = 0.16$). Though there was a small (though non-significant) correlation for their ratings with African American men’s IWB scores, there was none whatsoever for Caucasian American males. Though based on non-significant differences in the results, this may be some indication that African American females rated males differently, based on the males’ ethnicity. Perhaps with more reliable measures a clearer pattern may arise.

**Limitations of the Current Study**

Perhaps the largest concern with this study lies in its methodology. The failure to replicate Roney et al.’s (2006) results may have to do with having women conduct their ratings in group rather than individual sessions, and presenting the male photo stimuli on a projector screen at set time intervals rather than on personal computer screens which would have allowed raters to advance through photos at their own pace. Though every effort was made to ensure female raters could not see how other female raters were rating the stimuli, simply being in the presence of other females may have influenced how females were rating male targets. For instance, females may have been pressured to conduct their ratings quickly (and thus inaccurately) because the other females may have appeared to be finished with their ratings for a particular photo.

Another concern may be with the setting in which the study took place. It has been found that college females, when assessed with a more explicit measure, identify more with the college education self-concept than the self-concept of motherhood, but when assessed with an implicit measure, identify more with the self-concept of
motherhood than college education (Devos, Diaz, Viera, & Dunn, 2007a). Also, when in the presence of environmental cues related to one of the two concepts (e.g., a college classroom filled with books and computers or a room filled with pictures of children), college females tend to identify more with whatever concept is cued in the environment (Devos, Diaz, Viera, & Dunn, 2007b). It may be that certain features of the study environment primed female raters to adopt certain frames of thinking.

Depending on what elements of the study were salient to each female rater (e.g., having to rate males in terms of how much they like children, or simply participating in a study to gain course credit), she may have judged males from either a mindset of a potential mother or a college student. In addition, this study’s use of group sessions with a PowerPoint presentation projected on a screen may have activated the self-concept of college education more so than motherhood for women because they were surrounded by other students and were placed in a more classroom-oriented environment. In this sense, a college student may not yet be interested in having children or finding a mate with which to have children and would not invest much effort in rating male senders accurately. In contrast, Roney et al.’s (2006) use of individual rating sessions gave women more privacy and time to focus more on the male photographs, thus emphasizing the self-concept of motherhood. With this mindset, female raters would be more likely to look for cues of paternal investment in potential mates.

Lastly, with the significant negative correlation between presentation order and average “likes children” rating, it is speculated how female raters were rating the male targets on the degree to which the males like children. Although raters were instructed to rate the male targets as though they were being compared to other adult men in general, it
may be that females could not “gauge” how to rate the males without seeing the full range of photos first. They were provided with two practice photos to rate before they began rating the 30 photos of interest, but perhaps that number was not enough for them to calibrate their rating criteria. This implies that as women rated more photos, they tended to give them lower ratings. Women may have given males presented earlier “the benefit of the doubt” by rating them higher in regards to the degree to which they like children since they were not aware of the kinds of photos they were going to view.

Considerations for Future Studies

Though no clear evidence was found to support any of the proposed hypotheses, future studies may take into consideration the theoretical and methodological limitations of this study if seeking to further investigate women’s ability to detect cues of paternal investment. More precaution should be taken when designing experimental procedures, such as utilizing individual rating sessions and not putting a time limit on how long females can view photographs. By doing so, one can make a definitive claim as to whether Roney et al.’s (2006) findings can be replicated.

In addition, the results concerning how African American females rated the male photographs could serve as a starting point for future inquiry. African American females may still feel pressured to select good mates from a small pool of eligible males, and a factor such as their own desirability as a mate may also play a role in their mate judgments. African American females have less opportunities to assess their potential mates for paternal qualities, even from within their ethnic in-group; with this in mind, African American females may pay more attention to cues of paternal investment in African American males because they have the highest chances of finding a mate from
this group and are less likely to be rejected as a potential mate as with other ethnic
groups. This notion may be supported by the finding that social rejection leads to
strengthened attachment and identification with a meaningful in-group, such as an ethnic
group (Knowles & Gardner, 2008). However, if the males from which they are choosing
are not interested in investing in children, their ability to accurately detect cues of
paternal investment may still be compromised.

**Conclusion**

This study sought to investigate the presence of an in-group advantage
(Elfbenbein & Ambady, 2002a) in women’s ability to detect cues of paternal investment
in males by simply looking at photographs of their neutral facial expressions. Seeking to
expand Roney et al.’s (2006) study, it was hypothesized that not only would women be
able to accurately detect cues of paternal investment, but the level of accuracy would
differ among certain cultural groups. Based on the unique position African American
females hold in the marriage market, it was thought that the degree to which they could
detect cues of paternal investment would either be greater or less than that of a group
which does not experience the same issues concerning a limited mate pool, reduced
commitment in males, or decreased desirability as mates.

Unfortunately, none of the study’s hypotheses could be supported. Roney et al.’s
findings could not be replicated, and no clear evidence of an in-group advantage for
either Caucasian American or African American females could be found. It is questioned
whether the difference in methodology between Roney et al.’s study and the current study
may be to blame in the case of not finding any significant results. However, some
interesting findings (though non-significant) did suggest a possible difference in rating
pattern based on ethnicity of rater and of sender. By taking more precautions in procedural techniques, more definitive findings could emerge. Thus, despite this study’s inability to show differences in how females judge males in terms of their affinity for children, the question of whether they exist may still be an interesting one.
REFERENCES


Charles, K.K., & Luoh, M.C. (2010). Male incarceration, the marriage market, and


Enesco, I., Lago, O., Purificacion, R., & Guerrero, S. (2011). “We are the good guys but they are not bad.” In-group positivity and cognitive performance in preschoolers. *British Journal of Developmental Psychology, 29*, 593-611.


APPENDIX A

Pair 1

Image 1

Image 2

Pair 17

Image 33

Image 34
APPENDIX B

Visual Preference Test
Please use this answer sheet to indicate which image you prefer from each pair that is presented to you.

<table>
<thead>
<tr>
<th>SILHOUETTES</th>
<th>PHOTOS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pair 1</strong></td>
<td><strong>Pair 11</strong></td>
</tr>
<tr>
<td>Image 1</td>
<td>Image 21</td>
</tr>
<tr>
<td>Image 2</td>
<td>Image 22</td>
</tr>
<tr>
<td><strong>Pair 2</strong></td>
<td><strong>Pair 12</strong></td>
</tr>
<tr>
<td>Image 3</td>
<td>Image 23</td>
</tr>
<tr>
<td>Image 4</td>
<td>Image 24</td>
</tr>
<tr>
<td><strong>Pair 3</strong></td>
<td><strong>Pair 13</strong></td>
</tr>
<tr>
<td>Image 5</td>
<td>Image 25</td>
</tr>
<tr>
<td>Image 6</td>
<td>Image 26</td>
</tr>
<tr>
<td><strong>Pair 4</strong></td>
<td><strong>Pair 14</strong></td>
</tr>
<tr>
<td>Image 7</td>
<td>Image 27</td>
</tr>
<tr>
<td>Image 8</td>
<td>Image 28</td>
</tr>
<tr>
<td><strong>Pair 5</strong></td>
<td><strong>Pair 15</strong></td>
</tr>
<tr>
<td>Image 9</td>
<td>Image 29</td>
</tr>
<tr>
<td>Image 10</td>
<td>Image 30</td>
</tr>
<tr>
<td><strong>Pair 6</strong></td>
<td><strong>Pair 16</strong></td>
</tr>
<tr>
<td>Image 11</td>
<td>Image 31</td>
</tr>
<tr>
<td>Image 12</td>
<td>Image 32</td>
</tr>
<tr>
<td><strong>Pair 7</strong></td>
<td><strong>Pair 17</strong></td>
</tr>
<tr>
<td>Image 13</td>
<td>Image 33</td>
</tr>
<tr>
<td>Image 14</td>
<td>Image 34</td>
</tr>
<tr>
<td><strong>Pair 8</strong></td>
<td><strong>Pair 18</strong></td>
</tr>
<tr>
<td>Image 15</td>
<td>Image 35</td>
</tr>
<tr>
<td>Image 16</td>
<td>Image 36</td>
</tr>
<tr>
<td><strong>Pair 9</strong></td>
<td><strong>Pair 19</strong></td>
</tr>
<tr>
<td>Image 17</td>
<td>Image 37</td>
</tr>
<tr>
<td>Image 18</td>
<td>Image 38</td>
</tr>
<tr>
<td><strong>Pair 10</strong></td>
<td><strong>Pair 20</strong></td>
</tr>
<tr>
<td>Image 19</td>
<td>Image 39</td>
</tr>
<tr>
<td>Image 20</td>
<td>Image 40</td>
</tr>
</tbody>
</table>
APPENDIX C

ADULT/INFANT QUESTIONNAIRE

This questionnaire is entirely voluntary. You are not required to answer any part of it.

Why did you choose the photos that you did (adults versus infants)?
________________________________________________________________________

Why did you choose the silhouettes that you did (adults versus infants)?
________________________________________________________________________

True/False (circle one)

If you were at a party and there was a baby in the room (that you didn’t know) what would you most likely do…

T  F  Go over to see the baby at least once.

T  F  I would probably spend more than 10 seconds looking at it.

T  F  Reach out and touch the baby or smile and talk to it.

T  F  Compliment the parents or ask them about the baby’s age/name.

T  F  Ask to hold the baby.

T  F  Head straight for the baby as soon as I noticed it.

T  F  If I thought the parents wanted a break, I might carry the baby around for a while.

T  F  I would want to hold the baby for 30 minutes or longer.

T  F  I wouldn’t do anything about the baby. I wouldn’t make any effort to see it.

T  F  I would avoid the baby entirely.

Which best describes you (check only ONE):
[  ] I don’t like babies.
[  ] I only like certain babies.
[  ] I like all babies.
I think that I have a very maternal/paternal personality.  [ ] Yes  [ ] No

Would you rather spend 15 minutes with an adult that you were attracted to or with a baby that you found adorable?  [ ] Adult  [ ] Baby

Would you like to have a baby at this time in your life (within approximately 6 months)?  [ ] Yes  [ ] No

Which of the following categories best describes you (check all that apply):
[ ] I have children but want more
[ ] I have children, do not want more
[ ] I do not have children and never want any
[ ] I do not have children and am not sure if I ever want any
[ ] No kids yet but would like to have children sometime soon (0 - 5 years)
[ ] No kids yet but would like to have children in distant future (6 or more years)
[ ] Currently pregnant (you or your partner)
[ ] Currently in the process of adopting children

You are…  [ ] Female  [ ] No kids  [ ] Have children
[ ] Male  [ ] No kids  [ ] Have children

If you have children, is your youngest child…  [ ] 4 or younger
[ ] 5 – 8
[ ] 9 – 13
[ ] 14 – 18
[ ] 19 – 24
[ ] 25 or older

Please check if you or your partner are…  [ ] Pregnant  [ ] 1st trimester
[ ] 2nd trimester
[ ] 3rd trimester

(If applicable) Are you currently lactating (producing milk)?  [ ] Yes  [ ] No
If yes, how old is your baby? ___________
(If applicable) Regarding menopause, how would you describe your current situation?
   [ ] Peri-menopausal (early symptoms)
   [ ] Menopausal
   [ ] Post-menopausal

When you were young, did you babysit often?     [ ] Yes    [ ] No

On a scale of 1 – 5, how would you categorize the degree of your experience with babies?
(circle one)

1                                      2                3                4                5
(little or no experience)             (lots of experience)

How many children were there in your family, growing up (including yourself)?

________

In your natal family, are you the…         [ ] Only child
   [ ] Oldest child
   [ ] Middle child
   [ ] Youngest child

How old are you?    [ ] 18 – 23
                    [ ] 24 – 29
                    [ ] 30 – 35

What best describes you? (Check all that apply)    [ ] Heterosexual
                                                 [ ] Lesbian/gay
                                                 [ ] Bisexual
                                                 [ ] Single
                                                 [ ] Single but romantically involved (with one person)
                                                 [ ] Married or “living committedly”

What is your current occupation?

_____________________________________________

Thank you!
APPENDIX D

Student Sona ID#:______________   Date: __/__/___   Age: ________

Ethnic Background (please circle only ONE that you identify yourself as the most):
  1) African-American
  2) American Indian
  3) Asian/Asian-American
  4) Caucasian/European-American
  5) Hispanic or Latino
  6) Middle Eastern (Arab, Israeli, Turk, etc)
  7) Pacific Islander (Samoan, Tongan, etc)
  8) Other-Please specify:________________

What best describes you? [ ] Heterosexual
(Check all that apply) [ ] Lesbian/gay
[ ] Bisexual
[ ] Single
[ ] Single but romantically involved (with one person)
[ ] Married or “living commitedly”

Part I

• You will view 45 different photos TWICE on the screen.
• Moreover, for part 1 you will view 45 photos and answer one set questions for each photo, and then you will view the same set of photos again and answer a different set of questions for each photo.
• Please check whether you know this person or do not know this person first. Then circle your ratings for each photo.
• You will have 15 seconds to view each photo and circle your ratings. You will hear a “ding” when there are 3 seconds remaining.
• Then there will be 2 seconds to prepare for the next photo.
• Please let the experimenter know if you were not able to complete all of the ratings for a particular photo.

Rating Scale
Rate each photo RELATIVE TO OTHER YOUNG ADULT MEN on a scale from 1 to 7.

  A rating of 1 means that he is FAR BELOW AVERAGE
  A rating of 2 means that he is QUITE BELOW AVERAGE
  A rating of 3 means that he is SOMEWHAT BELOW AVERAGE
  A rating of 4 means that he is about AVERAGE
  A rating of 5 means that he is SOMEWHAT ABOVE AVERAGE
  A rating of 6 means that he is QUITE ABOVE AVERAGE
  A rating of 7 means that he is FAR ABOVE AVERAGE
**Practice Session:**
Before you begin the first session, you will complete a practice session where you will view and rate two photos. This is your chance to practice answering all of the questions in the time given. Please mark your response on this questionnaire during the 15 seconds each photo is displayed. You will have 2 seconds until the next photo is displayed.

---

**Practice Person 1**  
Check one:  
__ I do not know this person  
__ I know this person  

*You are rating this person relative to other young adult men*

<table>
<thead>
<tr>
<th></th>
<th>Far Below</th>
<th>Average</th>
<th>Somewhat Below</th>
<th>Average</th>
<th>Average</th>
<th>Somewhat Above</th>
<th>Average</th>
<th>Quite Above</th>
<th>Far Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Masculine</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physically attractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Kind</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Likes children (not a pedophile)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Practice Person 2**  
Check one:  
__ I do not know this person  
__ I know this person  

*You are rating this person relative to other young adult men*

<table>
<thead>
<tr>
<th></th>
<th>Far Below</th>
<th>Average</th>
<th>Somewhat Below</th>
<th>Average</th>
<th>Average</th>
<th>Somewhat Above</th>
<th>Average</th>
<th>Quite Above</th>
<th>Far Above</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Masculine</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Physically attractive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Kind</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Likes children (not a pedophile)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This is the end of the practice session. If you have any questions, please let your experimenter know by raising your hand. If not, the experiment will proceed with Part 1.
APPENDIX E

Student Sona ID#:______________   Date: __/__/___   Age: ________

Ethnic Background (please circle only ONE that you identify yourself as the most):
1) African-American
2) American Indian
3) Asian/Asian-American
4) Caucasian/European-American
5) Hispanic or Latino
6) Middle Eastern (Arab, Israeli, Turk, etc)
7) Pacific Islander (Samoan, Tongan, etc)
8) Other-Please specify:________________

Instructions
• You will view 45 different photos on the screen.
• You will rate each person’s facial expression on 4 different traits, using a scale from 1 to 7. The traits are: degree of emotion expression, degree of babyfaceness, degree of threat, and degree of healthiness.
• Please check whether you know this person or do not know this person first. Then circle your rating for each photo.
• You will have 25 seconds to view each photo and circle your rating. You will hear a “ding” when there are 3 seconds remaining.
• Then there will be 2 seconds to prepare for the next photo.
• Please let the experimenter know if you were not able to complete all of the ratings for a particular photo.

Rating Scales
For the four traits (degree of emotion expression, degree of babyfaceness, degree of threat, and degree of healthiness), rate each photo on a scale from 1 - 7.

A rating of 1 means that he is VERY UNHAPPY /NOT AT ALL BABY-FACED /NOT AT ALL THREATENING /NOT AT ALL HEALTHY

A rating of 4 means that he is NEUTRAL or MODERATE

A rating of 7 means that he is VERY HAPPY /VERY BABY-FACED / VERY THREATENING /VERY HEALTHY

**HEALTHINESS** is defined as mental, emotional, and physical wellness; being vigorous and free from any bodily or mental diseases.

**THREATENING** is defined as having a hostile or deliberately frightening quality or manner.
**Practice Session**
Before you begin the first session, you will complete a practice session where you will view and rate two photos. This is your chance to practice answering the questions in the time given. Please mark your response on this questionnaire during the 25 seconds each photo is displayed. You will have 2 seconds until the next photo is displayed.

**Practice Person 1**  
Check one: __ I do not know this person  
__ I know this person

<table>
<thead>
<tr>
<th>1. Degree of emotion expressed in this man’s face:</th>
<th>Very unhappy</th>
<th>2</th>
<th>3</th>
<th>Neutral</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Very happy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all baby-faced</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Moderately baby-faced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very baby-faced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Degree of babyfaceness in this man’s face:</th>
<th>Not at all baby-faced</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Moderately baby-faced</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Very baby-faced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all threatening</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>Moderate threatening</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Very threatening</td>
</tr>
<tr>
<td>Very threatening</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Degree of threat expressed in this man’s face:</th>
<th>Not at all threatening</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Moderately threatening</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Very threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all healthy</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>Moderate healthy</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>Very healthy</td>
</tr>
<tr>
<td>Very healthy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Degree of healthiness in this man’s face:</th>
<th>Not at all healthy</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Moderately healthy</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Very healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Person 2</td>
<td>Check one: __ I do not know this person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>__ I know this person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Degree of emotion** expressed in this man’s face:
   - Very unhappy: 1
   - 2
   - 3
   - Neutral: 4
   - 5
   - 6
   - Very happy: 7

2. **Degree of babyfaceness** in this man’s face:
   - Not at all baby-faced: 1
   - 2
   - 3
   - Moderately baby-faced: 4
   - 5
   - 6
   - Very baby-faced: 7

3. **Degree of threat** expressed in this man’s face:
   - Not at all threatening: 1
   - 2
   - 3
   - Moderately threatening: 4
   - 5
   - 6
   - Very threatening: 7

4. **Degree of healthiness** in this man’s face:
   - Not at all healthy: 1
   - 2
   - 3
   - Moderately healthy: 4
   - 5
   - 6
   - Very healthy: 7

This is the end of the practice session. If you have any questions, please let your experimenter know by raising your hand. If not, the experiment will proceed.
Table 1

**Intercorrelations among the Main Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. “Likes children”</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. “Kind”</td>
<td>.95**</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. IWB</td>
<td>.19</td>
<td>.25</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Emotion expression</td>
<td>.77**</td>
<td>.76**</td>
<td>.04</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Babyfaceness</td>
<td>.43**</td>
<td>.40**</td>
<td>.16</td>
<td>.32*</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Threat</td>
<td>-.67**</td>
<td>-.73**</td>
<td>-.08</td>
<td>-.68*</td>
<td>-.42**</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>7. Health</td>
<td>.45**</td>
<td>.46*</td>
<td>.03</td>
<td>.42**</td>
<td>.25</td>
<td>-.38**</td>
<td>---</td>
</tr>
</tbody>
</table>

*Note.* *p < .05; **p < .01

Table 2

**Correlations among Average Ratings of “Likes Children” and the Interact with Baby (IWB) Measure by Female Rater Ethnicity**

<table>
<thead>
<tr>
<th>CA Raters</th>
<th>AA Raters</th>
<th>Measure</th>
<th>CA Senders</th>
<th>AA Senders</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CA Senders</td>
<td>AA Senders</td>
<td>Total</td>
</tr>
<tr>
<td>IWB</td>
<td>.25</td>
<td>.23</td>
<td>.25*</td>
<td>.01</td>
<td>.16</td>
</tr>
</tbody>
</table>

*Note.* *p = .052; “CA” = Caucasian American, “AA” = African American

Table 3

**Mean IWB Z-Score Differences Based on Female Rater and Male Sender Ethnicity**

<table>
<thead>
<tr>
<th>CA Raters</th>
<th>AA Raters</th>
<th>Measure</th>
<th>CA Senders</th>
<th>AA Senders</th>
<th>CA Senders</th>
<th>AA Senders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>IWB</td>
<td>1.08 (.27)</td>
<td>1.13 (.23)</td>
<td>1.09 (.33)</td>
<td>1.10 (.24)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are found in parentheses; “CA” = Caucasian American, “AA” = African American