

Tenderness Expression as a Signal for Trustworthiness

by

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## ABSTRACT

The present research expands on prior research that demonstrated a prototypical facial expression in response to cute, baby-like *Kindchenschema* targets. This expression, referred to as the tenderness expression, is recognizable to onlookers as a response to such stimuli. Across two studies, the current research examined if there were differences in perceptions of trustworthiness (Studies 1 and 2) and willingness to trust (Study 2) toward individuals displaying the tenderness expression as compared to a Duchenne smile or a neutral expression. Results indicate the tenderness expression is associated with lower ratings of trustworthiness relative to a smile, but no differences among the expressions on willingness to trust. Exploratory analyses demonstrate a replicated pattern of differences on the Big Five Personality Inventory among these three expressions. While these findings were not consistent with a priori hypotheses, this research provides further insight into the social implications associated with this tenderness expression.

## DEDICATION

To my family. Fam is Fam.

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## CHAPTER 1

### INTRODUCTION

Being able to recognize and make meaning out of the emotional responses of another person can serve to help individuals avoid threats and pursue opportunities in their environment. For instance, witnessing an individual take a bite of food and immediately show a look of disgust on their face will likely be enough information for others to avoid that food. Similarly, people can use the expressions of others as a cue for important social information. People will be more likely to approach a smiling individual as opposed to a snarling individual, because they are able to infer that the smiling individual is less likely to behave aggressively (Knutson, 1996; Matsumoto & Kudoh, 1993). Recently, research has begun to examine these types of social implications of displaying and recognizing facial expressions of emotions (for review, Shariff & Tracy, 2011). This proposal seeks to add to that research by focusing on a specific facial expression of emotion. In prior research, I identified a prototypical facial expression, that is recognizable to onlookers, as a response to cute-baby like stimuli (O'Neil, Shiota, Danvers, & Hu, *under review*). The current research expands upon this prior work, by examining how onlookers' perceptions of an individual are influenced by the display of this cuteness expression.

#### **Social Implications of Emotion Expression**

Beginning with Darwin (1872) and garnering increased attention since the late 1960s (see Ekman, 1992), researchers have long been interested in the expression of emotions. Early research has demonstrated nonverbal facial expressions for numerous



emotion states that are recognizable across cultures. For instance, Ekman and colleagues (1971/1987) identified six prototypical displays of emotions—fear, anger, disgust, sadness, surprise, and joy/happiness—that are recognizable across numerous cultures. Additionally, research suggests that expressions of emotions such as contempt, pride, and shame are recognized cross-culturally (Ekman & Friesen, 1986; Elfenbein & Ambady, 2002; Haidt & Keltner, 1999; Tracy & Matsumoto, 2008; Tracy & Robins, 2008). Recently, I have conducted research demonstrating a cross-culturally recognizable expression in response to cuteness (O’Neil, Shiota, Danvers & Hu, *under review*).

More recently, research has begun to examine the resulting social effects of these expressions. Certain features of these expressions are thought to have evolved to serve physiological purposes, such as how the scrunching of the nose when feeling disgust serves to constrict airways (Chapman et al., 2009), or the widening of the eyes when feeling fear helps to better identify environmental threats (Susskind et al., 2008). However, over time, showing these expressions, and recognizing them in others, began to convey important social information about an individual’s internal emotional state (Shariff & Tracy, 2011).

Identifying that another person is expressing a given emotion is useful, because it provides information about the likely underlying motivational state of that person, allowing onlookers to make inferences about their likely behavior or current needs. Beall and Tracy (2017) argue that certain emotions evolved, in part, to solve adaptive problems relevant to specific basic motivational systems. Therefore, if recognizing expressions allows people to understand another’s emotion state, expressions also allow people to know what others’ current motives are, and to respond accordingly.

For instance, people across cultures are adept at recognizing the expression of *fear* (Ekman & Friesen, 1971), which is an emotion that prioritizes a self-protection motive over other motives and leads people to avoid dangerous environmental stimuli in facilitation of that motive (Ohman, 2002; Ohman & Mineka, 2001). The fear expression signals to onlookers that an individual is in danger and that the danger may extend to the onlookers themselves, leading the onlookers to either choose to help the individual or avoid the threat themselves (Ohman, 2002; Ohman & Mineka, 2001). Research indicates that while witnessing another's fear expression primes individuals to prepare for danger themselves (Vuilleumier, 2002; Wilkowski & Meier, 2010), they are also motivated to help each other (Knudson, 1996; Marsh, Ambady, & Kleck, 2005). In contrast, while witnessing an anger expression also prepares an individual to prepare for danger, it is associated with wanting to avoid the expresser. (Knutson, 1996; Marsh, et al., 2005, Vuilleumier, 2002; Wilkowski & Meir, 2010). Whereas fear indicates the expresser is feeling threatened, anger indicates that the expresser *is* the threat and may behave dangerously toward an onlooker. Therefore, it behooves onlookers to avoid the angry expresser, but not the fear expresser. This demonstrates that expressions of emotion provide situational insight for onlookers into the likely behavior of the expresser, and also indicates how onlookers themselves should respond.

In addition to drawing inferences about an individual's likely behavior in a given situation, people also tend to use expressions as a cue for trait-level information about that individual. For instance, the emotions of pride and shame are associated with success and failure in, respectively, status and affiliative oriented domains. In line with the underlying motives associated with these emotions, research indicates that showing a

pride expression conveys high status, but showing shame conveys low status to observers (Shariff & Tracy, 2009; Tracy & Matsumoto, 2008). Embarrassment, another socially-oriented emotion, tends to increase perceptions of trustworthiness and likeability, as showing embarrassment indicates to observers that the individual recognizes his social transgression and is likely going to make an effort to avoid such transgressions moving forward (Dijk et al., 2011; Keltner & Haidt, 1999). An angry expression leads people to assume an individual is less trustworthy, but also more competent and dominant (Flowe, 2012; Tiedens, 2001).

Much of this research that has examined the function of expression and inferences people draw has focused primarily on the expression of discrete negative emotions, and until recently has assumed all positive affect is expressed by smiling (for review see Keltner, Tracy, Sauter, Cordaro, & McNeil, *in press*). This body of research demonstrates that smiling is associated with being perceived as more trustworthy, affiliative, and altruistic, but also as less dominant, relative to non-smilers (Brown, Palameta, & Moore, 2003; Knutson, 1996; Krumhuber, Krumhuber, Manstead, Cosker, Marshall, Rosin, & Kappas, 2007; Tracy & Beall, 2011). However, more recent research has begun to identify distinct expressions for various positive emotions, and to differentiate the functions these emotions serve (Campos, Shiota, Keltner, Gonzaga, & Goetz, 2013; O'Neil et al., *under review*; Shariff & Tracy, 2009; Tracy & Robins, 2004). The current research adds to this growing body of research by examining a potential social function of a recognizable expression in response to cute, baby-like stimuli.

## Responding to Cuteness

Across species, infants tend to display a distinctive set of physical and behavioral characteristics that signal to others their infancy and need for care. In mammalian species, these traits have collectively been referred to as the *Kindchenschema*, roughly translated to mean “baby schema” or “cuteness,” more colloquially (Lorenz, 1943).

*Kindchenschema* features include soft, rounded features, small nose and mouth clustered tightly together, high forehead, large cheeks, large eyes relative to the rest of the face, and short, stubby limbs relative to the rest of the body (Lorenz, 1943, as cited in Vicedo, 2009; Trivers, 1974). Behaviorally, these traits include cues of clumsiness and an inability to reach one’s goals (Lorenz, 1971).

From an evolutionary perspective, *Kindchenschema* features are thought to serve the adaptive function of signaling infancy to others. Through the lens of the parent, this stimulus evokes provision of care and protection for one’s offspring, which helps ensure the offspring’s survival and serves the crucial adaptive goal of successfully propagating one’s own genes (Kenrick, Griskevicius, Neuberg, & Schaller, 2010, *for review*: O’Neil, Danvers, & Shiota, 2018). These physical cues of infancy seem to elicit a response more generally toward not just one’s own offspring, but other infants/children, or at times even other species (Archer, 1997; Belk, 1996; Hrdy, 1999). Infants, puppies, and kittens with high *Kindchenschema* features are rated as being cuter, are looked at longer, and elicit a stronger desire to provide care than those with fewer, or less exaggerated features (Fullard & Reiling, 1976; Glocker, Langleben, Ruparel, Lougehead, Gur, & Sachser, 2009; Golle, Lisibach, Mast, & Lobmair, 2013; Hildebrandt & Fitzgerald, 1978/1979/1981; Little, 2012; Schleidt, Schiefenhovel, Stanjek, & Krell, 1980). In certain

primate species where infant-sharing is common among females, newborns have brightly colored fur that fades with age (Hrdy, 1999). While this may seem maladaptive as it makes newborns more visible to predators, it also serves as a physical cue of infancy, and leads females in the social group—not just the mother—to show greater investment in caring for and protecting these newborns.

These caregiving tendencies toward *Kindchenschema* targets are facilitated by a specific emotional response, referred to here as “tenderness”, which includes a suite of cognitive, affective, physiological and behavioral changes, that act in concert to quickly promote caregiving (Bell, 2001; Darwin, 1872; Hrdy, 1999; Kalawaski, 2010; Lorenz, 1950/1971; McDougall, 1908; *for review*: O’Neil et al., 2018; Shaver, Morgan & Wu, 1996; Shiota, Campos, Oveis, Hertenstein, Simon-Thomas, & Keltner, 2017; Shiota, Neufeld, Danvers, Osborne, Sng, & Yee, 2014). Tenderness is thought to be distinct from other emotions such as sadness and joy, and involves a warm, positive, and pleasant feeling (Kalawaski, 2010, Frodi, et al., 1978, Shiota et al., 2017; Shiota et al., 2014). A suite of physiological and neural changes associated with tenderness suggests that it may involve an increase in approach motivation (Bartels & Zeki, 2004; Galbally, Lewis, Ijzendoorn, & Permezel, 2011; Glocker et al., 2009; Sherman, Haidt, & Coan, 2009; Shiota et al., 2011; Strathearn, Fonagy, & Montague, 2008; Tkaczyszyn et al., 2013). Infant faces draw visual attention more strongly than adult faces (Brosch, Sander, & Scherer, 2007; Cárdenas, Harris, & Becker, 2013), and infant vocal responses promote increased proximity seeking behavior between the infant and caregiver (Bowlby, 1969; Frodi, et al., 1978; Schuetze and Zeskind, 2001; Soltis, 2004). Several studies demonstrate that tenderness evokes increased caution, care, and narrowed attention, in

both motor and cognitive tasks (e.g., Griskevicius, Shiota & Neufeld, 2010; Nittono, Fukushima, Yano, & Moriya, 2012; Sherman et al., 2009; Sherman, Haidt, Iyer, & Coan, 2013). This existing empirical research demonstrates that *Kindchenschema* targets elicit a specific tenderness response, that facilitates caregiving.

### **Expressive Responses to Cuteness**

*Kindchenschema* targets also seem to evoke associated expressive responses in individuals. Recent research has suggested that in addition to these increased displays of care, cute stimuli also elicit a desire to express playful aggression toward the cute stimulus (e.g. gritting teeth, pinching cheeks, etc.; Aragón, et al., 2015). Across the world, when interacting with infants and dogs, people demonstrate a distinctive speech pattern characterized by high-pitched, musical intonation, known as *motherese* (Falk, 2004; Hirsh-Pasek & Treiman, 1982; Snow, 1972). Chimpanzee mothers are known to make a repeated *hoo* sound when they are separated and seeking reunion with their infant (Goodall, 1986). People and certain primate species engage in more gentle stroking, patting and cuddling to express love and maternal care (Goodall, 1986; Hertenstein, Keltner, App, & Bulleit, 2006). People also tend to smile more while looking at infants than when looking at adults (Hildebrandt & Fitzgerald, 1978/1981; Schleidt et al., 1980).

Santibáñez and Bloch (1986) suggested the possibility of a facial expression associated with tenderness. Recently, I identified such a facial expression by recording and coding the facial expressions of individuals watching video clips of extremely cute babies and baby animals (O'Neil et al., *under review*). This expression involves a rather complex set of facial muscle movements including the components of an authentic *Duchenne* smile (raising of the lip corners and cheeks), a raising of the chin, a tightening

or pressing of the lips, and at times the pulling down and tightening of the lip corners, and the raising of the eyebrows. Furthermore, we demonstrated that this expression is recognized as a response to *Kindchenschema* targets by others, cross-culturally. However, research has not yet examined the social effects of this expression. If the underlying purpose of the tenderness emotion is to facilitate caregiving toward a *Kindchenschema* target, it would seem that the expression of tenderness would primarily serve as a signal to that target. Our prior research indicates that this expression is recognized by adults as a response to cuteness, but has not identified what this expression may be signaling to other adults. That is, what are the social implications or inferences being drawn by onlookers recognizing this expression?

### **Signal for Trustworthiness**

This tenderness expression serves as a signal that an individual is motivated to help and provide care to vulnerable others (i.e. *Kindchenschema* targets). Onlookers may be using this signal of care and helpfulness to identify and capitalize on the expresser's likely behavior. Research demonstrates that people's perceptions of trustworthiness increase when they observe another to be more helpful (de Jong, Van der Vegt, & Molleman, 2007; Lotz-Schmitt, Siem, & Sturmer, 2017). Therefore, when onlookers recognize the tenderness expression, they may infer that this individual is willing to help others, and may therefore be more trustworthy.

Trustworthiness has been defined as one's willingness to meet another's positive expectations—that is, to cooperate with another (Boone & Buck, 2003; Levine, Bitterly, Cohen, & Schweitzer, 2018). One way that people make judgments of another's

trustworthiness is by using that individual's emotion expressions as a social cue (Frank, 1988/2001; Krumhuber, et al., 2007; Scharlemann, Eckel, Kacelnik, & Wilson, 2001). For instance, individuals who are high in emotional expressivity tend to be more trustworthy, and are perceived by others to be so (Boone & Buck, 2003; DePaulo, 1992; DePaulo, Stone, & Lassiter, 1985); Friedman & Miller-Herringer, 1991). Individuals who are emotionally expressive are not good at faking their emotions; therefore, if they intended to defect, it would be easy for others to detect. Partly out of necessity, emotionally expressive individuals tend to actually be more cooperative, and thus more trustworthy, than their less expressive counterparts (Schug, Matsumoto, Horita, Yamagishi, & Bonnet, 2010). Observers tend to infer, somewhat accurately, that more expressive individuals are more trustworthy. Onlookers are particularly likely to infer trait trustworthiness and to expect cooperative behavior from those expressing positive emotion, especially a Duchenne smile (Brown et al., 2003; Mehu, Grammer & Dunbar, 2007; Mehu, Little & Dunbar, 2007; Scharlemann et al., 2001). Given that the tenderness expression is reflective of a positive emotion, and happens to include the components of the Duchenne smile, expressing tenderness may similarly elicit increased perceptions of trustworthiness.

Trust in other individuals can also be increased or decreased based on the schemas or stereotypes associated with the target's particular group memberships (Bodenhausen, Macrae, & Sherman, 1999; Brewer, 2008; Loundt, 2010; Orbell, Dawes, & Schwartz-Shea, 1994). A nurse or school teacher may be perceived as more trustworthy, whereas a used-car salesman may be perceived as less trustworthy, simply as a result of their respective professions. Knowledge of an individual's past behavior is



often an effective heuristic for their likely future behavior (Holmes, 1991; Lewicki & Bunker, 1995; Rousseau & McLean Parks, 1993). A person who always cooperates is more likely to cooperate in the future, as opposed to an individual who regularly defects or cheats (Rapoport, & Chammah, 1965). Tenderness is an emotion that motivates caregiving and helping behavior. Mayer, Davis, and Schoorman (1995) argue that one of the core pillars of trustworthiness is perceiving that an individual is both caring and in tune with the needs of others. Therefore, displaying an expression associated with caring and being in tune with the needs of others may serve to increase perceptions of trustworthiness, or a willingness to trust that individual.

## CHAPTER 2

### CURRENT RESEARCH

The current research investigates the relationship between this tenderness expression that people display in response to *Kindchenschema* targets and perceptions of trustworthiness. Across two studies, I have examined if participants perceive individuals to be more trustworthy, and are more willing to trust these individuals, if they are displaying the tenderness expression relative to a neutral expression, or a Duchenne smile. Given that prior research indicates that smiling increases perceptions of trustworthiness (Brown et al., 2003; Mehu et al., 2007a; Mehu et al., 2007b; Scharlemann et al., 2001), it was important to distinguish the tenderness expression from smiling in this regard. In the first study, participants were asked to report their perceptions of target individuals' trait trustworthiness. In the second study, participants also played an investment game assessing their willingness to trust a target individual.

Hypotheses:

Study 1: Participants were expected to rate the trustworthiness of individuals as highest when those individuals show the tenderness expression relative to showing a Duchenne smile or a neutral expression, and least trustworthy to individuals showing a neutral expression.

Study 2: Participants were expected to be the most willing to trust an individual displaying a tenderness expression, relative to a Duchenne smile or a neutral expression, and least willing to trust an individual showing a neutral expression.

1. Participants should show the highest monetary risk toward the tenderness expresser, relative to a Duchenne smiler or a neutral expresser, and lowest risk toward the neutral expresser.
2. Participants should expect the highest return on their investment from the tenderness expresser, relative to a Duchenne smiler or a neutral expresser, and lowest return on investment from the neutral expresser.

## CHAPTER 3

### STUDY 1

The purpose of this study is to examine whether participants show differences in their perceptions of trait trustworthiness in individuals displaying certain facial expressions. I expected that participants would rate individuals as having the highest trait trustworthiness when those individuals display the tenderness expression, as compared to a Duchenne smile or a neutral expression.

#### **Method**

**Participants.** Participants were recruited online through Amazon's Mechanical Turk, and were compensated \$0.70 for 10-15 minutes of their time. Of the 276 participants who completed the survey, 23 reported at the end that they had completed the survey before, and 25 failed to respond when asked if they had completed the survey before. These participants were removed from analyses, leaving a final sample of  $N = 228$  (111 females [48.7%],  $M_{age} = 35.20$  years, range = 18-70).

**Design.** This study involved a 2x3x3 mix-method design. Participants viewed still frames of past participants showing different facial expressions while watching a specific film clip.

Participants were randomly assigned to one of two between-subject Context conditions, where they were either told that the individuals in the frames were watching a video of cute babies and baby animals (i.e. *Kindchenschema* Context condition,  $n=111$ ), or were simply told that the individual posers were watching a video without being given context as to the contents of that video (i.e. No Context condition,  $n=117$ ). This between-

subject independent variable was included in order to examine if there are differences in participants' perceived trustworthiness of these posers depending on if they are provided context of the elicitor for the given facial expressions, or not.

The expressions shown in the still-frames served as the primary within-subject independent variable of interest, and included: a tenderness expression, a simple Duchenne smile, and a neutral expression. Each participant viewed three images in total: one image of each of the three expressions, each displayed by a different poser. The order of the expressions was randomized, and the expression displayed by each of the three posers was evenly counterbalanced across participants.

Poser was an additional within-subject variable, orthogonal to expression; each poser contributed a pose of each expression to the stimulus set. However, poser was not hypothesized to have a significant effect. Preliminary analyses using One-Way ANOVAs revealed that poser did not have a significant effect on perceptions of trustworthiness. Neither main effect of poser collapsing across conditions nor main effects of poser separately within each expression were significant. As such, the analyses presented here assumed a design of a 2x3, with Context Condition and Expression Condition serving as the two primary independent variables.

### **Materials.**

*Expression Stimuli.* Participants viewed three still frames selected from FACS-coded spontaneous expressions displayed by participants in a prior study while viewing extremely cute baby animals and human babies (O'Neil et al., *under review*). Only still images of participants who had given written consent for their videos to be shown to participants in future studies were included as stimuli. I selected a total of nine still

frames across three expression posers, displaying three expressions each: a tenderness expression, an authentic smile, and a neutral (see Appendix A).

*Trustworthiness Measure.* In order to assess perceived trustworthiness, participants completed a personality measure with added trustworthiness items (see Appendix B). The personality test used was the Ten Item Personality Inventory (TIPI), which is a shortened measure of the Big Five personality inventory (Gosling, Rentfrow, & Swann, 2003). This scale measures the personality traits of Extraversion, Agreeableness, Conscientiousness, Openness, and Neuroticism across 10-items on a 7-point Likert scale (1=Strongly disagree, 7=Strongly agree). For each trait, there is one direct-scored item, and one reverse-scored item (e.g. for Extraversion, standard item: “extraverted, enthusiastic,” and reverse-scored item: “reserved, quiet”) that are averaged together. Embedded within the TIPI scale, I added two trustworthiness items on the same 7-point Likert scale, with one direct-scored item (i.e. trustworthy, reliable) and one reverse-scored item (i.e. dishonest, lacking integrity), that will be averaged together as a measure of “trustworthiness.”

**Procedure.** Participants viewed still frames of three individuals, and rated each individual on a personality test. Participants were informed that these individuals participated in a previous study where they completed the personality test and then watched a specific film clip while we recorded their facial responses, but the contents of the film clip cannot be seen in these recordings. Participants were also told that the still frames of the individuals were taken from random points in the recording, and that we are now interested in participants’ accuracy in judging others’ personalities based on limited information. In reality, the individuals in the still frames did not complete the personality

measure, and we are simply interested in the current participants' ratings of these individuals. Participants then completed a short demographics questionnaire.

## Results

**Trustworthiness Ratings Analyses.** In order to examine if there are differences in perceptions of trustworthiness based on facial expression, I ran a mixed ANOVA, comparing trustworthiness ratings between the context or no-context between-subject conditions, and across the three emotion expression within-subject conditions, including gender of participant as a moderator. Preliminary analyses indicated that gender of participant did not significantly moderate effects. Results indicate no significant differences between the *Kindchenschema* context ( $M = 5.01$ ) and the No context ( $M = 4.95$ ) conditions,  $F(1,226) = 0.22$ , *n.s.*, partial  $\eta^2 = .001$ . Further, there was no significant interaction between the context condition and the expression conditions,  $F(2,452) = 1.96$ , *n.s.*, partial  $\eta^2 = .009$ . There was a significant difference among the facial expression conditions,  $F(2,452) = 46.86$ ,  $p < .001$ , partial  $\eta^2 = .172$  (See Figure 1).. In line with prior research, the Smile expression ( $M = 5.44$ ) elicited significantly higher ratings of trustworthiness than the Neutral expression ( $M = 4.59$ ,  $p < .001$ ,  $d = .74$ ). In line with the hypothesis, the Tenderness expression ( $M = 4.91$ ) also had significantly higher ratings of trustworthiness than the Neutral expression ( $p < .001$ ,  $d = .25$ ). Contrary to my hypothesis, however, the Tenderness expression had significantly lower ratings of trustworthiness than the Smile expression ( $p = .001$ ,  $d = .48$ ).

**Exploratory Big Five Analyses.** In order to examine if there were additional perceived trait differences in people displaying these three expressions, I ran exploratory

analyses using One-Way ANOVA to compare the three expression conditions on each of the Big Five personality traits (i.e. Extraversion, Agreeableness, Conscientiousness, Openness, and Neuroticism). These analyses revealed several differences among the three expression conditions across the personality traits (see Figure 5). Specifically, the tenderness expression ( $M = 4.70$ ) was associated with higher ratings of Extraversion than the neutral expression ( $M = 3.63, p < .001$ ) but lower than the smile expression ( $M = 5.03, p = .001$ ),  $F(2,506) = 84.46, p < .001$ , partial  $\eta^2 = .25$ . The tenderness expression ( $M = 4.70$ ) was associated with higher ratings of Agreeableness than the neutral expression ( $M = 4.00, p < .001$ ), but lower than the smile expression ( $M = 5.45, p < .001$ ),  $F(2,506) = 91.39, p < .001$ , partial  $\eta^2 = .28$ . The tenderness expression ( $M = 4.38$ ) was associated with lower ratings of Openness than the smile expression ( $M = 4.94, p < .001$ ), but higher than the neutral expression ( $M = 4.06, p = .002$ ),  $F(2,506) = 41.42, p < .001$ , partial  $\eta^2 = .14$ . In contrast, the tenderness expression ( $M = 4.31$ ) was associated with lower ratings of Conscientiousness than both the smile ( $M = 5.04, p = .002$ ) and neutral ( $M = 4.70, p < .001$ ) expressions,  $F(2,506) = 28.04, p < .001$ , partial  $\eta^2 = .11$ . Moreover, the tenderness expression ( $M = 4.23$ ) was associated with higher ratings of Neuroticism than both the smile expression ( $M = 3.11, p < .001$ ) and the neutral expression ( $M = 3.68, p < .001$ ),  $F(2,506) = 58.01, p < .001$ , partial  $\eta^2 = .19$ .

## **Discussion**

These results indicate that contrary to hypothesis, the tenderness expression was associated with lower perceptions of trustworthiness of poser than the Duchenne smile. However, in line with hypothesis, the tenderness expression was associated with higher perceptions of trustworthiness than the neutral expression. Additionally, exploratory



analyses on perceptions of the Big Five indicate that tenderness expression is associated with perceptions of Extraversion, Agreeableness, and Openness that are lower than the Duchenne smile but higher than the neutral expression. The tenderness expression led to perceptions of the lowest ratings of Conscientiousness and the highest ratings of Neuroticism relative to the Duchenne smile and neutral expression. In Study 2, I sought to replicate the findings presented here as well as expand upon these findings using a behavioral measure of perceived trustworthiness.

## CHAPTER 4

### STUDY 2

In addition to replicating Study 1, the purpose of Study 2 was to examine if there are differences in people's willingness to engaging in trusting behavior depending on a novel partner's facial expression. In this study, participants engaged in a trust game, called the "Investor Game," wherein their willingness to trust their partner was operationalized by the number of tickets they "invest" with (i.e., give to) their partner in the game, as well as the number of tickets they expect their partner to return to them. Although Study 1 indicated higher trait ratings of trustworthiness toward the smiling faces relative to the tenderness faces, I hypothesized that participants would expect that people expressing tenderness would be perceived as more caring and prosocial. Therefore, I expected participants would invest the greatest number of tickets, and expect the greatest amount of return, when their partner is displaying the tenderness expression, as compared to a Duchenne smile or a neutral expression. Further, I expected the Duchenne Smile to be associated with a greater number of tickets invested and expected return on that investment than the neutral expression.

#### **Method**

**Participants.** Participants were recruited online through Amazon's Mechanical Turk, and were compensated \$0.70 for 10-15 minutes of their time. Of the 305 participants who completed the survey, 23 reported at the end that they had completed the survey before, and 5 failed to respond when asked if they had completed the survey

before. These participants were removed from analyses, leaving a final sample of  $N = 277$  (123 females [44.4%],  $M_{age} = 36.1$  years, range = 18-70).

**Design.** This study involved a 3x3 between-subject design. Because Study 1 did not show differences on the Context Condition, this variable was removed for Study 2. In Study 2, all participants were given no context for the facial expression of their partner beyond being told that the partner was watching a film clip.

The same expression conditions used in Study 1 were used in Study 2; however, this served as a between-subject variable in Study 2. These expressions included a tenderness expression, an authentic smile, and a neutral expression. Poser was a between-subject variable; however, poser was not hypothesized to have a significant effect on perceptions of trustworthiness.

**Materials.** The same expression stimuli used in Study 1 were used in this study. Unlike Study 1, participants only viewed one of the nine still frames; however, the frames were randomly and evenly distributed among participants. Thus, participants were divided into three expression conditions: Neutral ( $n=94$ ), Smile ( $n=92$ ), and Tenderness ( $n=91$ ). Participants were told that this individual is their “partner” for the investment game and that the still frames were taken at a random point while their partner watched a video. Participants were not given contextual information regarding the content of the video that their “partner” was watching.

**Procedure.** After consent procedures, participants were told that they were going to play a game with a partner, who they believe to be another participant currently doing a separate task involving watching a film clip, while they are receiving instructions about the game. They were then given the instructions of the investment game and shown a still

frame of their “partner” at an allegedly random point while the partner was watching the film clip.

In the investment game (Berg, Dickhaut, & McCabe, 1995), participants are told that they have been given 10 raffle tickets for a drawing for an extra \$25 payment for one participant that will be drawn when the study is finished with data collection. They are told that they can choose to give as many of their raffle tickets as they want to their partner, and whatever number of raffle tickets they give to their partner will triple (i.e. if they give all ten tickets, the partner will have 30 tickets). The partner can then choose to return as many tickets back to the participant as the partner wants. Therefore, participants have the opportunity to increase their total number of raffle tickets, but only if they are willing to risk giving a proportion of their guaranteed tickets to their partner, and trust their partner to return more tickets back to them. After receiving these instructions, participants were first asked to indicate how many of their raffle tickets they wanted to give to their partner. Then, while ostensibly waiting for the partner’s response, participants filled out a short questionnaire, where they first indicated how many raffle tickets they expect their partner to give back to them, and then completed the same personality test measure about their partner that was used in Study 1. Participants were then informed that there was no actual partner in this game, and that every participant was given the maximum number of raffle tickets they invested. Thus, if a participant “gave” 10 tickets to their partner, they received 30 entrances into the raffle; if a participant “gave” five tickets to their partner, they received 15 entrances into the raffle.

## Results

**Trustworthiness Ratings Analyses.** Preliminary analyses using a Two-Way ANOVA comparing perceptions of trustworthiness based on facial expression of poser by poser, with gender included as a moderator revealed no significant effects of poser on perceptions of trustworthiness, and no significant differences between male and female participants. As such, the analyses presented here examined main effect of the Expression Condition as the primary independent variable. These analyses indicated that similar to Study 1, there were significant differences among the three expression conditions in ratings of partner trustworthiness,  $F(2,268) = 5.33, p = .005$ , partial  $\eta^2 = .040$  (See Figure 2). Specifically, in line with prior research and the findings from Study 1, the Smile expression ( $M = 5.52$ ) elicited significantly higher ratings of trustworthiness than the Neutral expression ( $M = 5.02, p = .01, d = .401$ ). Also in line with the findings from Study 1, but contrary to my hypothesis, the Tenderness expression ( $M = 5.09$ ) had significantly lower ratings of trustworthiness than the Smile expression ( $p = .003, d = .46$ ). Unlike Study 1, there were no significant differences between Tenderness and Neutral on ratings of trustworthiness ( $n.s., d = .062$ ).

**Investment Game Analyses.** In order to examine if there are differences in willingness to trust based on a partner's facial expression, I examined the number of raffle tickets given to the participant's partner in the investment game. Because this variable was multi-modal and thus not normally distributed, I conducted a non-parametric test, the Kruskal-Wallis H Test, to compare the three expression conditions. These results indicate no significant differences among the three expression conditions on number of raffle tickets given to the partner,  $H(2) = 0.72, n.s.$  (See Figure 3).

In order to examine if there were differences in the expected return on their investment, I calculated the proportion of the total amount available after investment and tripling that participants anticipated receiving back from their partner. That is, if participants gave their full 10 raffle tickets to their partner, and expect to receive all 30 raffle rickets in return, this was transformed into a proportion of 1.0; if participants gave their full 10 raffle tickets and expected to receive 15 raffle tickets in return, this was transformed into a proportion of 0.50. Because this variable was also multi-modal and thus non-normally distributed, I conducted a Kruskal-Wallis H-test to compare the three expression conditions on these proportions of expected return, revealed no significant differences among the three expression conditions,  $H(2) = 0.84, n.s.$  (See Figure 4).

**Exploratory “Big Five” Analyses.** I also examined if the exploratory analyses from Study 1 indicating differences in perceptions of poser Big Five personality traits based on poser expression would replicate in this sample. These analyses indicate a somewhat consistent pattern of replication of the Study 1 findings (see Figure 5). Specifically, similar to Study 1, the tenderness expression ( $M = 4.97$ ) was associated with higher ratings of Extraversion than the neutral expression ( $M = 4.13, p < .001$ ), but in this study did not differ significantly from the smile ( $M = 4.98, n.s.$ ),  $F(2,274) = 17.08, p < .001$ , partial  $\eta^2 = .11$ . The tenderness expression ( $M = 5.1$ ) was associated with lower ratings of Agreeableness than the smile expression ( $M = 5.69, p < .001$ ), but in this study did not differ significantly from the neutral expression ( $M = 4.84, n.s.$ ),  $F(2,274) = 14.08, p < .001$ , partial  $\eta^2 = .093$ . The tenderness expression ( $M = 4.79$ ) was associated with marginally lower ratings of Openness than the smile expression ( $M = 5.07, p = .08$ ), and higher ratings of Openness than the neutral expression, although this was non-significant

( $M = 4.57, p = .17$ ),  $F(2,274) = 4.91, p = .008$ , partial  $\eta^2 = .035$ . Similar to Study 1, the tenderness expression ( $M = 4.68$ ) was associated with lower ratings of Conscientiousness than the smile expression ( $M = 5.31, p < .001$ ), and marginally lower than the neutral expression ( $M = 5.03, p = .07$ ),  $F(2,274) = 7.90, p < .001$ , partial  $\eta^2 = .055$ . Replicating Study 1, the tenderness expression ( $M = 3.80$ ) was associated with higher ratings of Neuroticism than both the smile expression ( $M = 2.88, p < .001$ ) and the neutral expression ( $M = 3.06, p < .001$ ),  $F(2,274) = 13.74, p < .001$ , partial  $\eta^2 = .09$ .

## **Discussion**

These results replicated the finding Study 1 that the tenderness expression was associated with lower perceptions of trustworthiness of poser than the Duchenne smile. However, unlike Study 1, the tenderness expression was not significantly different from the neutral expression on perceptions of trustworthiness. There were no differences found among the expression conditions on participants' willingness to trust or expectations of return on investment with their partner. Exploratory analyses on perceptions of the Big Five were largely replicated from Study 1. The tenderness expression led to perceptions of the lowest ratings of Conscientiousness and the highest ratings of Neuroticism relative to the Duchenne smile and neutral expression. Additionally, the pattern from Study 1 that the tenderness expression is associated with perceptions of Extraversion, Agreeableness, and Openness that are lower than the Duchenne smile but higher than the neutral expression, tended to replicate; however, certain contrasts were only marginally or non-significantly different in Study 2.

## CHAPTER 5

### DISCUSSION

While Study 2 did not find any differences among the “partner” facial expressions in participants’ willingness to trust their partners in the investment game, both studies found that participants did infer different levels of trustworthiness depending on the target’s expression. However, these findings were contrary to hypotheses. Specifically, results suggest that participants perceive lower levels of trustworthiness in an individual displaying the tenderness expression as compared to a simple Duchenne smile. Also, Study 1 suggests that, in line with the hypothesis, the tenderness expression leads to perceptions of higher trustworthiness relative to a neutral expression.

Exploratory analyses demonstrated a consistent pattern of perceived trait differences among the displayed expression of an individual. The tenderness expression evokes lower perceptions of Extraversion, Openness, and Agreeableness relative to a Duchenne smile, but evokes higher perceptions of these traits than a neutral expression. Further, the tenderness expression evokes lower perceptions of Conscientiousness and higher perceptions of Neuroticism relative to both a Duchenne smile and a neutral expression.

Prior research demonstrated that people recognize a distinct facial expression in response to cuteness (O’Neil et al., *under review*). The goal of the present research was to expand upon this research by examining what this recognizable tenderness expression may be signaling or communicating to others. While I did not find support for my hypothesis that the tenderness expression would increase perceptions of trustworthiness



relative to a smile, the findings reported above do provide insight into the inferences people draw about others who display this tenderness expression.

The tenderness expression appears to lead to an attenuation of certain traits—Extraversion, Agreeableness, Openness, and trustworthiness—relative to a smile. However, the finding that the tenderness expression is lower in Conscientiousness and higher in Neuroticism relative to both a Duchenne smile and a neutral expression is particularly intriguing because it demonstrates that the tenderness expression is signaling something qualitatively distinct from a smile.

Early expression research posited that positive emotion generally is expressed with a smile (for review Keltner et al., *in press*). More recently, however, research has identified a more nuanced understanding of expressions in response to a variety of positive emotions; wherein, different positive emotions elicit expressions that often include the features of a smile, but involve the activation of additional muscles as well (Campos et al., 2013; O’Neil et al., *under review*; Tracy & Robins, 2004). This research has demonstrated that people infer distinct characteristics from showing these expressions that are not inferred from a simple smile, such as the pride expression being associated with a perception of higher status and dominance of an individual (Shariff & Tracy, 2009). The present research adds to this literature by demonstrating that people infer certain traits toward an expressive display of tenderness that are not inferred toward a display of a smile.

Additionally, given that tenderness is a positive emotion associated with caregiving (for review O’Neil et al., 2018), it was unexpected that the tenderness expression would lead to an increase in perceptions of Neuroticism and a reduction in

perceptions of Conscientiousness. Neuroticism is associated with emotional instability, high anxiety, becoming easily upset, and often with negative affect (John & Srivastava, 1999). However, in this case, the tenderness expression, an expressive response to a positive emotion, is increasing perceptions of Neuroticism. Conscientiousness is associated with being responsible, dependable, and organized. One might expect that an individual expressing tenderness, which is associated with increased vigilance and narrowed, careful attention (John & Srivastava, 1999), might lead to an increase in Conscientiousness. However, the findings from the present research do not support that prediction. This unexpected finding provides a starting point for understanding how people *perceive* those expressing—and perhaps, by extension, experiencing—tenderness. Future research is needed to further elucidate what specifically the tenderness expression is signaling that leads to these perceived increases in Neuroticism and decreases in Conscientiousness.

One limitation of the current research is that in Study 1, there was no attention check to identify if participants in the *Kindchenschema* context condition encoded the information that the posers were watching babies and baby animals. No differences were found between the *Kindchenschema* and No context conditions. However, because participants were not asked to recall if they remember the context for what the posers were watching, it is unclear if participants were attuned to that detail in the study at all. Follow-up research should emphasize this context more clearly, and then confirm with an attention check at the end of the study that participants encoded that the posers were in fact watching *Kindchenschema* targets.

Additionally, while the present research offers initial insight into people's perceptions of those expressing tenderness, the present research used three female posers for displaying these expressions. Thus, it is unclear if these findings are a result of the expression itself or perhaps if gender is a moderating variable, wherein people only infer these trait perceptions when women show this expression. Replicating this research with both male and female posers would provide further clarification on the causes of these differences in perceptions based on facial expression. If the same trends hold for both male and female posers, this would suggest that features of the tenderness expression itself are signaling different cues than a smile or neutral expression. However, if gender is moderating this effect, and the pattern is only present for female posers, it may suggest that females showing the tenderness expression activates a maternal or motherly stereotype involving these changes in trait perceptions.

The current research did not find differences in willingness to trust individuals showing the tenderness expression as compared to a smile or neutral expression. However, willingness to trust was operationalized as potential financial/material gain. The tenderness expression may not be influencing people's willingness to engage in financial risk taking, but perhaps it is associated with a different component of trustworthiness. Trustworthiness is thought to consist of three core pillars: ability (e.g. competent, capable), benevolence (e.g. caring, empathic), and integrity (e.g. ethical, principled; Mayer et al., 1995). The measure of trust that was used in Study 2, emphasized the integrity component. However, tenderness leads individuals to provide care and help toward *Kindchenschema* targets (for review see O'Neil et al., 2018). The implication of this feature of tenderness is that the targets of the care and help are in need.

This is more in line with the benevolence component of trustworthiness. Thus, future research should examine if expressing tenderness leads to being perceived as more altruistic or prosocial.

One of the most proximal future directions for this area of research is to investigate potential mechanisms that explain the increase in Neuroticism and decrease in Conscientiousness from perceiving the tenderness expression. One possible mechanism is that the tenderness expression is activating a stereotype of new mothers, or perhaps caregivers more generally. The stereotype of new new mothers being overwhelmed, exhausted, and hyper-anxious about their child's health and well-being is well-known and often caricatured in the media (Sánchez-Rodríguez, Perier, Callahan, & Stayed, 2019). Perhaps the tenderness expression is serving as a signal for this stereotype, as the findings from the present research indicating less Conscientiousness and more Neuroticism perceived toward those showing tenderness fall in line with this stereotype. By replicating this research with both male and female posers, research will be able to offer initial clarification on this point. If only female posers of the tenderness expression elicit lower Conscientiousness and higher Neuroticism, this suggests that the tenderness expression may elicit a maternal/mother stereotype.

To further this prediction of a mother-stereotype serving as the mechanism explaining the tenderness expression leading to this pattern of trait inferences, future research should also examine the perceptions of new mothers/parents more generally. If the tenderness expression is serving as a cue for a maternal stereotype, and that is what is leading to these differences in perceived traits relative to a smile or neutral expression, then clarification is needed on what this maternal stereotype consists of. Thus, future

research should investigate if the same perceptions of increase in Neuroticism and decrease in Conscientiousness is present toward new parents.

Another direction for future research is to examine how tenderness more generally, and the tenderness expression, influence people on a state-level. The present research rested on the predication of onlookers assuming that expressing tenderness would lead to the same behavior toward the onlookers themselves as the expressers would be expected to show the *Kindchenschema* targets. Feeling tenderness leads one to be helpful and caring toward *Kindchenschema* targets; however, does feeling tenderness toward a *Kindchenschema* target necessarily lead one to be helpful and caring toward non-*Kindchenschema* stimuli? Future research should examine people's willingness to behave prosocially toward non-*Kindchenschema* targets when they are in a tenderness state. If tenderness is not associated with helping non-*Kindchenschema* individuals, then perhaps that explains why participants are not more willing to trust an individual showing tenderness. They recognize that an individual expressing tenderness may be more willing to help and care for a baby, but may not be willing to help or care for others.

The finding of lower Conscientiousness and higher Neuroticism demonstrates that while tenderness is a positive emotion, onlookers are not exclusively inferring positive traits from individuals showing an expression of tenderness. Thus, an additional area for future research would be to examine if there are state-level inferences individuals make upon seeing this expression that are also less positive. For instance, perhaps seeing an individual displaying this expression toward one's own infant elicits an uncertainty, or protective response from parents. While the parents may recognize that the tenderness expresser isn't outright intending on harming the infant, the intentions of the expresser

remain unclear (e.g. Why do they want to approach this infant?). Does this uncertainty alter one's perceptions of the expresser, and if so how? On the one hand, the tenderness expression may signal that an expresser intends to care for and help the infant, which may be perceived positively and welcomed by the infant's primary caregiver. However, if the primary caregiver views this intention as threatening, particularly to their own position as primary caregiver, perhaps this expression would be perceived negatively. Future research could examine how witnessing the tenderness expression influences caregivers' perceptions of the expresser's immediate intentions or caregivers' behavior toward these expressers.

## **Conclusion**

The goal of these studies was to examine the social implications of a facial expression that has yet to be researched closely. While I did not find support for my hypothesis that the tenderness expression would increase perceptions of trustworthiness and willingness to trust relative to a Duchenne smile or neutral expression, these studies have served to provide insight into the social implications of this expression. There are numerous avenues for future research to delve more deeply into the interpersonal effects of both expressing and recognizing tenderness, and the present research is the first to begin examining these effects.

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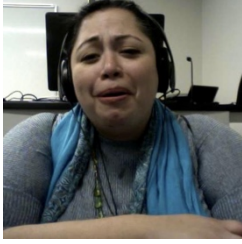

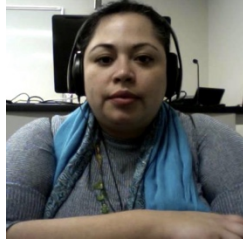
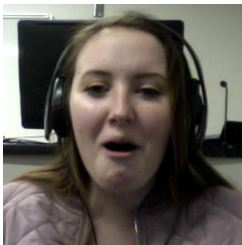
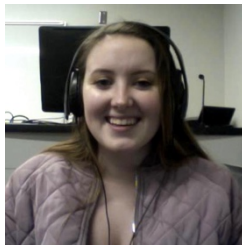
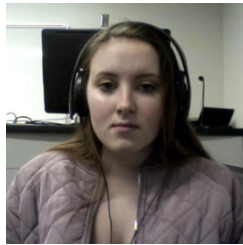
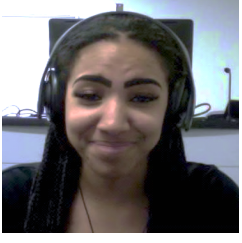

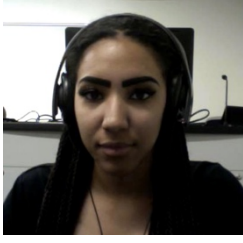
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APPENDIX A  
EXPRESSION STIMULI

Tenderness Expression	Duchenne Smile	Neutral Expression
 A woman with dark hair, wearing a blue scarf and a grey top, is shown with a tenderness expression, characterized by a slight frown and closed eyes.	 The same woman is shown with a Duchenne smile, featuring a wide, genuine smile with visible teeth and crinkled eyes.	 The same woman is shown with a neutral expression, looking directly at the camera with a straight face.
 A woman with long brown hair, wearing a pink quilted jacket, is shown with a tenderness expression, characterized by a slight frown and closed eyes.	 The same woman is shown with a Duchenne smile, featuring a wide, genuine smile with visible teeth and crinkled eyes.	 The same woman is shown with a neutral expression, looking directly at the camera with a straight face.
 A woman with dark hair, wearing a black top, is shown with a tenderness expression, characterized by a slight frown and closed eyes.	 The same woman is shown with a Duchenne smile, featuring a wide, genuine smile with visible teeth and crinkled eyes.	 The same woman is shown with a neutral expression, looking directly at the camera with a straight face.

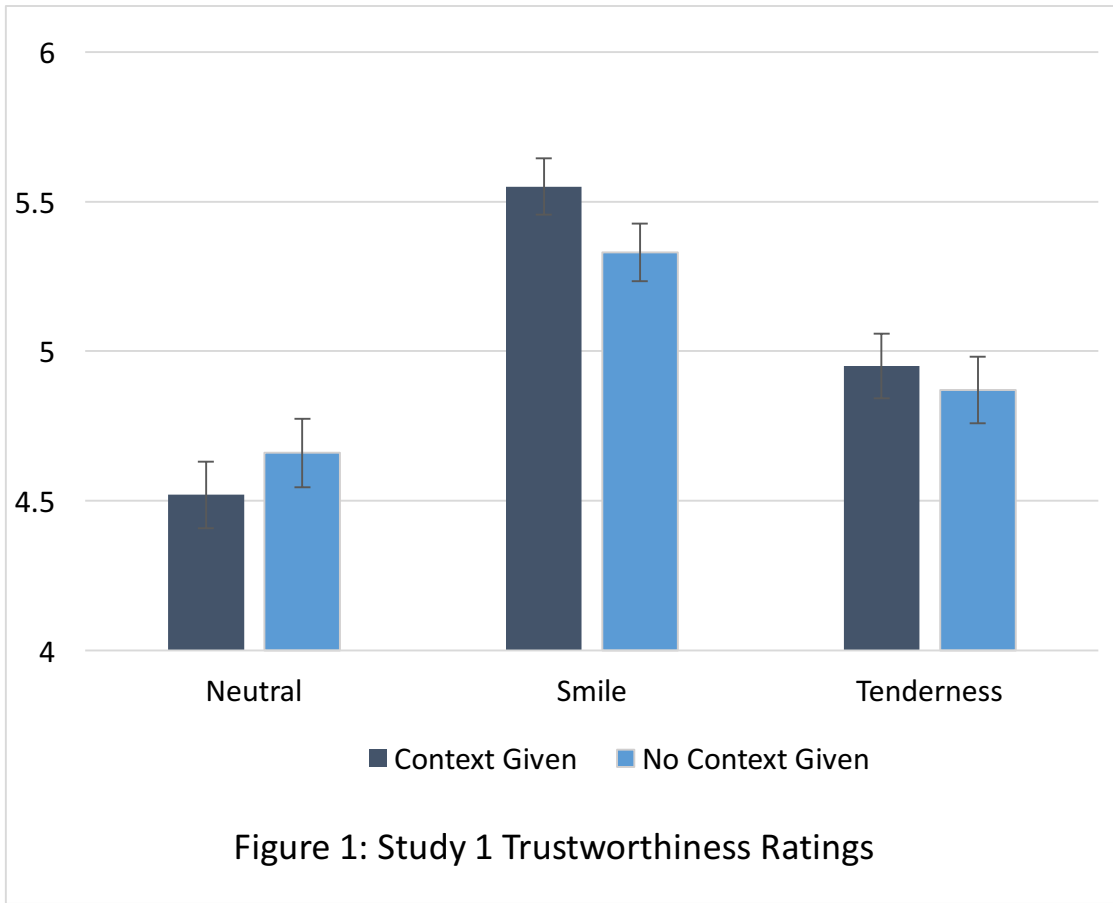


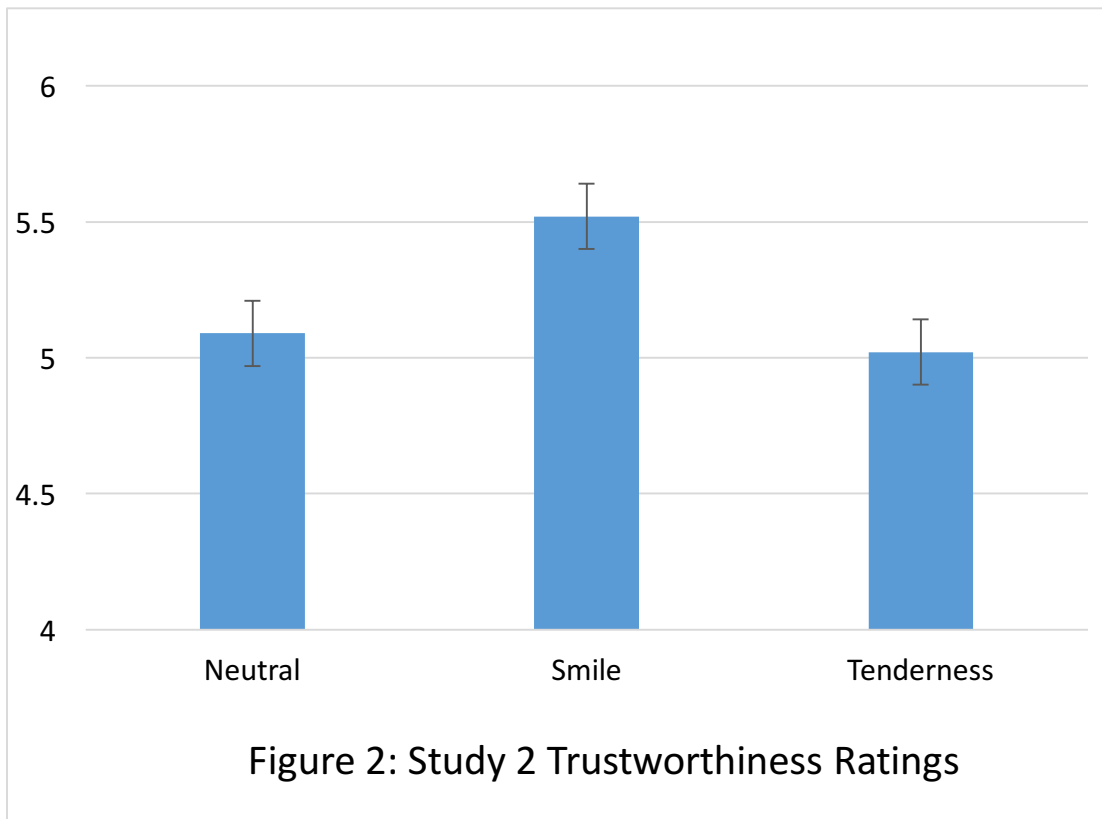
APPENDIX B  
PERSONALITY MEASURE

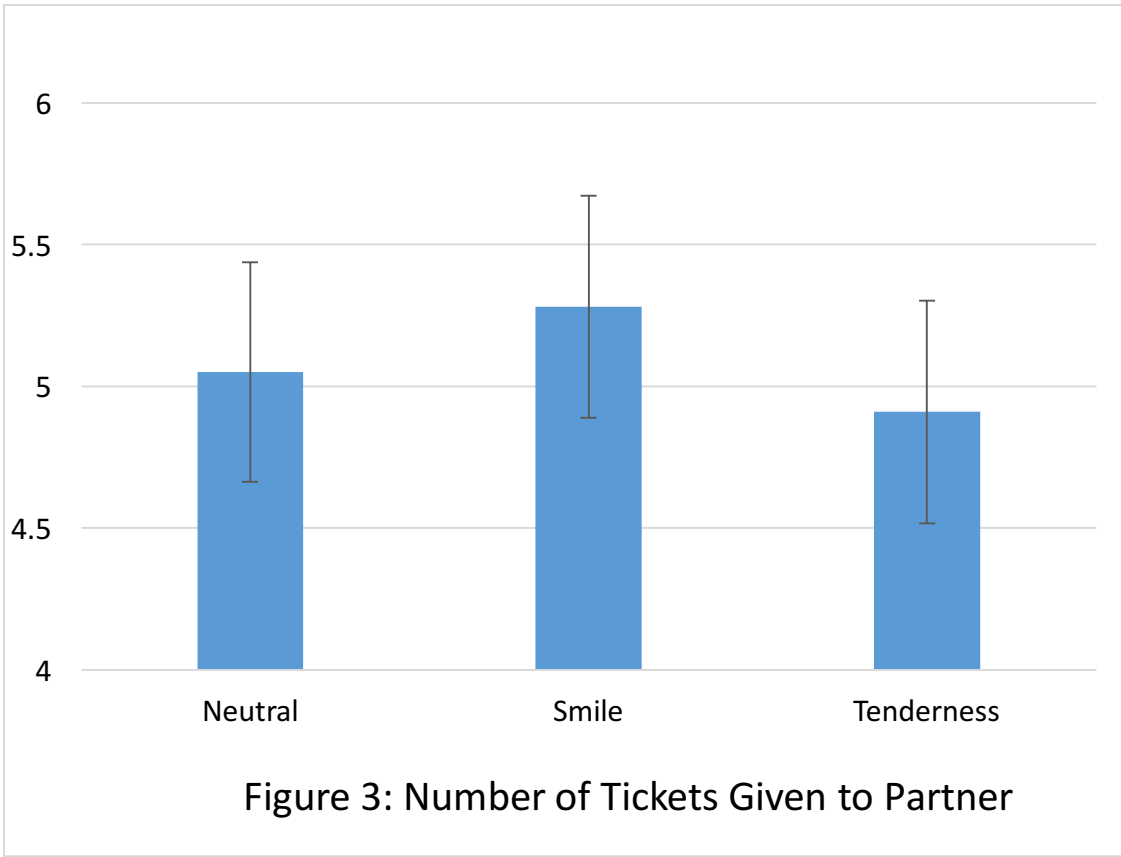
Please indicate how well the following statements describe the personality of the person in the screenshot above (1=Strongly Disagree, 7=Strongly agree).

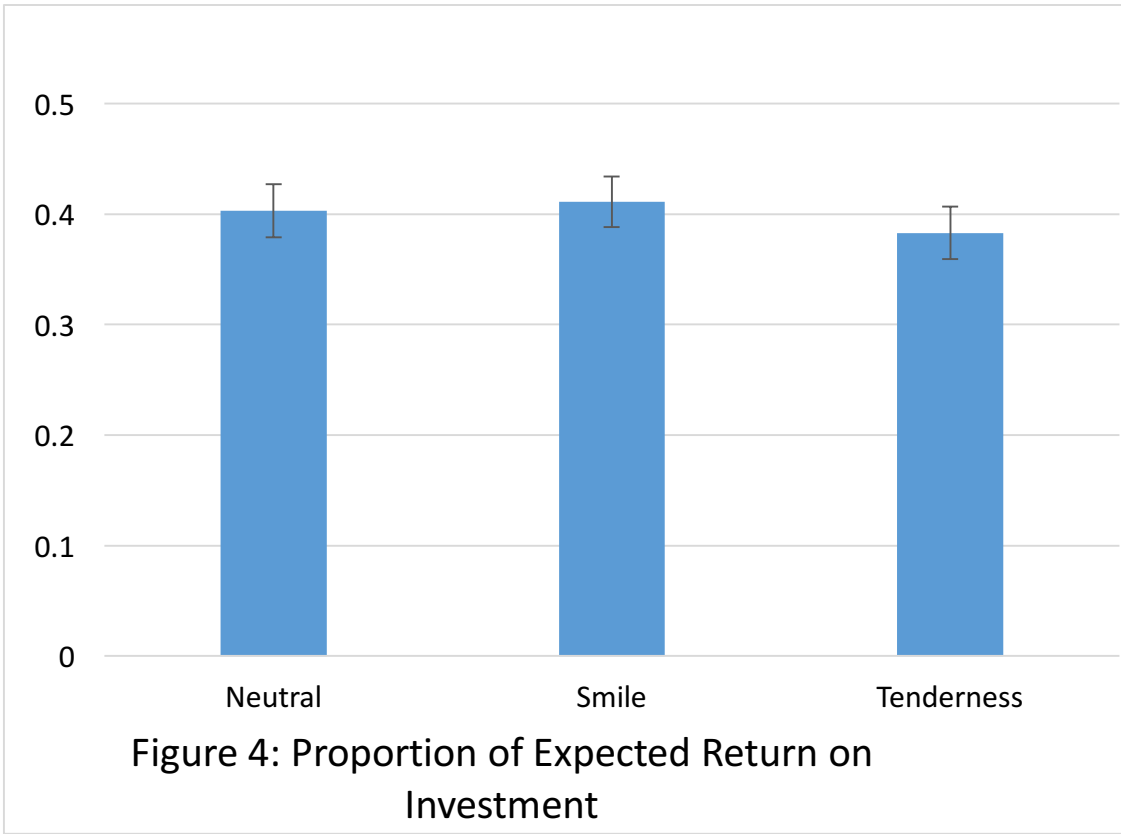
This person seems like someone who is...

1. Extraverted, enthusiastic.
2. Critical, quarrelsome.
3. Dependable, self-disciplined.
4. Anxious, easily upset.
5. Open to new experiences, complex.
6. Trustworthy, reliable
7. Reserved, quiet.
8. Sympathetic, warm.
9. Disorganized, careless.
10. Calm, emotionally stable.
11. Conventional, uncreative.
12. Dishonest, lacking integrity









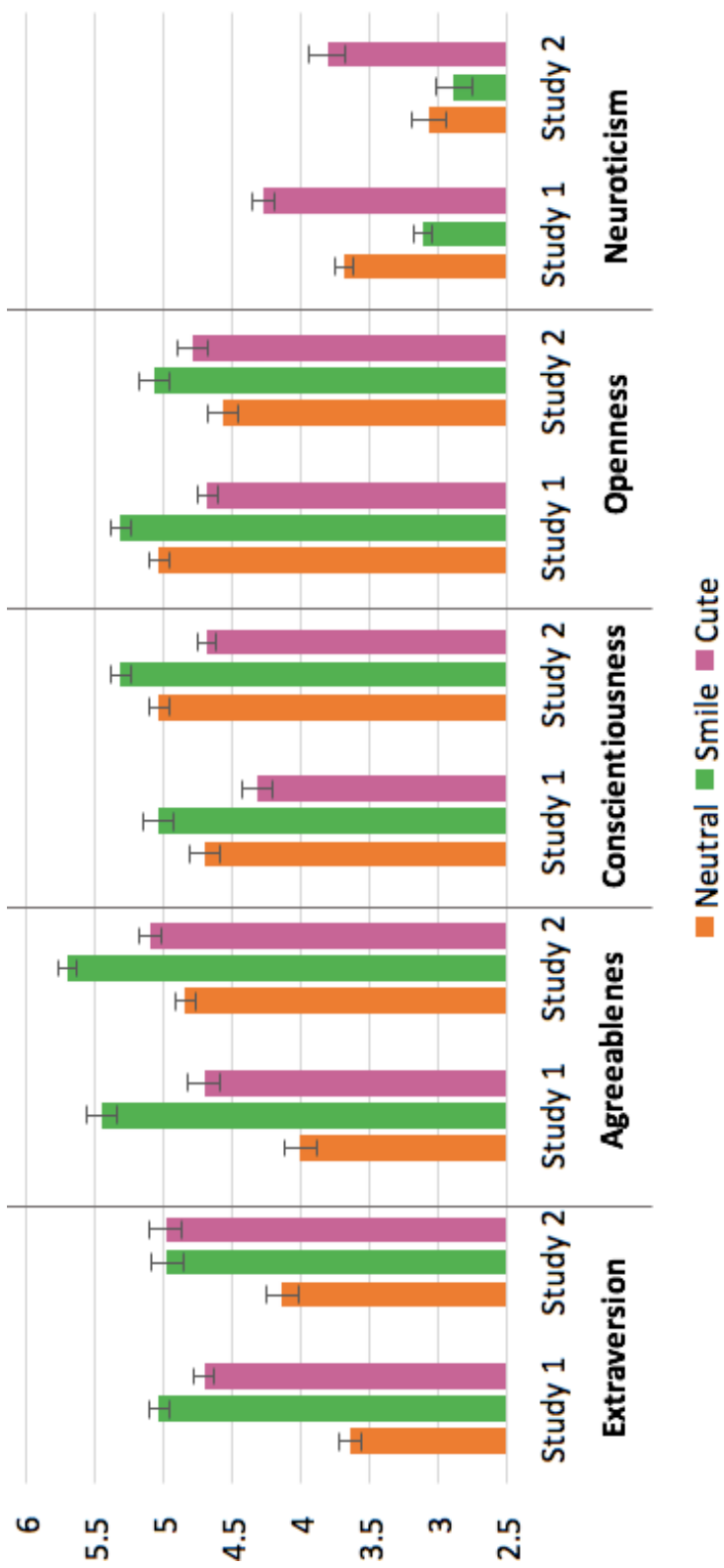


Figure 5: Perceived "Big Five" Traits by Expression across Studies 1 and 2.