# What's in a Face?

## A Cognitive and Evolutionary Psychology Pilot Study

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Abstract

Prior research has demonstrated the universality of attractiveness and facial expression perception among humans, as well as the widespread social and cognitive consequences of these related features. However, the body of research concerning the impact of attractiveness on a face's memorability remains contradictory, and research concerning the impact of facial expression on memorability has hardly begun. This pilot study aimed to help clarify the influence of attractiveness and affect on recognizability. Since research has also suggested that attractiveness and affect play important roles in mate value, we also explored whether mate value could help explain any relationship between attractiveness, affect and recognizability. Fifty-four participants viewed faces varying on attractiveness (high vs. low) and affect (positive vs. neutral). Afterwards, participants were tested for recognition accuracy and then rated these faces for attractiveness, short-term mate value and long-term mate value. Results showed that highly attractive, neutral affect faces were remembered significantly better than any other category of faces. Furthermore, positive affect significantly increased the attractiveness of unattractive faces but not attractive faces. Facial expression also significantly impacted long-term mate value but not short-term mate value; however, mate value did not significantly influence recognizability in this study.

*Key words:* attractiveness, affect, facial expression, mate value, recognition accuracy

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## Introduction

Humans' extraordinary cognitive capacity for recognizing faces plays an important role in everyday life, and many of the tendencies within facial recognition extend across cultures. For instance, extensive research has supported cross-cultural agreement on ratings of facial attractiveness by showing racially diverse sets of photographs to participants of different cultures and receiving significant, strong agreements between raters (Langlois et al., 2000; Jones & Hill, 1993; Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Coetzee, Greeff, Stephen, & Perrett, 2014). Additionally, research has also supported the universality of facial expressions like smiling, which even extend to, for example, isolated New Guinea cultures (Ekman, 1989; Keating et al., 1981).

Our recognition of facial attractiveness and facial expressions has widespread consequences for behavior. Several studies have found that attractive children and adults are perceived more positively and are subsequently treated more favorably than unattractive children and adults by others (Dion, Berscheid, & Walster, 1972; Reis et al., 1990; Clifford & Walster, 1973; Adams, 1978). Therefore, the ways in which we let attractiveness and facial expression influence our everyday perception of people are fundamentally important functions to explore and to understand.

Consequently, the roles that attractiveness and facial expression play in our ability to remember faces are highly researched topics due to the reach and potential gravity of their implications. Yet, the existing body of research struggles to resolve a mess of contradictions (Wickham & Morris, 2003). Some research has found that attractive faces are the best

remembered and that remembering attractive faces is neurologically rewarded (Marzi & Viggiano, 2010; Tsukiura & Cabeza, 2011; Cross, Cross, & Daly, 1971), while Light, Hollander and Kayra-Stuart (1981) found that attractive faces were instead *harder* to remember, perhaps due to attractive faces' homogeneity. Yet, Shepard and Ellis (1973) found that after 35 days, high *and* low attractiveness faces were both well remembered, and moderately attractive faces were forgotten. Later, Sarno and Alley (1997) argued that attractiveness did not determine memorability; distinctiveness explained the relationship instead. Wickham and Morris (2003) also supported the role of distinctiveness in memorability of faces. Ultimately, the conflicting state of research on this topic necessitates clarification and a fresh approach; thus, the exigence for our study was born from this problem.

Our search for additional factors to explore in the context of attractiveness and recognizability initially led us to the domain of facial expression. I have already argued the universality and importance of facial expression, and indeed the facial expression of a smile ties into both attractiveness and memorability. A recent study by Golle, Mast and Lobaier (2014) found that smiling faces are perceived as significantly more attractive, and that "a happy facial expression could even compensate for relative unattractiveness" (p. 298). Studies by O'Doherty et al. (2003), Mueser, Grau, Sussman and Rosen (1984) and Reis et al. (1990) also supported this relationship between smiling and facial attractiveness. Furthermore, Shimamura, Ross and Bennett (2006) studied the relationship between different facial expressions (happy, surprised, angry and fearful) and *recognition* and found that faces with a happy smile were remembered the best. In fact, faces with happy expressions were remembered better than other facial expressions even when the faces were inverted (Shimamura, Ross & Bennett, 2006, p. 220). However, this

kind of research on the relationship between smiling, attractiveness and *recognition* is very limited; therefore, our study aimed to further explore these findings.

Finally, we also identified a major gap in the literature concerning smiling, mate value and recognition. Evolutionary psychologists have hypothesized on the breakdown of attraction into two kinds of potential mate value: attractiveness as a long-term romantic partner versus a short-term sexual partner (Buss & Schmidt, 1993). Physical attractiveness plays a key role in both mating strategies but especially short-term mating strategies (Buss, 1989; Norman, 2007). Meanwhile, cues of kindness play a major role in long-term partner attractiveness (Norman, Valentine & Patel, 2011; Lukaszewski & Roney, 2009). Consequently, evolutionarily based cognitive systems might exist for remembering certain kinds of attractive faces. Moreover, if smiling signals kindness and therefore long-term attractiveness, and traditional physical attractiveness signals short-term attractiveness, then a holistic exploration of mate value, smiling and facial recognition is warranted. The body of scholarly psychological literature contains no research on either the relationship between mate value and facial expression nor the relationship between mate value and recognition.

Consequently, the current study continues to explore the sparsely researched interaction between smiling, perceived attractiveness and memorability as well as whether mate value can help explain these apparent correlations. We showed participants 64 faces varying on attractiveness and facial expression. After a distractor task, participants undertook a recognition test and then rated each of the faces on physical attractiveness, long-term mate value and short-term mate value. We hypothesized that affect would have a main effect: participants will remember faces exhibiting positive affect more often than faces with neutral expressions in the recognition test. We also hypothesized that attractiveness would have a main effect: attractive

faces will be better remembered than unattractive faces in the recognition test. Subsequently, we hypothesized that attractiveness and affect would have an interaction effect: faces exhibiting positive affect will be the most recognizable faces, and this will be most pronounced for high attractiveness faces. Next, we hypothesized that faces exhibiting positive affect would be rated as more attractive than those exhibiting neutral affect, and that this would be most pronounced for highly attractive faces. Finally, we hypothesized that positive affect faces will be rated more often than neutral faces as good potential *long-term* partners regardless of attractiveness, and high attractiveness faces will be rated more often than low attractiveness faces as good *short-term* partners regardless of facial expression.

## Method

### Participants

Participants consisted of 54 undergraduate students enrolled in PSY 120L from the University of California, Santa Barbara. Participants were contacted with survey links from our professor and were compensated with course credit in their PSY 120L class. 16 males and 38 females participated in this study. The average age among participants was 21.6 years with a standard deviation of .89 years. Age ranged from 20 to 24 years of age.

### Ethical Considerations

Our IRB proposal was submitted on February 4, 2015 and was ultimately approved by our advisors Dr. Vanessa Woods and Dr. Jennifer La Guardia of the University of California, Santa Barbara. Since we expected the sample size to be small, no questions about sexual orientation or other sensitive, identifying information were asked. Additionally, it is important to note that participants had the opportunity to request an alternate study if they declined to participate in our study, so participation was entirely voluntary.

**Design**

The current study used a within-subjects design in order to explore several potential relationships despite a relatively small sample size.

The two independent variables were attractiveness and affect for each face. Attractiveness was broken down into two conditions: high attractiveness versus low attractiveness. Affect was broken down into two conditions: positive affect (smiling with a closed mouth) versus neutral affect (neutral expression).

The three dependent variables were recognition accuracy, attractiveness ratings and mate value ratings. Recognition accuracy was defined as the percentage of correct recognition in the recognition task. The dependent variable attractiveness was defined as participants' ratings for each face on a 7-point Likert scale of attractiveness. Mate value was defined as participants' yes/no responses to whether each face in each picture looked like a good short-term and/or long-term partner.

**Procedure**

Our survey was hosted on Qualtrics survey software, which collected participants' responses in all of the following tasks.

Participants first read our informed consent form. This page simply described the survey as a study of recognition and did not color our study with hints of an evolutionary or cognitive focus. This form also emphasized how participants' responses would be kept anonymous and confidential.

If they agreed to participate, participants then viewed a slideshow of 64 pictures of faces. Each face appeared on the screen for two seconds with a one second break in between. The order

of the faces was randomized for every participant in order to prevent any serial position effect or other order effects.

Next, subjects participated in a distractor task that asked them to unscramble eight 5 to 6 letter words. These words were neutral nouns (e.g. turtle, coffee, house, etc.). This task allowed some time to pass between the slideshow and recognition test, prevented maintenance rehearsal and reduced recency effects.

Afterwards, participants undertook a recognition test that showed, in a random order and one at a time, 32 faces. Sixteen of these faces had appeared in the original slideshow and included one randomly chosen face from each of our sixteen attractiveness, affect, gender and race groups (for a clearer understanding of this categorical breakdown, refer to Appendix A). The other 16 faces were faces the participant had never seen before. These 16 faces were randomly selected from the moderate attractiveness faces and were also equally split among affect conditions, race and gender. For each of the 32 faces, participants indicated whether they saw the face in the earlier slideshow or not.

Finally, participants rated each of the 16 previously seen faces from the recognition test on physical attractiveness, short-term mate value and long-term mate value.

Participants were debriefed at the end and offered our contact information as well as the contact information of our advisors. The debriefing form encouraged participants to contact any of us to discuss concerns or questions or to seek resources related to this study. We again emphasized the anonymity and confidentiality of participants' responses.

**Measures & Materials**

**Attractiveness**. To assess participants' perceptions of each face's attractiveness, we used a 7-point Likert scale where a 1 indicated "Very unattractive", a 4 indicated "Neither unattractive

nor attractive" and a 7 indicated "Very attractive". This scale was adapted from Mueser, Grau, Sussman & Rosen's (1984) 10-point attractiveness Likert scale used in their study of attractiveness and facial expression. Although Mueser et al.'s (1984) scale had no neutral option, restrictions set by our advisors forced us to add a neutral option. We also shortened the scale for the sake of simplicity. Validity and reliability data for this specific scale was not provided.

**Mate Value.** To assess participants' perceptions of each face's short-term and long-term mate value, we used an adapted version of Frederick and Haselton's (2007) scale for mate value. Due to ethical restrictions set by our advisors, we adapted the scale from addressing the participant directly to asking more generally about the opinion of "someone" else. We also eliminated the question assessing the participant's own mate value because that information was not relevant to our research questions. Therefore, our scale consisted of two items: a question about short-term sexual partnership and a question about long-term relationship partnership. A "yes" meant the participant agreed that the person in the picture would be a good partner for that type of relationship, and a "no" meant that the participant disagreed that the person in the picture would be a good partner for that type of relationship. For example, for each face we asked, "Would this person make a good short-term sexual partner for someone?" Validity and reliability data for this scale was not provided.

## Apparatus

**Qualtrics**. This online survey software and insight platform served as the foundation of our survey design. Qualtrics operates on a secure server that is password protected, so participants' data could be kept safe and confidential.

**Chicago Face Database.** The pictures of faces in our study were used with permission from the Chicago Face Database (Ma, Correll, & Wittenbrink). We used a total of 80 pictures

from this database. All faces were shown with a white background, with hair pulled away from the face, in a grey t-shirt and in a picture measuring approximately 500 pixels x 359 pixels. Pictures of faces were initially rated on attractiveness by several independent raters hired by the Chicago Face Database (Ma, Correll, & Wittenbrink). Figure A1 (see Appendix A) clearly illustrates the process by which we selected faces for this study. The eight highest and eight lowest rated faces from each gender/race category (Caucasian female, Caucasian male, African male and African female) were selected for the slideshow. From the eight faces for each of the aforementioned categories, each face was randomly assigned to the positive affect or neutral affect condition. When either the positive or neutral category was filled, the rest of the unassigned faces would enter the other category. This design gave us equal numbers of positive affect and neutral affect faces in each category. For instance, once four of the high attractiveness African males were randomly assigned to positive affect, the rest of the undetermined high attractiveness African males would be assigned to neutral affect.

**SPSS (Statistical Package for the Social Sciences).** This statistics analysis software helped us analyze the data for frequencies, means, standard deviations, correlations and ANOVAs.

## Results

### Descriptives

Fifty-four participants (38 women, 16 men) participated in this study. Participants ranged in age from 20 to 24 years old ($M$ = 21.57 years; $SD$ = .89 years). One participant dropped out halfway through the survey. On average, participants recognized 68.26% of faces ($SD$ = 16.96 percent) correctly in the recognition task. The average attractiveness rating across all conditions was 3.87 points out of 7 ($SD$ = .67 points). Overall, participants rated 52.78% of faces as good

short-term sexual partners (*SD* = 23.97 percent) and 67.59% of faces as good long-term romantic partners (*SD* = 24.47 percent).

**Affect, Attractiveness and Recognizability**

We hypothesized that highly attractive people would be better recognized than unattractive people and that faces exhibiting positive affect would be better recognized than those exhibiting neutral affect. We also hypothesized that highly attractive people exhibiting positive affect would have more recognizable faces than faces of any other condition. In order to determine the validity of this hypothesis, we ran a 2 x 2 repeated measures ANOVA to test whether attractiveness (high vs. low) and affect (positive vs. neutral) had main effects on recognizability and whether attractiveness and affect interacted to impact recognizability. Results showed no significant main effects of either attractiveness [$F$ (1, 54) = 1.042, $p$ = .312] or affect [$F$ (1, 54) = .587, $p$ = .447] on recognizability. However, results did show a significant interaction effect between attractiveness and affect, as illustrated in Figure B1 [$F$ (1, 54) = 9.303, $p$ = .004]. Specifically, highly attractive faces exhibiting *neutral* affect (HANA faces) were recognized more often than any other category, as illustrated in Figure B2 (*M* = 75.46 percent correctly recognized, *SD* = 25.23 percent). Low attractiveness faces exhibiting positive affect (LAPA) were also recognized more than low attractiveness/neutral affect (LANA) faces or high attractiveness/positive affect (HAPA) faces though less than HANA faces (LAPA *M* = 69.55 percent correctly recognized, *SD* = 24.86 percent ; LANA *M* = 63.48 percent correctly recognized, *SD* = 29.16 percent ; HAPA *M* = 64.55 percent correctly recognized, *SD* = 25.77 percent). Therefore, our hypothesis was not supported. Neither attractiveness nor affect alone affected recognizability of faces and *together* these factors significantly impacted recognizability in an unpredicted way.

To clarify the significance of the differences between means for our interaction effect on recognition accuracy, we also ran post-hoc analyses of the simple main effects. For people who were *not* smiling, there was a significant effect of attractiveness such that highly attractive people were better remembered ($p = .007$). However, for people who were smiling, there was no significant effect of attractiveness ($p = .177$). Therefore, the HANA faces were indeed significantly better recognized than other conditions, but the elevated recognition accuracy of the LAPA faces was not statistically significant.

**Attractiveness, Affect and Participants' Ratings of Attractiveness**

We hypothesized that faces exhibiting positive affect would be rated as more attractive than those exhibiting neutral affect; therefore, HAPA faces would be rated more attractive than faces of any other condition. These relationships are already highly researched, and so analysis of these variables served more as a manipulation check. Thus, we ran a 2 x 2 repeated measures ANOVA in order to determine whether affect (positive vs. neutral) had a main effect on ratings of attractiveness, whether Chicago Face Database's ratings of attractiveness (high vs. low) had a main effect on participants' ratings of attractiveness, and whether these factors also interacted to influence attractiveness. Results showed that affect had a significant main effect on participants' ratings of attractiveness [$F$ (1, 53) = 8.803, $p = .005$]. Results also showed that attractiveness had a significant main effect on participants' ratings of attractiveness [$F$ (1, 53) = 468.197, $p < .001$]. Finally, results showed that affect and attractiveness had a significant interaction effect on participants' ratings of attractiveness [$F$ (1, 53) = 4.114, $p = .048$]. Interestingly, positive affect increased *un*attractive faces' ratings of attractiveness (LAPA $M = 2.80$ points, $SD = .90$ points; LANA $M = 2.50$ points, $SD = .81$ points) much more than it increased highly attractive faces' ratings of attractiveness (HAPA $M = 5.13$ points, $SD = .84$ points; HANA $M = 5.04$ points, $SD$

= .85 points). Overall, our hypothesis was supported. Positive affect significantly increased attractiveness ratings, and affect significantly interacted with attractiveness where HAPA faces were rated the most attractive of any condition.

However, to clarify the significance of the difference in means for the interaction effect on attractiveness, we ran post-hoc analyses of the simple main effects. For *un*attractive faces, there was a significant effect of affect on attractiveness, such that smiling faces were rated as more attractive than neutral faces ($p = .002$). However, for attractive faces, there was no significant effect of affect on attractiveness ($p = .273$). Therefore, affect truly impacted the attractiveness ratings of unattractive people but not that of attractive people.

**Attractiveness, Affect and Short-term Mate Value**

We hypothesized that high attractiveness faces would be rated more often than low attractiveness faces as good *short-term* partners regardless of facial expression. To test this hypothesis, we conducted a 2 x 2 repeated measures ANOVA to examine the main effects of attractiveness (high vs. low) and affect (positive vs. neutral) on participants' ratings of faces' short-term mate value and to examine how these factors might interact to influence short-term mate value. Results showed that attractiveness had a significant main effect on short-term mate value [$F$ (1, 53) = 126.572, $p < .001$]. However, affect did not have a significant main effect on short-term mate value [$F$ (1, 53) = .649, $p = .424$]. Furthermore, the interaction effect of attractiveness and affect on short-term mate value was not significant [$F$ (1, 53) = .875, $p = .354$]. Therefore, our hypothesis was supported. Attractiveness was the only significant influence on participants' ratings of faces' short-term mate value, such that high attractiveness increased short-term mate value. Facial expression did not influence short-term mate value.

**Attractiveness, Affect and Long-term Mate Value**

We hypothesized that positive affect faces would be rated more often than neutral faces as good potential *long-term* partners regardless of attractiveness. To explore the validity of this hypothesis, we ran a 2 x 2 repeated measures ANOVA to determine whether attractiveness (high vs. low) and affect (positive vs. neutral) had main effects on participants' ratings of faces' long-term mate value and whether these two factors had an interaction effect on long-term mate value. Results showed that attractiveness did have a significant main effect on long-term mate value [$F$ (1, 53) = 77.751, $p < .001$]. Affect also had a significant main effect on long-term mate value [$F$ (1, 53) = 36.1, $p < .001$]. Appendix C illustrates the differences in the percentages of participants' ratings for different faces' long-term mate value. Finally, the results showed that there was no significant interaction effect between attractiveness and affect on long-term mate value [$F$ (1, 53) = .094, $p = .761$]. Therefore, our hypothesis was supported. Affect played a key role in increasing a face's long-term mate value, and affect does not interact with attractiveness in any significant way to impact long-term mate value.

**Short-term Mate Value, Long-term Mate Value and Recognizability**

To come full circle with our exploratory analysis of mate value, we also calculated Pearson correlational coefficients to determine the relationship between short-term mate value and recognizability and the relationship between long-term mate value and recognizability for each face. Results showed that there was no significant relationship between mate value and recognizability. For each of the 16 previously seen faces in the recognition task, short-term mate value only correlated significantly with recognizability for two of the faces. Long-term mate value did not correlate significantly with recognizability for any of the faces. The Pearson

correlational coefficients and significance values for each of the 16 faces are available in Appendix D. Ultimately, results do not support an impactful role of mate value on the recognizability of a face.

## Discussion

In our exploration of the impact of attractiveness and affect on recognizability, we found that neither attractiveness nor affect alone increased recognition accuracy. However, when the two factors came together, high attractiveness / neutral affect faces were significantly better remembered than other faces. Furthermore, low attractiveness / positive affect faces were the second best remembered category. These findings did not support our hypotheses. Instead, in line with the prior literature, we had predicted that attractiveness and affect would have main effects on recognition and that highly attractive, *positive* affect faces would be the best-recognized faces. Distinctiveness could be at work here again. Research conducted by Sarno and Alley (1997) and Wickham and Morris (2003) suggested that distinctiveness determined the memorability of faces – making both highly attractive and highly unattractive faces the most memorable. Perhaps unhappy, attractive faces (as perceived from the HANA pictures) and happy, unattractive faces (as perceived from the LAPA pictures) are both especially distinct combinations; whereas, happy attractive faces and unhappy unattractive faces fit better with our social schemas and therefore are less perceptually salient. Prior research has suggested that stimuli incongruent with our schemas violate our expectations and therefore can be better remembered (Hoosain, 1974; van Kesteren, Ruiter, Fernandez, & Henson, 2012). Thus, distinctiveness could be one possible explanation for our findings on attractiveness, affect and recognizability; of course, additional research is needed to clarify this relationship.

In our exploration of affect on attractiveness, we found that positive affect significantly increased perceived attractiveness. We also found that affect and attractiveness interacted to impact attractiveness. These findings supported our second set of hypotheses and were consistent with prior literature suggesting that smiling increases perceived attractiveness (Golle, Mast, & Lobaier, 2014; O'Doherty et al., 2003; Mueser, Grau, Sussman, & Rosen, 1984; Reis et al., 1990). However, affect also interacted with attractiveness to affect perceived attractiveness in an interesting way. Specifically, unattractive faces' attractiveness increased significantly with positive affect, but highly attractive faces did not show a significant difference between the neutral and positive affect conditions. One explanation could come from evolutionary psychology. Physical attractiveness seems to trump many other factors in both kinds of mating strategies (Buss, 1989; Norman, 2007), yet kindness does play a key role in long-term strategies (Norman, Valentine & Patel, 2011; Lukaszewski & Roney, 2009). So, perhaps after physical attractiveness is determined, cues of kindness only play a secondary role if necessary. However, Golle, Mast, and Lobaier (2014) had a slightly different finding – that "faces that were manipulated to be less attractive but smiling were preferred to faces that were manipulated to be more attractive but less smiling" (p. 306). Granted, their methods were very different from the methods used in this study, and so we cannot make a direct comparison. Nonetheless, the emergence of this striking interaction effect in our study may differ from the findings of prior research and thus necessitates clarification through future research.

Finally we found that attractiveness significantly increased short-term mate value; whereas, affect had no significant impact on short-term mate value. This finding both supported our hypothesis that attractiveness would have a main effect on short-term mate value and aligned with prior research on the role of physical attractiveness in mating strategies (Buss, 1989;

Norman, 2007). The literature had no previous research on how facial expression interacts with short-term mate value, and so our research helped to fill this gap in knowledge. Smiling vs. neutral facial expression does not significantly influence short-term mate value either way. Furthermore, we found that both attractiveness and affect significantly influenced long-term mate value, although the two factors did not interact significantly. This finding supported our hypothesis that positive affect would be an important determinant of long-term partner attractiveness. The finding also remains consistent with previous research that has found that attractiveness plays a role in long-term mating strategy (Buss, 1989; Norman, 2007) as well as literature on the role of kindness cues in long-term mating strategy, if we consider a smile to be a cue of kindness (Norman, Valentine & Patel, 2011; Lukaszewski & Roney, 2009). Again, no research we could find has yet assessed the role of facial expression in mate value, and so our study helped fill this gap in knowledge, as well.

Our design benefitted from several specific design aspects. For instance, Qualtrics survey software allowed us to randomize the order of the faces presented in the slideshow as well as the order of faces in the recognition task for every participant. This implementation strengthened the internal validity of our test by eliminating order effects. Furthermore, Chicago Face Database provided excellent face stimuli. The consistency among the photos for lighting, clothing, minimal makeup, background, quality, etc. was a tremendous advantage for the internal validity of our findings. Differences between faces beyond physical attractiveness and facial expression were minimized.

Nonetheless, several weaknesses interfered with our ability to conduct a more thorough study. Foremost, our sample had more than twice as many women than men although our face stimuli were evenly divided between the genders. This gender skew introduces some participant

biases into the study. Furthermore, although half of the face stimuli we used were of African descent, our sample consisted of very few African participants. Although ratings of attractiveness are consistent across races (Langlois et al., 2000; Jones & Hill, 1993; Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Coetzee, Greeff, Stephen, & Perrett, 2014), research has demonstrated the other-race effect whereby faces of "other" races are more difficult to recognize than faces of one's own race (Rhodes, Locke, Ewing, & Evangelista, 2009). Therefore, this effect may have weakened the relationship between attractiveness and recognizability. Furthermore, due to time constraints, the gap of time between the slideshow of 64 faces and the recognition task was only a few minutes. Consequently, recognition rates were fairly high ($M$ = 67.59 percent correctly recognized; $SD$ =24.47 percent), while studies like that of Shepard and Ellis (1973) only found significant correlations between attractiveness and recognizability after many *days* had passed. Lastly, the Chicago Face Database had many moderately attractive white males, but not many highly attractive or highly unattractive white males. Consequently, the variability in attractiveness among white males was much lower than that of white females, black males, or black females. This inconsistency in one of our independent variables may have also weakened the relationship between attractiveness and the dependent variables. A replication of this study with adjustments for these weaknesses may help strengthen our findings.

Considering the universal impact of factors like attractiveness and affect in our daily lives, future research should continue to clarify the complex relationships that these qualities have with variables like memorability. Some of our findings were comfortably consistent with previous literature, but some results provided completely new ideas and directions for research. Why were high attractiveness / neutral affect faces the best recognized? Why were the findings of Shimamura, Ross and Bennett (2006) – that smiling faces are better recognized – not

replicated? Why does positive affect increase the attractiveness of unattractive but not attractive faces? And why does affect not influence short-term mate value? Our findings on affect's role in long-term mate value also require replication and expansion, as previous research has never before explored this topic. Ultimately, this pilot study has opened the door to a wider perspective on the cognitive impacts and evolutionary implications of attractiveness and affect.

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Appendix A

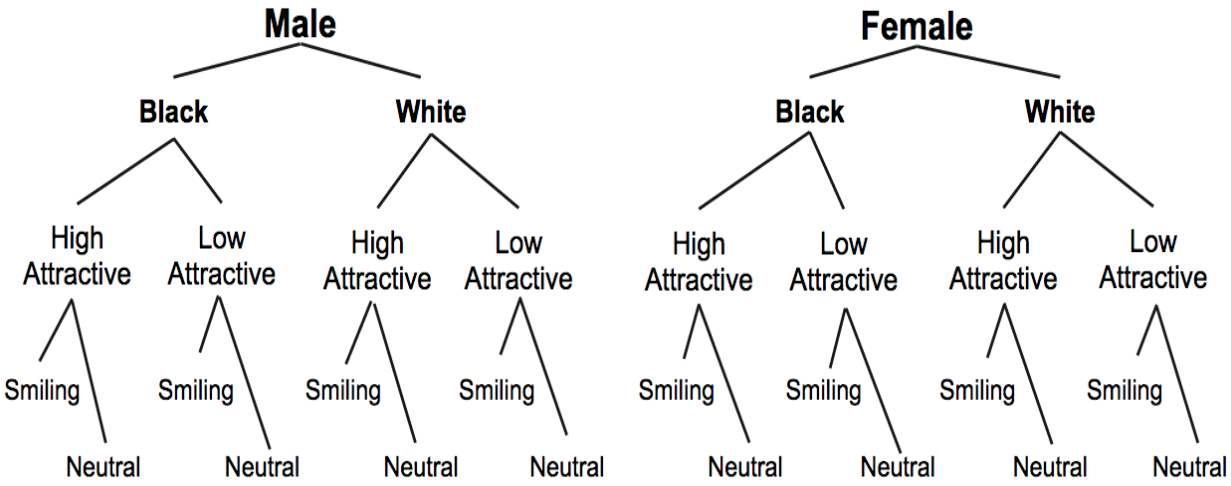


*Figure A1*. The breakdown of the faces we selected from the Chicago Face Database.

Appendix B

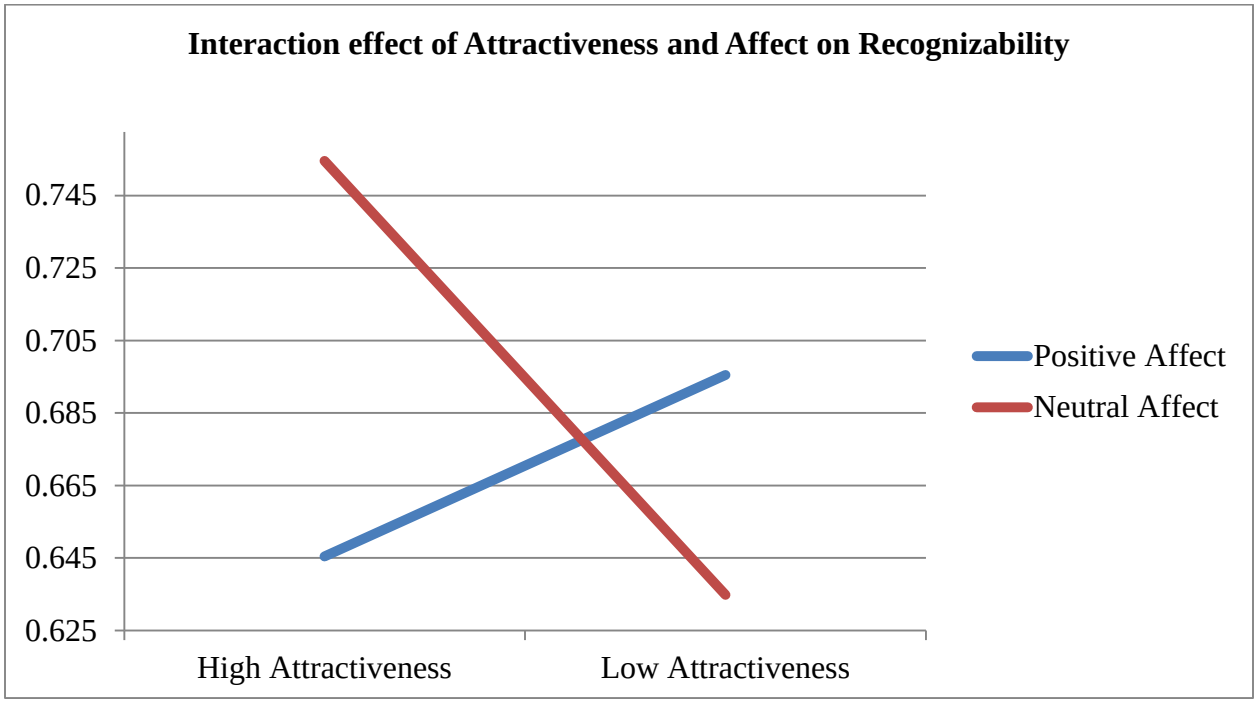


*Figure B1*. The interaction effect between attractiveness and affect on recognizability.

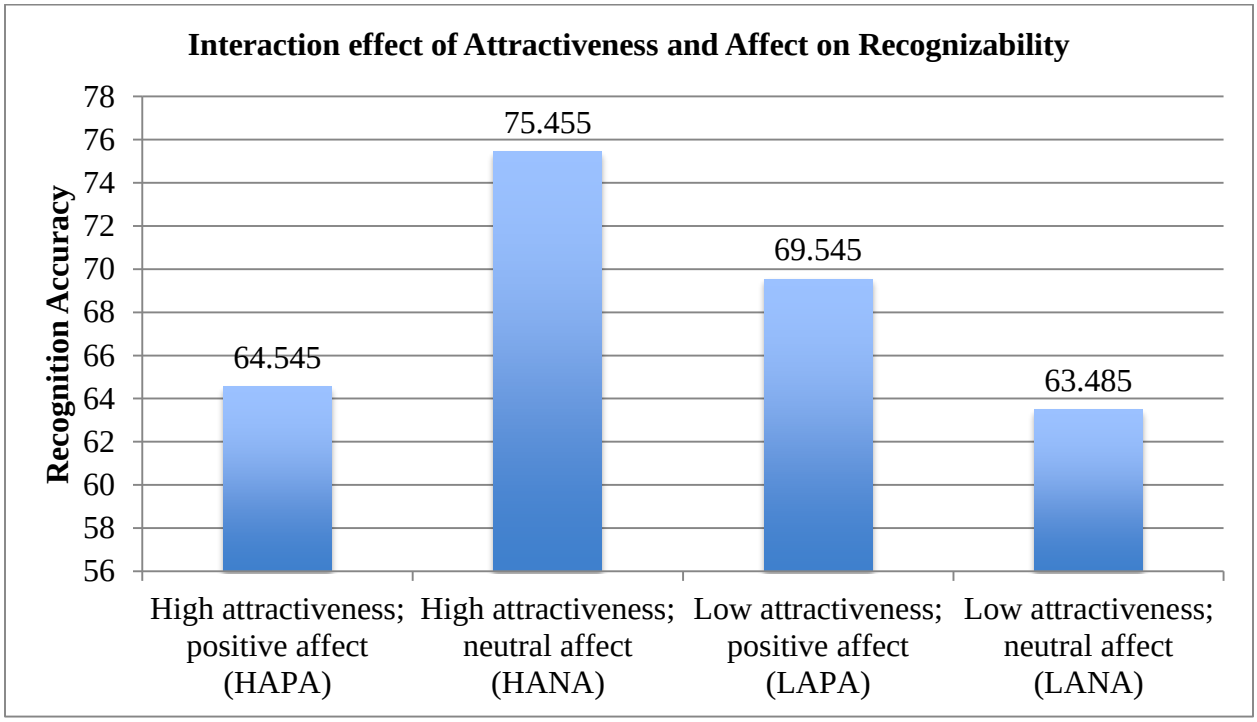


*Figure B2*. Percentages correctly recognized for each condition of attractiveness and affect.

Appendix C

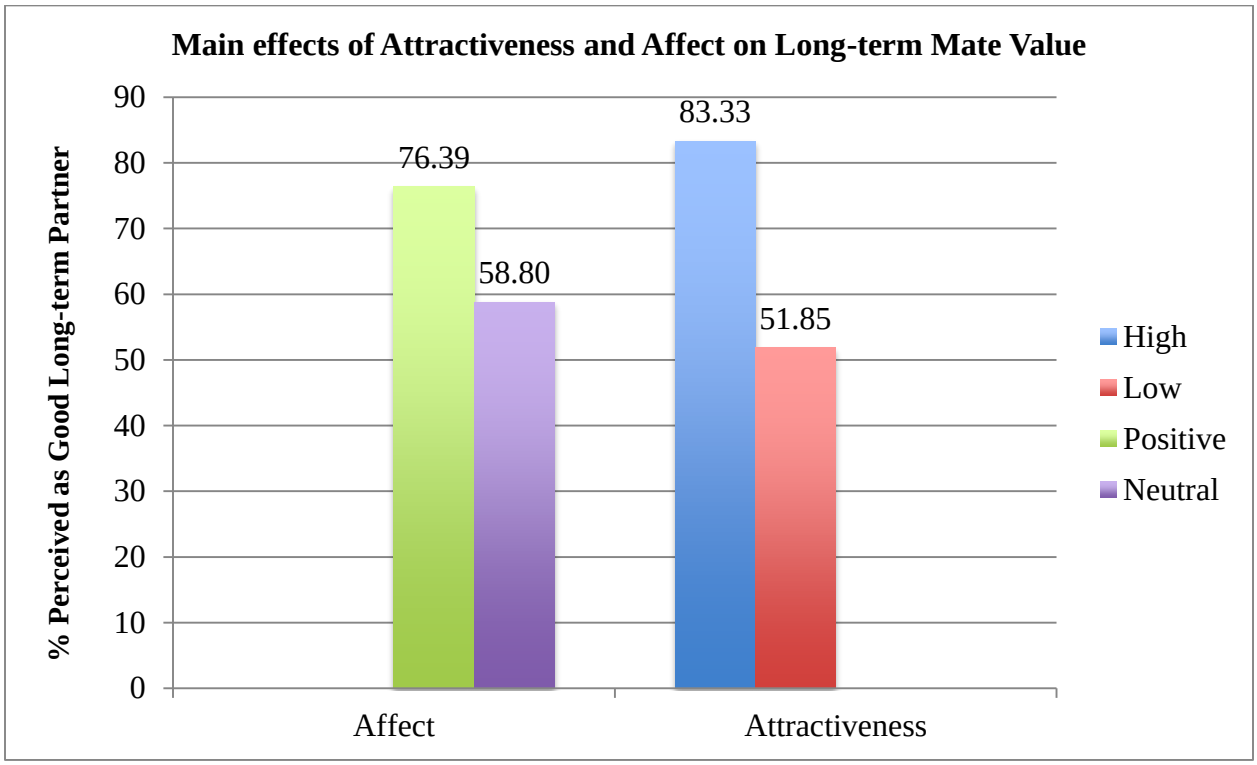


*Figure C1*. Percentages of faces perceived as good long-term mates.

Appendix D

Table D1

*Correlations Between Mate Value and Recognizability.*

| Recognition of | Short-term Mate Value | Long-term Mate Value |
|---|---|---|
| HANA1 | $r$ = .275 , $p$ = .044 * | $r$ = .153 , $p$ = .269 |
| HAPA1 | $r$ = .043 , $p$ = .756 | $r$ = .065 , $p$ = .641 |
| LANA1 | $r$ = -.048 , $p$ = .731 | $r$ = .240 , $p$ = .080 |
| LAPA1 | $r$ = .114 , $p$ = .414 | $r$ = -.104 , $p$ = .452 |
| HANA2 | $r$ = -.070 , $p$ = .616 | $r$ = .038 , $p$ = .786 |
| HAPA2 | $r$ = .169 , $p$ = .223 | $r$ = .166 , $p$ = .230 |
| LANA2 | $r$ = -.307 , $p$ = .024 * | $r$ = -.145 , $p$ = .297 |
| LAPA2 | $r$ = .178 , $p$ = .199 | $r$ = -.131 , $p$ = .346 |
| HANA3 | $r$ = .000 , $p$ = 1.00 | $r$ = -.113 , $p$ = .761 |
| HAPA3 | $r$ = -.043 , $p$ = .758 | $r$ = .048 , $p$ = .416 |
| LANA3 | $r$ = -.066 , $p$ = .635 | $r$ = .216 , $p$ = .117 |
| LAPA3 | $r$ = -.162 , $p$ = .241 | $r$ = -1.80 , $p$ = .193 |
| HANA4 | $r$ = .031 , $p$ = .821 | $r$ = -.003 , $p$ = .981 |
| HAPA4 | $r$ = .015 , $p$ = .913 | $r$ = .053 , $p$ = .704 |
| LANA4 | $r$ = .267 , $p$ = .051 | $r$ = .162 , $p$ = .241 |
| LAPA4 | $r$ = .131 , $p$ = .346 | $r$ = .162 , $p$ = .241 |

*Note.* * Correlation is significant at the 0.05 level (2-tailed).