Facial Expressions Interact with Facial Structures to Predict Inferences of Trust

by

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Abstract

Emotional expressions give rise to inferences about a person’s trustworthiness (Todorov & Oosterhof, 2008). In this study I propose that such inferences are magnified or reduced depending on the observed individuals’ facial structures that cue babyface and matureface features. The results showed that for male targets with babyface features, happy expressions led to greater trust inferences relative to a neutral expression condition, but angry expressions did not change trust inferences relative to the neutral condition. In contrast, for male targets with matureface features, anger expressions led to decreased trust inferences relative to a neutral expression condition, while happy expressions did not change trust inferences relative to the neutral condition. Thus, the current study revealed that the combination of emotional expressions and facial features most strongly elucidates trust inferences in male targets. More broadly, this research suggests factors that signal dependence or dominance may influence how emotional expressions are interpreted.
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1. Introduction

In the course of our evolutionary history, humans have come to cooperate with each other in order to enhance survival (Brewer, 1999, 2007). Such cooperation is expected to flourish to the extent that people can learn to depend on or trust others (Kramer, 1999; Kramer, Brewer, & Hanna, 1996; Rousseau, Sitkin, Burt, & Camerer, 1998). Among the various signals that people use to judge another’s trustworthiness, facial cues are distinctive because they can be used to assess unknown individuals in the absence of other information such as their reputation or social history. One such type of facial cues are emotional expressions. Research has shown that emotional expressions, in particular anger and happiness, are important for making trust inferences (e.g., Oosterhof & Todorov, 2008; Todorov & Oosterhof, 2008). In this paper, I argue that another type of facial cue, namely facial cues that represent baby-faced as opposed to mature-faced facial structures (see Zebrowitz & Montepare, 2008, for a review), influence the effect of emotional expressions on trust inferences. More specifically, I propose that emotional expressions give rise to inferences about a person’s trustworthiness, but such inferences are magnified or reduced depending on the observed individuals’ facial structure.

1.1. Facial Inferences of Trust

The emotional expressions literature has demonstrated a link between expressions of happiness and anger and inferences of trust because such expressions respectively give clues about friendly versus harmful intentions and signal that a person can be approached or should be avoided (Fridlund, 1994; Marsh, Ambady, & Kleck, 2005; Todorov & Oosterhof, 2008). Consistent with such conclusions, research demonstrates that happy faces trigger approach responses and angry faces trigger avoidance responses (Balconi & Mazza, 2010; Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Marsh et al., 2005). More specifically, Marsh et al.
(2005) found that participants reacted more quickly to fear than to anger expressions. In addition, they found that participants pushed a lever more quickly than they pulled it in reaction to anger expressions, but pulled more quickly than they pushed in reaction to fear expressions. From these results taken together, the authors concluded that the anger expression facilitates avoidance-related responses, which supports the idea that anger is a threatening stimulus. In terms of happiness, two studies (Balconi & Mazza, 2010; Davidson et al., 1990) have found that seeing happy expressions leads to more activity in the left side of the brain which is associated with the behavioural activation system (BAS) which provides support for the notion that happy faces trigger approach responses.

Moreover, Scharlemann, Eckel, Kacelnik, and Wilson (2001) showed that people trusted the photos of smiling individuals more than non-smiling individuals. Further, Winston, Strange, O’Doherty, and Dolan (2002) found that among photos that portrayed different emotional expressions, the angry faces were rated as the least trustworthy, and the happy faces were rated as the most trustworthy. Also consistent with these findings, faces that have features that are associated with positive valence or happiness (e.g., upturned lips) are generally perceived to be the most trustworthy and faces that have angry features (e.g., V shaped eye-brows) are perceived to be the least trustworthy (Oosterhof & Todorov, 2008; Todorov & Oosterhof, 2008). This converging evidence clearly shows that emotional expression of happiness elicits greater inferences of trustworthiness, while emotional expressions of anger are associated with lower trustworthiness; and indicates that the reason for the link between expressions of happiness and anger and inferences of trust may be because such expressions cue friendly versus harmful intentions, and signal to the perceiver that the person can be approached or should be avoided (Fridlund, 1994; Marsh et al., 2005; Todorov & Oosterhof, 2008).
A separate literature on facial structures has shown that baby-like faces play an important role in how trustworthy individuals are viewed by others. The babyface overgeneralization hypothesis posits that babyface features bring to mind observers’ stereotypes of children, that is, that children are more trustworthy, trusting, and affectionate than adults (e.g., Kessen, 1965), and such stereotypes are then applied to babyface people (Montepare & Zebrowitz, 1998). Hence, according to theory, people may perceive babyface individuals to possess more childlike attributes and consequently may perceive them to be more trustworthy (Berry & McArthur, 1985; Zebrowitz, et al., 1996).

Consistent with this idea, research has shown that individuals who have more babyface features—such as a round face, larger eyes, a larger forehead, and a smaller chin (Berry & McArthur, 1985; Berry & McArthur, 1986)—tend to be trusted more by others, perceived as more trusting of others, and perceived as warmer and more honest than matureface individuals (McArthur & Apatow, 1984; Berry & McArthur, 1985; McArthur & McDonald, 1991; Zebrowitz & Montepare, 2008). Furthermore, relative to matureface individuals, babyface individuals tend to be favoured for jobs that require warmth and congeniality (Zebrowitz & Montepare, 2008), exonerated when charged with intentional crimes (Zebrowitz & McDonald, 1991), and perceived as more interpersonally trustworthy as actors in TV commercials (Brownlow & Zebrowitz, 1990). Additionally, in an interesting study, Powers and Kiesler (2006) found that people took advice more from robots who had proportionally bigger eyes and smaller chins, features that are associated with babyfaceness. Moreover, evidence indicates that Korean participants, similar to American ones, found babyface pictures to be more trustworthy, trusting, and warmer, suggesting that such effects are not a function of culture (McArthur & Berry, 1987).
These studies demonstrate that individuals with babyface features are perceived to be more trustworthy by others than their matureface counterparts. The underlying reason presented in previous research for why babynessness is positively associated with inferences of trust is that babyface features bring to mind observers’ stereotypes of children, and because children are seen as trustworthy, babyness individuals will also be seen as trustworthy (Berry & McArthur, 1985; Zebrowitz, et al., 1996). However, this begs the question of why children themselves are seen as trustworthy?

Todorov and Oosterhof (2008) stated that trustworthiness judgments are fundamentally “an attempt to infer behavioral intentions.” I argue that because children are viewed as more dependent and less powerful than adults, their behavioral intentions are generally interpreted as less harmful and more benign than those of adults, and hence they are seen as more trustworthy than adults. I also propose that the greater dependence associated with babyness individuals by itself is insufficient to communicate intentions, but when mixed with emotional expressions that communicate such intentions, babynessness increases ratings of trustworthiness.

1.2. Combining Baby-Faced and Emotional Cues

To date, research on the impact of emotional expressions and facial structures on inferences about trust have been conducted fairly independently. I argue that facial expressions and structures have unique characteristics that, when combined, most strongly elucidate inferences of trust. In particular, I propose that emotional expressions give rise to inferences about a person’s intentions—that is, whether a person is seen as harmful versus friendly—but that inferences about such intentions are magnified or reduced depending on the observed individuals’ facial structure. Specifically, I propose that babyness features will enhance the positive intentions inferred from the target’s happy expressions, but inhibit the negative
intentions inferred from angry expressions. By contrast, matureface features will magnify the negative intentions inferred from the target’s angry expressions, but inhibit positive intentions inferred when the target is happy.

These predictions are derived from the conclusion that observers perceive babyface and matureface people as differing in their degree of independence. Babyface individuals are more likely to be perceived as dependent and in need (Keating, Randall, Kendrick, & Gutshall, 2003); as a result, individuals have come to respond to positive emotions of a babyface individual as indexing friendly intentions, but are unlikely to infer harmful intentions when babyface individuals are observed to be angry, relative to when they are observed as having a neutral expression. For those in caregiver roles, this likely served a functional purpose, such that angry emotional expressions resulting from babies would be more likely interpreted as distress—a signal of need—rather than as a signal of harmful intent. After all, murderous babies would have done little to help their own survival rates. Supporting this rationale, research has found that babies’ negative emotions, including anger, are interpreted as a sign of distress (Oster, Hegley, & Nagel, 1992). This explanation leads to the following prediction: relative to a babyface with a neutral expression, happy babyface individuals will be seen as more trustworthy, but angry babyface individuals will not be seen as less trustworthy. Distress is not an emotion that communicates harmful intentions; as such, this provides another piece of evidence for why angry babyface individuals may be seen as less harmful than angry matureface individuals.

By contrast, matureface individuals are seen as relatively more independent and powerful (Keating et al., 2003; Mueller & Mazur, 1996). Accordingly, I argue that individuals who are perceived to be independent and powerful will fundamentally change the interpretation of happy and angry emotions. Specifically, matureface individuals, who are seen as independent and
powerful, will be seen as less trustworthy when angry relative to when they have a neutral expression because they will be seen as more capable of acting on their harmful intentions. However, happy expressions are unlikely to conjure increased ratings of trustworthiness (relative to faces with a neutral expression) because such happiness will likely be interpreted as resulting from the target’s capabilities. I argue that such happiness will be interpreted as self-satisfaction rather than as indexing benign intentions.

A test of such predictions would require that I orthogonally manipulate facial structure (babyface, matureface) and emotional expressions (angry, neutral, happy) in a single study. According to my explanation, in such a test, I predict an interaction. More specifically, I predict that for maturefaces, anger expression will decrease trust inferences in comparison to neutral expression, whereas for babyfaces anger expression will not change trust inferences in comparison to neutral expression. In addition, for babyfaces happy expression will increase trust ratings in comparison to neutral expression, whereas for maturefaces happy expression will not change trust ratings in comparison to the neutral expression.

2. Method

2.1. Participants and Procedure

Pilot testing indicated that the facial structure effect size to be as small as $r = .19$. To best ensure that this study was sufficiently powerful to detect an effect, a power analysis set at 80% calculated using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) indicated a minimum sample size of 450 participants was needed. A total of 477 participants were recruited from Amazon’s Mechanical Turk to participate in the study. Twenty nine people failed an attention task and were excluded from the data analyses. Out of the 448 remaining participants (51.6% female, mean age = 33.92, $SD = 11.94$), 81% identified as European or White, 8% were African
American, 4% were Asian, 4% Hispanic, 1% Native American, and 2% self-identified as “other.” The study consisted of a 2 (facial structure: matureface, babyface) X 3 (emotion: angry, neutral, happy) between-participant design. Each participant was presented with a female and a male photo in a random order (i.e., some participants saw a female photo first and others saw a male photo first).

To create matureface and babyface photos, I manipulated composite male and female pictures that were obtained by compositing 50 male pictures (for the male composite picture) and 50 female pictures (for the female composite picture). These photos are depicted in Figure 1, Panel A (male photo) and Figure 1, Panel B (female photo). Based on previous research (Berry & McArthur, 1985; McArthur & Apatow, 1984), I created the matureface photos by making the chins more pronounced, the eyebrows fuller and thicker, the facial features more angular, and decreasing the distance between eyebrows and eyes. The babyface photos were created by making the chins less pronounced, the eyebrows thinner, the facial features rounder, increasing the distance between eyebrows and eyes, making the lips fuller, and increasing the eye size (see Supplement 1 for further details on the study that was conducted for feature manipulation). The photos are depicted in Figure 2, Panel A (male babyface photo), Figure 2, Panel B (male matureface photo), Figure 3, Panel A (female babyface photo), and Figure 2, Panel B (female matureface photo). Moreover, these were the photos used for the neutral emotion condition. Pilot testing and the results of this study (see the results section for statistical analysis), both revealed that the structural manipulations were successful.

Further, I created happy and angry photos based on descriptions of angry and happy faces provided in Ekman and Friesen (2003). More specifically, to create the happy photos, I upturned the lips, pushed up the cheeks and added “crow’s feet wrinkles” on the sides of the eyes. The
photos are depicted in Figure 2, Panel C (male babyface happy photo), Figure 2, Panel D (male matureface happy photo), Figure 3, Panel C (female babyface happy photo), and Figure 3, Panel D (female matureface happy photo). To derive the angry photos, I moved the eyebrows down, moved them closer together, and made them more arched. The photos are depicted in Figure 2, Panel E (male babyface angry photo), Figure 2, Panel F (male matureface angry photo), Figure 3, Panel E (female babyface angry photo), and Figure 3, Panel F (female matureface angry photo).

Pilot studies that were conducted prior to the study revealed that the structural manipulations (i.e., babyface and matureface) and expression manipulations (i.e., happy and angry) were successful. Further, pilot testing and the results of this study (see the results section for statistical analysis) revealed that the manipulations were successful as well. After being presented with the photos, the participants were asked to rate the photos on trustworthiness, and after completing the study, each participant was paid $1.

2.2. Measures

Trustworthiness. Participants were asked to rate the extent to which they view the person in the picture as “trustworthy” and “honest” on a 7-point scale (1 = not at all to 7 = extremely). I aggregated these two items (Cronbach’s α = .82), to create a composite measure of trustworthiness.

Emotions. In order to determine whether the emotion manipulations were successful I asked participants to answer the following questions: “To what extent do you find him/her to be happy” and “To what extent do you find him/her to be angry” on a 7-point scale (1 = not at all to 7 = extremely).

Babyfaceness. In order to determine whether the structural manipulations were successful I asked participants to answer the following question: “How mature-faced or baby-
faced (i.e. childlike or youthful looking) do you find him/her?" (1 = extremely matureface, 4 = neither matureface nor babyface, 7 = extremely babyface).

Attractiveness. Participants were asked to rate the extent to which they view the person in the picture as “attractive” on a 7-point scale (1 = not at all to 7 = extremely).

3. Results

Analyses indicated that the gender of the target in the photo significantly moderated predicted effects for some of our primary predictions and measures. As a result, to simplify presentation, I have presented analyses of men and women separately. Further, results showed that the order in which participants saw the targets (i.e., whether they saw male targets first or female targets first) did not affect the results. As a consequence, this manipulation was dropped from analyses.

3.1. Reactions to Male Faces

Manipulation checks. Results showed that the emotion manipulations were successful. A one-way ANOVA revealed an effect of happiness expression manipulations on happiness ratings, $F(2, 444) = 122.88$, $p < .001$, $r = .60$. More specifically, independent samples t-tests showed that the male happy photos ($M = 5.38$, $SD = .92$) were rated as significantly more happy than the neutral male photos ($M = 3.99$, $SD = 1.16$), $t(305) = 11.58$, $p < .001$, $r = .56$, and the angry male photos ($M = 3.42$, $SD = 1.24$), $t(295) = 15.48$, $p < .001$, $r = .67$. Further, a one-way ANOVA revealed an effect of angry expression manipulations on anger ratings, $F(2, 445) = 75.20$, $p < .001$, $r = .51$. More specifically, independent samples t-tests showed that the male angry photos ($M = 3.46$, $SD = 1.47$) were rated as significantly more angry than the neutral male photos ($M = 2.76$, $SD = 1.34$), $t(293) = 4.28$, $p < .001$, $r = .25$, and the happy male photos ($M = 1.69$, $SD = 1.00$), $t(293) = 12.20$, $p < .001$, $r = .59$. 
The structural manipulations for males were successful as well. More specifically, independent samples t-tests showed that male babyface photos ($M = 4.84$, $SD = 1.16$) were rated as more babyface than the male matureface photos ($M = 3.95$, $SD = 1.37$), $t(451) = 7.47$, $p < .001$, $r = .33$.

Trust ratings. Attractiveness and babyfaceness have been found to influence perceptions of trustworthiness independently from each other (McArthur & Apatow, 1984). In the case of attractiveness, the effect may reflect the attractiveness halo-what is beautiful is good (see McArthur, 1982; Secord, 1958). Similarly, in the case of babyfaceness, the effect might reflect the babyface overgeneralization effect, whereby individuals with a more childlike appearance are perceived to have more child-like traits, such as being more honest and trustworthy (Zebrowitz et al., 1996). Since I wanted to examine the unique effect of babyfaceness on trust inferences, consistent with previous research (e.g., McArthur & Apatow, 1984; Zebrowitz & McDonalds, 1991; Zebrowitz & Montepare, 1992; Zebrowitz et al., 1996), I controlled for attractiveness in the analysis. The results of a 2X3 ANCOVA for the male targets revealed a main effect of emotional expression on trustworthiness, $F(2, 437) = 25.29$, $p < .001$, $r = .31$. Further, I did not obtain a significant main effect of facial structure on trustworthiness $F(1, 437) = 2.37$, $p = .12$. Consistent with my hypothesis, I found an interaction between emotional expression and facial structure in predicting trust inferences $F(2, 437) = 11.07$, $p < .001$, $r = .21$. Means are presented in Table 1. The pattern of these results remained unchanged in a subsequent set of analyses in which I did not control for attractiveness.

To localize the effects of the interaction, I conducted pair-wise comparison of means. In the matureface condition, the angry male was rated as significantly less trustworthy than the neutral male, $F(1, 142) = 14.16$, $p < .001$, $r = .30$. However, there was not a significant
difference between the neutral male and the happy male on trust inferences, $F(1, 141) = .42, p = .57$. In addition, in the babyface condition, the happy male was rated as more trustworthy than the neutral male, $F(1, 152) = 13.05, p < .001, r = .28$. However, there was no difference between the neutral male and the angry male on trust inferences, $F(1, 149) = .30, p = .59$. Further, without attractiveness partialed out, the results of the pair-wise comparisons remained unchanged.

In sum, consistent with hypotheses for male targets, I found an interaction between emotional expressions and facial structures in predicting trust inferences such that in the matureface condition, anger expression decreased, and happy expression did not change trust inferences as compared to neutral expression. Further, in the babyface condition, happy expression increased, and angry expression did not change trust inferences as compared to neutral expression.

3.2. Reactions to Female Faces

**Manipulation checks.** Results showed that the emotion manipulations for female faces were successful. A one-way ANOVA revealed an effect of happiness expression manipulations on happiness ratings, $F(2, 447) = 117.03, p < .001, r = .59$. More specifically, independent samples t-tests showed that the female happy photos ($M = 5.54, SD = .91$) were rated as more happy than the neutral female photos ($M = 4.13, SD = 1.18$), $t(297) = 11.61, p < 001, r = .56$, and angry female photos ($M = 3.57, SD = 1.33$), $t(296) = 14.93, p < 001, r = .66$. Further, a one-way ANOVA revealed an effect of angry expression manipulations on anger ratings, $F(2, 445) = 109.91, p < .001, r = .58$. More specifically, independent samples t-tests showed that the female angry photos ($M = 3.52, SD = 1.43$) were rated as more angry than the neutral female photos ($M = 2.68, SD = 1.46$), $t(299) = 5.03, p < 001, r = .29$, and the happy female photos ($M = 1.44, SD = .90$), $t(297) = 15.08, p < 001, r = .68$. 

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The structural manipulations were successful as well. More specifically, independent samples t-tests showed that female babyface photos \((M = 4.83, \text{SD} = 1.13)\) were rated as more babyface than the female matureface photos \((M = 3.33, \text{SD} = 1.25)\), \(t(452) = 13.39, p < .001, r = .53\).

**Trust ratings.** For female targets, the results of a 2X3 ANCOVA, controlling for attractiveness, revealed a main effect of emotional expression on trustworthiness, \(F(2, 452) = 26.32, p < .001, r = .32\). However, there was no effect of facial structure on trustworthiness, \(F(1, 452) = .30, p = .61\). Additionally, the interaction between emotional expression and facial structure in predicting trust inferences was marginally significant, \(F(2, 452) = 2.89, p = .055, r = .11\). The pattern of these results remained unchanged whether or not I controlled for attractiveness.

Pair-wise comparison of means did not provide support for my hypotheses for women (see Table 2). More specifically, in the matureface condition, the angry female was not rated as less trustworthy than the neutral female, \(F(1, 153) = .25, p = .62\). Further, the happy female was rated as more trustworthy than the neutral female, \(F(1, 153) = 6.07, p = .015, r = .20\). In addition, in the babyface condition, the happy female was not rated as more trustworthy than the neutral female, \(F(1, 146) = .84, p = .36\). However, the angry female was rated as less trustworthy than the neutral female, \(F(1, 148) = 23.48, p < .001, r = .37\). Further, without attractiveness partialed out, the results of the pair-wise comparisons remained unchanged.

In sum, for female targets I did not find an interaction between emotional expressions and facial structures in predicting trust inferences. Furthermore, contrary to the hypotheses, I found that for matureface females, anger expression did not change, but happy expression increased
trust inferences; and for babyface females, happy expression did not change, but angry expression decreased trust inferences.

4. Discussion

The results of this study supported my hypotheses for the male targets. More specifically, I found that, for targets with babyface features, happy expression led to greater trust inferences relative to a neutral expression condition, but angry expression did not change trust inferences relative to the neutral condition. By contrast, matureface features decreased trust inferences inferred from target’s angry expression, but did not change such inferences inferred from target’s happy expression. These findings support the argument that facial expressions and structures have distinctive characteristics that when combined most strongly elucidate inferences of trust. That is, emotional expressions give rise to inferences about a person’s intentions—more specifically, whether a person is seen as harmful versus friendly—but that such intentions are magnified or reduced depending on the observed individuals’ facial structure.

However, the pattern of results for female targets did not support my hypotheses. This finding may be because matureface features, which signal physical strength (Folstad & Karter, 1992), may not be diagnostic of women’s capability to inflict harm. Research has shown that when women have harmful intentions, they often do not use physical strength to implement those harmful intentions. Rather, women ostracise, stigmatise, and otherwise exclude others from social interaction without risking direct physical confrontation (Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Campbell, 2004). Such acts do not eliminate or physically injure the target; they do, however, inflict stress and diminish the opponent’s reputation and social support (Campbell, 2004). Further, one study found that women’s testosterone levels (which is an index for physical strength and matureface facial features) were not positively related to their status
ranking by their peers, but instead, there was even a negative association between testosterone in women and status (Cashdan, 1995). Thus, Cashdan’s (1995) study suggests that babyface females may be considered more powerful than matureface females. Features that are associated with high babyfaceness in female faces may signal fitness by association with sexual maturity and fertility (Zebrowitz & Montepare, 2008), and perhaps that is why females with babyface features may be perceived as more powerful than their matureface counterparts. Consequently, when matureface women are angry, they may not be perceived as powerful or capable of inflicting harm, but when babyface women are angry they may be perceived as having the power to inflict harm. In terms of smiling, if babyface females are considered to be more powerful than matureface females, it may be the case that in babyface females smiling is perceived as a sign of self-satisfaction, and in matureface females, who may be perceived as lower in power, smiling may be perceived as a sign of submission or affiliation. This in turn can provide an explanation for why happy expression did not increase trust inferences for babyface females, whereas it did for matureface females.

An alternative explanation for the pattern of results obtained for the babyface females is that angry babyface females may be seen as acting in a manner that is inconsistent with what is expected from them and this in turn may result in them being rated lower on trustworthiness. This is because research has shown that babyfaceness ratings are highly correlated with femininity ratings (Barbee, & Pike, 1990). Thus, it is plausible that females who are seen as babyface are highly expected to act consistent with feminine stereotypes. Considering that females are stereotyped and expected to show less anger than males (Plant, Hyde, Keltner, & Devine, 2000), it is possible that people would see a feminine looking woman who is angry as acting in an unusual manner, uncharacteristic of what is expected from her, and consequently this
may lead to decreased trust inferences. In contrast, females are expected to show more happy expressions than males (Plant et al., 2000). Thus, it may be the case that people see a feminine looking woman who is smiling as acting in a usual manner and not necessarily as a cue for affiliation. This in turn may explain why happy expression did not increase trust inferences for the babyface female.

Using average faces and manipulating them to derive mature and baby faces—based on the features that previous studies have shown make up these faces—constitutes an important methodological advance, and allowed me to more easily use an experimental design to examine my hypotheses. To my knowledge the only experimental study that examined the effects of babyfaceness used schematic photos of baby and mature faces (Zebrowitz & Apatow, 1984) which “entail a sacrifice in realism” (Zebrowitz & Apatow, 1984). Other study designs have been correlational and have only used participants’ self-ratings of babyfaceness (e.g., Berry & McArthur, 1985; McArthur & McDonald, 1991; Zebrowitz et al., 1996; McArthur-Zebrowitz & Berry, 1987; Zebrowitz & Montepare, 1992). Experimental designs allow for controlling the independent variable, reduce the effect of unwanted extraneous variables, and are more powerful than correlational designs for evaluating cause-and-effect relationships (Cozby & Bates, 2011).

However, one limitation of the method I used in this study is that we do not know if the results generalize to real-life matureface and babyface individuals. In other words, we cannot be certain that the matureface and babyfaces that I generated are representative of average mature faces and average baby faces respectively. In order to alleviate this problem, future research could utilize composite pictures of matureface and babyface individuals to examine whether facial structures of these average mature and baby face targets interact with the emotional expressions in predicting trust inferences.
This limitation notwithstanding, the main contribution of this research is to show that facial structures matter in the context of how emotional expressions are interpreted, specifically in predicting trust inferences. Previous research programs have documented that trust inferences could manifest from emotional expressions or facial structures. In this study, I showed that it is the combined impact of the two that most strongly explains such inferences in male targets. Another contribution of this research is that I offered an explanation for why children are seen as trustworthy. Previously researchers stated that the reason that babyfaceness is positively associated with inferences of trust is that babyface features bring to mind observers’ stereotypes of children, and because children are seen as trustworthy, babyface individuals will also be seen as trustworthy (Berry & McArthur, 1985; Zebrowitz, et al., 1996). However, previous research has not provided an explanation for the underlying reason why children are viewed as more trustworthy than adults. I argued that children are seen as more trustworthy than adults, because they are viewed to be dependent on adults, physically weak, and as a result less capable of inflicting harm than adults and more in need of affiliation with others than adults. Consequently, their behavioral intentions are in general interpreted to be less harmful and more benign than adults. This explanation in turn helped explain the interaction between facial structures and expressions in predicting trust inferences.

This research has implications for managing other’s perceptions of trustworthiness. In particular, for matureface males, anger decreases the inferences of trustworthiness, whereas it does not affect such inferences for their babyface counterparts. Further, for babyface males happiness increases inferences of trustworthiness, whereas it does not affect such inferences for their matureface counterparts. Thus, in the contexts wherein individuals wish to enhance their relationships and the extent to which others will trust them, it may be helpful for matureface
individuals in particular try to avoid looking angry and for babyface individuals to try to look happy. More broadly, this research may have implications for managing perceptions of trait inferences. Previous research has shown that almost all trait judgments are correlated with trustworthiness and that, out of 13 trait judgements, trustworthiness is the best predictor of all the other trait judgements (the correlation between the first principal component obtained from all trait judgments combined except trustworthiness and trustworthiness judgments was .94; Todorov & Oosterhof, 2008). This suggests that trustworthiness judgments from faces may reflect the general evaluation of the face (Todorov & Oosterhof, 2008). Thus, the findings from this research may be generalizable to other trait judgements that have been shown to be highly correlated with trustworthiness such as emotional stability, responsibility, sociability, being caring, intelligence, being mean, and aggression (negative correlation with the last two).

Further, in this study I only examined two of the six primary emotions—anger and happiness—because previous research has shown that these two emotions are most important for making trust inferences (Oosterhof & Todorov, 2008). However, we do not yet know if other emotions, such as disgust, fear, surprise and sadness, interact with facial features to predict trust or trait inferences more broadly. It may be the case that babyface features modulate the interpretation of all the emotions such that they are interpreted more in terms of affiliation and dependence on others, and matureface features may modulate the inferences of emotions such that they are seen more in terms of dominance related traits. More broadly, it may be the case that depending on the extent to which individuals signal dependence versus dominance, the interpretation of their emotional expressions by others may be different. For example, a smiling face on a high ranking individual within a group may mainly be interpreted as a sign of
dominance, but the same smile on a face of a less powerful individual may mainly be interpreted as a sign of affiliation or submission.

In sum, two independent research programs on trust have previously documented that trust inferences can manifest from two facial cues: emotional expressions (Todorov & Oosterhof, 2008) and facial structures (Zebrowitz & Montepare, 2008). The current study revealed that the combination of these two facial cues most strongly elucidates trust inferences in male targets. More broadly, it may be the case that factors that signal dependence or dominance influence how emotional expressions are interpreted. I hope that the results of the current study will encourage more research on the interaction between the factors that signal dependence or dominance and emotional expressions on the inferences of trust or trait inferences more generally.
References


http://search.proquest.com/docview/619364727?accountid=14771


http://search.proquest.com/docview/619417588?accountid=14771


doi:http://dx.doi.org/10.1037/0012-1649.28.6.1143


Table 1. Descriptive Statistics for Trustworthy Ratings of Male Targets by Facial Structure and Emotional Expression

<table>
<thead>
<tr>
<th>Expression</th>
<th>Facial Structure</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry</td>
<td>4.41 (.10)</td>
<td>4.04* (.10)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>4.48 (.09)</td>
<td>4.64 (.10)</td>
<td></td>
</tr>
<tr>
<td>Happy</td>
<td>4.98* (.09)</td>
<td>4.75 (.10)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Means reported (standard error in parentheses). Within each column, means with asterisk (*) in their superscript are significantly different from the neutral condition.
Table 2. Descriptive Statistics for Trustworthy Ratings of Female Targets by Facial Structure and Emotional Expression

<table>
<thead>
<tr>
<th>Expression</th>
<th>Facial Structure</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry</td>
<td>4.37*</td>
<td>4.57</td>
<td>(.10)</td>
</tr>
<tr>
<td>Neutral</td>
<td>5.06</td>
<td>4.75</td>
<td>(.08)</td>
</tr>
<tr>
<td>Happy</td>
<td>5.29</td>
<td>5.23*</td>
<td>(.09)</td>
</tr>
</tbody>
</table>

Note: Means reported (standard error in parentheses). Within each column, means with asterisk (*) in their superscript are significantly different from the neutral condition.
Figure 1. Panel A. Composite picture of 50 males. Panel B. Composite picture of 50 females.
Supplement 1

The purpose of this pilot study was to create mature and baby faces and examine trust inferences in such faces. Based on previous research (Berry & McArthur, 1985; McArthur & Apatow, 1984; Zebrowitz & Montepare, 1992), I created the maturefaced photos by modifying composite of average faces (see Figure 1, Panel A and Panel B). More specifically, the photos were modified by making the chins more pronounced, the eyebrows fuller and thicker, the facial features more angular, increasing the nose-bridge width, and decreasing the distance between eyebrows and eyes. The babyfaced photos were created by increasing the eye size, making the eyes rounder, the chins less pronounced, the eyebrows thinner, the facial features rounder, increasing the distance between eyebrows and eyes, making the lips and the cheeks fuller, and decreasing the nose-bridge width.

To make the manipulations more objective, I used the measurements obtained from a composite photo of 32 adult faces and 32 children faces (Gruendl, 2003). I used the information obtained from the photo to manipulate the eyes, the chins, the lips, and the nose-bridge. Since the eyebrows of the babyface adult composite photo were not different from the average adult composite photo, I manipulated the eyebrow size. Below, I explain each of these manipulations in more detail.

Manipulating Eyes

Research has shown that babyface people have both rounder and larger eyes. In order to tap into the roundness associated with babyface eyes, I used the composite babyface photo (Gruendl, 2003), and calculated the ratio of the width to length of that photo. This ratio was .46. In order to make the eyes larger, I decided to increase the eye area by 20%. This was because results from a previous pilot study showed that a 20% increase to the area of the eyes yielded an
optimal increase in babyfaceness ratings. Thus, overall in order to derive the eyes for our babyface photo, I needed to increase the area of the eyes by 20% in such a way that the ratio of the eyes was increased to .46. Mathematical calculations revealed that in order to derive the eyes for the babyface photo, I would need to increase the length of the eyes in the average pictures by 16% and the width of the eyes by 4%.

Manipulating Eyebrows

To derive eyebrows for the babyface and matureface photos, I decreased and increased the width of the eyebrows by 30% respectively. In addition, I made the eyebrows for the maturefaced photo look fuller by saturating the color of the eyebrows. Further, these manipulations led to the distance between eyebrows and the eyes to increase for the babyface photos and decrease for the matureface photos.

Chins

To derive the chins for the babyface and matureface photos, I changed the size of the chins and I also changed the roundness of chins. More specifically, to derive the chins for the babyface and matureface photos, the vertical distance between the lips and the lowest point of the chins was decreased or increased by 15% respectively. In addition, I made the chins rounder in our babyface photos and more angular in our matureface photos.

Nose-Bridge, Lips, and Cheeks

To derive the nose-bridges for the babyface and matureface photos, I decreased or increased the width of the nose-bridge by 18% respectively. Additionally, to derive the lips for the babyface and matureface photos, I increased and decreased the width of the lips by 15% respectively. To derive the cheeks for the babyface photo, I made the chins fuller/puffier, but I did not make any changes to the cheeks on the maturefaced photo.
Participants and Procedure

In order to test the validity of structural manipulations and trust inferences, a total of 194 participants were recruited from Amazon’s Mechanical Turk to participate in the study. Seven people failed an attention task and were excluded from the data analyses. Out of the 187 remaining participants (46% female, mean age = 33.56, SD = 10.28), 79% identified as European or White, 12% were African American, 4% were Asian, 3% Hispanic, and 2% self-identified as “other.” The study was a between-participant design which consisted of 3 facial structures: average face, matureface, and babyface. Emotional expression was not manipulated here; the matureface and babyface photos thus represented the photos used in the “neutral expression” condition in the main study. Each participant was presented with a female and a male photo in a random order (i.e., some participants saw a female photo first and others saw a male photo first). To confirm the strength of the manipulation, I included a manipulation check, indexing the degree to which they view the person in the picture as “mature-faced or baby-faced” on a 7-point scale (1 = extremely matureface, 4 = neither matureface nor babyface, 7 = extremely babyface). The participants were also asked to rate the extent to which they view the person in the picture as “trustworthy” on a 7-point scale (1 = not at all to 7 = extremely). After completing the study, each participant was paid $.50.

Results

Manipulation checks. Results showed that our structural manipulations for males were successful. A one-way ANOVA revealed an effect of structural manipulation on babyfaceness ratings, $F(2, 186) = 11.14, p < .001, r = .33$. More specifically, independent samples t-tests showed that the average male photo ($M = 4.30, SD = 1.16$) was rated as less babyfaced than the
babyface male photo ($M = 4.92, SD = 1.28$), $t(122) = 2.81, p = .006, r = .25$, and more babyfaced than the matureface male photos ($M = 3.89, SD = 1.22$), $t(122) = 1.95, p = .054, r = .19$.

In addition, results showed that our structural manipulations for females were successful. A one-way ANOVA revealed an effect of structural manipulation on babyfaceness ratings, $F(2, 186) = 29.17, p < .001, r = .49$. More specifically, independent samples t-tests showed that the average female photo ($M = 4.02, SD = 1.23$) was rated as less babyfaced than the babyface female photo ($M = 4.80, SD = 1.18$), $t(124) = 3.65, p < .001, r = .31$, and more babyfaced than the matureface female photos ($M = 3.18, SD = 1.21$), $t(120) = 3.80, p < .001, r = .33$.

**Trust rating.** For male targets, mean ratings of trust were similar in the babyface ($M = 4.56, SD = 1.03$), average ($M = 4.48, SD = 1.01$), and matureface conditions ($M = 4.63, SD = 1.00$). A one-way ANOVA revealed that there was no effect of male targets’ facial structure on trustworthiness ratings, $F(2, 186) = .39, p = .68$. Similarly, for female targets, mean ratings of trust were similar in the babyface ($M = 4.92, SD = 1.07$), average ($M = 4.97, SD = .81$), and matureface conditions ($M = 4.90, SD = 1.22$). Further, a one-way ANOVA revealed that there was no effect of female targets’ facial structure on trustworthiness ratings, $F(2, 186) = .06, p = .95$.

**Summary of Results**

The results revealed that all the structural manipulations were successful for both males and females. In addition, there was no effect of facial structure on male or female targets’ ratings of trustworthiness.