

Facial Expression Intelligence Scale (FEIS):
Recognizing and Interpreting Facial Expressions and Implications for Consumer Behavior

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ABSTRACT

Each time we meet a new person, we draw inferences based on our impressions. The first thing we are likely to notice is a person's face. The face functions as one source of information, which we combine with the spoken word, body language, past experience, and the context of the situation to form judgments. Facial expressions serve as pieces of information we use to understand what another person is thinking, saying, or feeling. While there is strong support for the universality of emotion recognition, the ability to identify and interpret facial expressions varies by individual. Existing scales fail to include the dynamicity of the face. Five studies are proposed to examine the viability of the Facial Expression Intelligence Scale (FEIS) to measure individual ability to identify and interpret facial expressions. Consumer behavior implications are discussed.

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CHAPTER 1 – OVERVIEW

“What is that you express in your eyes? It seems to me more than all the print I have read in my life.” – Walt Whitman

1.1 Introduction

Faces provide insights into the traits and emotions of individuals, and some structural facial characteristics influence people’s judgments. For example, attractive individuals are often perceived (or stereotyped) as having more positive personality traits and successful life outcomes (Eagly et al. 1991), whereas individuals with asymmetrical features are perceived as unhealthy and unintelligent (Grammer and Thornhill 1994). Baby-faced individuals (i.e., individuals with a round face and large eyes) are perceived as naïve and weak (Montepare and Zebrowitz 1998). These structural characteristics are over-generalized to traits attributed to individuals and help inform first impressions and social judgments (e.g., Zebrowitz et al. 2003).

Beyond face shape, symmetry and other structural characteristics, an interesting component of impression formation is the dynamic nature of the face. While an individual is unlikely to change the structure of his/her face (except perhaps with plastic surgery), one can become more or less friendly with a smile. Montepare and Dobish (2003) found that when viewing individuals expressing happiness or surprise, raters inferred that the individuals were high in dominance and affiliation, while raters inferred high dominance and low affiliation traits from individuals expressing anger, and low dominance and low affiliation from individuals expressing sadness and fear. This study indicates that individuals deduce various personality characteristics from facial expressions.

A person's facial expression can also be consciously manipulated to convey emotions and intent. Ekman and Friesen (1974), for example, demonstrated that when individuals are lying, they monitor their facial expressions to reduce others' perception of their deceptive intent. This deception is detectable particularly through the perception of smiles (Ekman et al. 1991). Duchenne smiles (i.e., expressions of true enjoyment) are more prevalent when an individual is being honest, while masked smiles (i.e., negative emotions and smiling movements occurring simultaneously) are more prevalent during deception (Ekman and Friesen 1982).

1.2 Universality of Emotion in Faces

There is wide agreement for the existence of six universal emotions: happiness, sadness, anger, disgust, surprise, and fear (Ekman and Friesen 1971; Ekman and Friesen 1975). Particularly interesting is that these emotions are equally identified by individuals from Westernized cultures and individuals from New Guinea, who had minimal contact or exposure to modern cultures prior to the research period (Ekman and Friesen 1971). Further cross-cultural research has demonstrated consistent cross-cultural agreement on expressed emotions, including second-order emotions and the strength and intensity of emotion (Ekman et al. 1987). More recent research has shown that the face has evolved to efficiently transmit these six emotional signals, with minimal overlap, and the brain has evolved to decode them (Smith et al. 2005).

1.3 Ability to Interpret Emotion in Faces

The ability to accurately identify emotions in the face has been the subject of considerable research, particularly in the area of emotional intelligence. Abilities to recognize and interpret facial expressions vary across individuals (Mayer, Salovey, and Caruso 2004). Several scales have been created to measure individual abilities in the recognition of emotions; one popular scale

is the Mayer, Salovey, and Caruso Emotional Intelligence Test (MSCEIT). Salovey and Mayer (1990) described emotional intelligence as “the ability to monitor one’s own and other’s feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions.” According to the theories of emotional intelligence, the degree to which people are good at monitoring their own emotions and those of others around them is likely to differ.

“Emotional competencies are thought to be important for social interaction because emotions serve communicative and social functions (Lopes et al. 2004).” These same researchers found additional empirical evidence of the importance of emotional intelligence in social interaction which included a positive correlation between emotional intelligence and quality of relationships, consisting of both friendship and opposite sex interactions.

Research positively connects emotional intelligence with “academic performance, measures of relatedness, the ability to communicate motivating messages such as vision statements and other similar criteria. As EI [emotional intelligence] declines, problem behaviors, deviance and drug use rise (Mayer, Salovey, and Caruso 2004, 209-210).”

Contemporary work in consumer research has examined emotional competencies in consumer contexts. One study found that a domain-specific measure of emotional intelligence, the Consumer Emotional Intelligence Scale, was predictive of healthy food choice (Kidwell, Hardesty, and Childers 2008). Emotional abilities were also related to successful job performance outcomes for realtors, insurance agents, and salespeople (Kidwell et al. 2011).

Marketing exchanges and consumption are “socially interactive experience[s]” (Howard and Gengler 2001), which involve navigating social and emotional contexts. When purchasing a product from a salesperson, dining with a friend, or negotiating a business contract, emotion

recognition (i.e., reading facial expressions) is likely to play an important role. Individuals with a heightened ability to recognize emotions are better at interpreting information about other people's emotional states. This 'nonverbal intelligence' is likely to influence how consumers react to a variety of consumption contexts and the behavioral outcomes that occur from these varied experiences.

Five studies are presented to examine individual differences in the ability to identify and interpret facial expressions. The development, reliability, and validation of a 24-item instrument indicate facial expression recognition is a stable individual difference which impacts success outcomes.

1.4 Dissertation Outline

The remainder of the dissertation is organized as follows. Chapter 2 discusses three theories of face perception, providing insight into the information one receives from viewing a face. Chapter 3 reviews the perception of emotions and provides evidence for the universality of the six emotions that are the focus of this dissertation. Chapter 4 provides a review of how emotions impact judgments. Chapter 5 discusses the construct of emotional intelligence and existing measures. Chapter 6 identifies the research objectives and provides an overview of the studies. Chapters 7-11 present five studies that examine individual differences in facial expression intelligence. Study 1 (Chapter 7) includes the development of a three component instrument (FEIS) to assess the ability to identify and interpret static, contextual, and dynamic views of facial expressions. Study 2 (Chapter 8) compares the FEIS with the MSCEIT. Study 3 (Chapter 9) examines the test-retest reliability of the FEIS. Studies 4 and 5 test the face and predictive validity, respectively, of the scale to provide some insight as to how FEIS differentiates

individuals of varying abilities. Study 4 (Chapter 10) differentiates the abilities of students in socially oriented majors (i.e., marketing) versus students in more introverted majors (i.e., accounting, business information technology, and finance). Study 5 (Chapter 11) investigates the role of individual abilities to read facial expressions in negotiations. Chapter 12 provides a general discussion of the five studies with their respective limitations and direction for future research.

CHAPTER 2 – THEORIES OF FACE PERCEPTION

“God has given you one face and you make yourselves another.” – Shakespeare’s *Hamlet* (Act 3, Sc. 1, line 143-145)

Surprisingly little research has examined the role of faces and facial expressions in the consumer literature (Andrade and Ho 2009; Buchan, Croson and Johnson 2004). This lack of work is particularly notable given the social nature of marketplace interactions (e.g., in-store purchase behavior and customer-salesperson negotiations for large purchases) and consumption (e.g., the propensity for consumers to shop with others or share consumptive experiences with others). Various theoretical frameworks from related literatures can begin to help us understand what we actually see when looking at a face. Three such theories will be presented: the Dual Process Model (e.g., Bruce and Young 1986), the Emotions as Social Information Model (Van Kleef 2009), and the Ecological Approach to Face Perception (Zebrowitz 2006).

2.1 The Dual Process Model

Research in cognitive neuroscience has identified two components to person perception: the perception of identity (and static features of the face) and the perception of emotion (and dynamic features of the face) (Bruce and Young 1986; Calder and Young 2005; Haxby, Hoffman, and Gobbini 2002). The perception of identity is affected by the activation of the fusiform face area (FFA) in the temporal lobe of the brain, where individuals register identity recognition (Kanwisher, McDermott, and Chun 1997). When this area is damaged (as in prosopagnosia) through a brain injury or congenital condition, an individual will not be able to recognize or identify faces (DeRenzi, Farah, and Feinberg 2000).

Emotional recognition and biological movement (e.g., eye gaze, smiling) activates the superior temporal sulcus (STS), indicating this function is a separate and distinct neurological process (Hoffman and Haxby 2000). Autism spectrum disorders provide examples of neurodevelopmental conditions whereby individuals can recognize identity but have underdeveloped or no emotion recognition abilities (Volkmar, Charwaska, and Klin 2005). While the neuroscience behind this theory is beyond the scope of this dissertation, an illustrative example and critique of the dual process model can be found in Calder and Young (2005).

This model contributes to our understanding of face perception by identifying two separate neurological processes that occur when perceiving a face: identity and emotion recognition. Identity recognition captures the constant, stationary, and unchanging components of the face, while the emotion recognition captures the action and motion of the face.

2.2 The EASI Model

The Emotions as Social Information model (EASI model) argues that expressions of emotion act as informational sources for observers (Van Kleef 2009), while mood acts as an informational source for the self (Schwarz and Clore 1983). This information likely influences behavior through various inferences that are made from viewing facial expressions and emotional reactions that occur as a result of viewing facial expressions. One example of inferential processes is a study conducted by Klinnert et al., (1983) where infants were found to have a higher likelihood of crossing a visual cliff (an ambiguous situation for infants) when presented with a smile versus a fearful expression on their mother's face. According to the EASI model, the infants viewed their mother's smile (fear) as a source of information to signal that it was (not) safe to proceed through the ambiguous situation.

Affective reactions can occur through contagion (e.g., mimicry) or through impressions. For example, Clark and Taraban (1991) found that expressions of happiness (irritability) increased (decreased) liking of the counterpart. Whether these two types influence behavior in a combined fashion, in opposing ways, or by influencing one another, and whether facial expressions affect interpersonal behavior depends on an individual's motivation and ability to process the facial expression information. Expressly, high information processing leads to stronger inferential processing of facial cues, while low information processing leads to stronger affective reactance to facial cues. Finally, the model includes social relational factors such as the type of the interpersonal relationship, social and cultural norms, and how the emotion is expressed.

This theory recognizes that facial expressions serve as information sources which consequently affect our behavior through two distinct routes: inferential processing and emotional reactance. Yet the key factor this theory introduces is that one must have the ability and the motivation to process the facial expression information.

With respect to inferential processing, individuals deduce how one should behave in a social interaction based on the observation of others' emotional displays (e.g., Smith et al. 1993). One illustration of inferences from expression is individuals expressing sadness to strategically request help (Clark, Pataki and Carver 1996). The receiver of the sad emotional display infers a sense of need and is therefore more likely to give help to the producer of the sad emotion. In negotiations, individuals expressing anger received more concessions than individuals expressing happiness (Van Kleef, De Dreu, and Manstead 2004a). The perceivers of the emotional display inferred how to behave with an angry opponent (give more concessions) versus a happy opponent (give fewer concessions).

With respect to emotional reactance, individuals have internal reactions to emotions displayed by others either through emotional contagion (i.e., mimicking another's emotional response) or through impression formation (Van Kleef 2009). In both social interactions and negotiations, a display of happiness (anger) leads to more positive (negative) evaluations of one's counterpart and increases (decreases) the rates of satisfaction with the interaction and wanting to work with that person again (Clark and Taraban 1991; Van Kleef et al. 2004a, 2004b).

Another application of the EASI model predicts the impact of emotional displays (i.e., feedback through angry and neutral facial expressions) on creativity for participants with high versus low motivation. Individuals who were highly motivated exhibited higher levels of creativity after viewing angry expressions, whereas individuals who exhibited low levels of motivation demonstrated lower levels of creativity after viewing angry expressions (Van Kleef, Anastasopoulou, and Nijstad 2010). In the following section, a model of face perception is presented that combines the concept of facial expressions serving as a source of information with the idea that perceivers of the expressions may possess varying abilities (either through stable traits or contextual cues) to identify and interpret expressions of emotion.

2.3 An Ecological Approach

The ecological approach to face perception (Zebrowitz 2006; Zebrowitz and Collins 1997; Zebrowitz and Montepare 2006) identifies three main tenets: perceiving affordances, identifying stimulus information, and perceiver attunements. These tenets go beyond the aforementioned dual process model (i.e., the brain possesses two separate processes for perceiving identity and expressions of emotions) and the EASI model (i.e., emotional expressions serve as information)

and borrows ideas from Gibson's ecological theory of perception and theory of affordances (Gibson 1966, 1969, 1979).

Perceiving affordances. Perceiving affordances serves as an adaptive function, in which a perceiver recognizes an identity and an emotion and then uses this information to act in a goal-oriented way. This component of the ecological approach differs from the dual process model, which simplifies face perception into identity and emotion perception, by stating that individuals will use information derived from the face to attain goals. For example, using facial information as a means of determining whether someone is physically capable of helping you move a heavy box and whether someone is willing to help you move the box.

The psychological traits of trustworthiness (DeBruine 2005) and competence (Todorov, et al. 2005) are inferred from face perception as well as physical (Zaidel, Aarde, and Baig 2005) and mental health (Buckley et al. 2005). This information in the structural characteristics of the face allows people to act in a goal-oriented manner (e.g., electing a competent person to Congress). In a study examining face perception in elections, individuals rated the competence of candidates for House and Senate congressional elections after exposure to a head shot of the candidates. The competence ratings alone predicted election outcomes for both the Senate and House races better than chance. These findings also occurred when the participants were exposed to the photograph for only one second (Todorov et al. 2005).

Facial movement and emotion also promote various goal-oriented behavioral outcomes. For example, fear and anger elicit approach and avoidance behaviors, respectively (Marsh, Ambady, and Kleck 2005). Marsh, Ambady, and Kleck (2005) presented photographs of individuals expressing anger and fear and asked participants to identify the emotional expression

by either pulling or pushing a joystick (joystick direction's correspondence with a particular emotion was counterbalanced). Response latencies for emotion categorization were recorded. Results indicated an interaction effect for expression and joystick direction; that is, participants pushed (pulled) the joystick faster after viewing an angry (fearful) face. Winkielman, Berridge, and Wilbarger (2005) examined the role of emotional expression in beverage consumption and evaluation. Thirsty participants who viewed a happy expression were more likely to consume and pay more for a beverage, whereas thirsty participants who viewed a sad expression exhibited the contrary.

Identifying stimulus information. For the second component, “facial structure, pigmentation, texture, and movement should provide the most useful information about all of the qualities that are gleaned from faces (Zebrowitz 2006, 672).” One example is that facial information derived from babies is also extended to people who have a “babyface,” that is, babyfaced adults are attributed to be submissive, warm, naïve, and physically weak (Montepare and Zebrowitz 1998; Zebrowitz et al. 2003). (Note: An individual is considered to have a “babyface” if they have a round face, large eyes, high eyebrows, and a small chin and nose bridge (Zebrowitz 2006)). Similarly, unattractive faces receive negative overgeneralizations of social, physical, and cognitive deficiencies in comparison with their attractive counterparts, who receive positive halo effects (Zebrowitz et al. 2003; Zebrowitz and Rhodes 2004).

There is some evidence that personality inferences from structural characteristics of the face may be accurate. Pound, Penton-Voak and Brown (2007) investigated self-reported extraversion and facial symmetry, providing some evidence for physiognomic inferences for personality traits. This personality characteristic may be a result of a self-fulfilling prophecy, whereby a person develops a particular personality characteristic because others interact with

them in a particular way (i.e., because the individual appears to be extroverted). Penton-Voak and Chen (2004) collected photographs and testosterone levels of men to create composite photographs of a high-testosterone face and a low-testosterone face. Composites were shown to study participants, who rated the photographs on masculinity (condition 1) and attractiveness (condition 2). Results indicated a significant relationship between high-testosterone composites and ratings of masculinity.

Much like the EASI model, for emotions, this component (i.e., identifying stimulus information) signifies that a particular set of facial movements denotes a particular emotion (for example, a smile typically indicates happiness, whereas a furrowed brow indicates anger). Perceiving a smile or a furrowed brow is an indication of its relative cognitive meaning – that the expresser of the emotion is satisfied or dissatisfied with the receiver of the emotion, respectively (Smith et al. 1993).

Perceiver attunements. Perceivers' attunements refer to one's efforts in achieving accuracy in perception of identity, emotions and traits (Zebrowitz 2006; Zebrowitz and Montepare 2006). Individuals with developmental disabilities and brain lesions (Tranel, Damasio, and Damasio 1988; Young et al. 1993) have reduced abilities in expression identification, interpretation, and deriving other facial information (e.g., trustworthiness). Furthermore, individuals often encounter reduced abilities when reading facial information from the opposite sex (Hall 1984; Montagne et al. 2005), ethnicity (Schimmack 1996), and demographic differences (Elfenbein and Ambady 2003; Meissner and Brigham 2001). According to this ecological theory of social perception, perceiver goals, capabilities, and experiences influence individual level differences in face perception (Zebrowitz 2006).

Situational characteristics may also affect a perceiver's attunements when reading a face. Research on the effect of hormonal changes, for example, has shown that women are more likely to judge the masculine characteristics of a man's face as more attractive during ovulation (Penton-Voak and Perrett 2001). The researchers explain that women may be more attuned to masculinity during this point in their menstrual cycle because this trait is an indicator of fertility and fitness. Perceivers who are racially prejudiced have a propensity to infer anger in emotionally equivocal African American over Caucasian faces (Hugenberg and Bodenhausen 2003) and to associate racially equivocal anger expressions as African American over Caucasian (Hugenberg and Bodenhausen 2004). This ecological approach to face perception goes beyond capturing identity and emotional expression perception to encompass trait inferences, variances in abilities to interpret expressions, and how these functions are used as an adaptive way to navigate daily social interactions. Most importantly, this theory highlights that the perceiver is an important component to the interpretation of the face and that individuals will likely possess various "attunements" or abilities with regards to face perception. This suggests that both the information provided by facial expressions and the perceivers' ability to process that information is important to perceive emotion in facial expressions.

These theories of face perception provide insight into information one can gather from viewing a face. Of particular interest is the emotional content of the face. If we view facial expressions as providing information about emotion, it would be useful to understand the types of information that can be perceived from facial expressions. The following chapter highlights research on facial expressions.

CHAPTER 3 – EMOTIONS IN FACES

Charles Darwin initially noted the universality of emotional expressions. For his book, *The Expression of Emotion in Animals and Man* (1872), Darwin asked missionary friends to record information about the nature of facial expressions in various races and cultures around the world. Darwin's requests for observations inquired about specific emotional displays by asking questions such as "Is disgust shown by the lower lip being turned down, the upper lip slightly raised, with a sudden expiration, something like incipient vomiting, or like something spit out of the mouth?" and "When in good spirits do the eyes sparkle, with the skin a little wrinkled round and under them, and with the mouth a little drawn back at the corners (Darwin 1872, 16)?" Responses indicated that indeed, expressions of emotions of races and cultures across the world were similar to those of Europeans. Darwin believed these expressions to be evolutionarily based, citing that "very many kinds of monkeys, when pleased, utter a reiterated sound, clearly analogous to our laughter, often accompanied by vibratory movements of their jaws or lips, with the corners of the mouth drawn backwards and upwards, by the wrinkling of the cheeks, and even by the brightening of the eyes (Darwin 1872, 362)."

Although some post-Darwin work suggested that the interpretation of facial expressions was limited by large-scale inaccuracy and culture (Bruner and Tagiuri 1954), six emotions have been identified repeatedly across cultures; happiness, surprise, sadness, fear, disgust, and anger (Ekman et al. 1987).

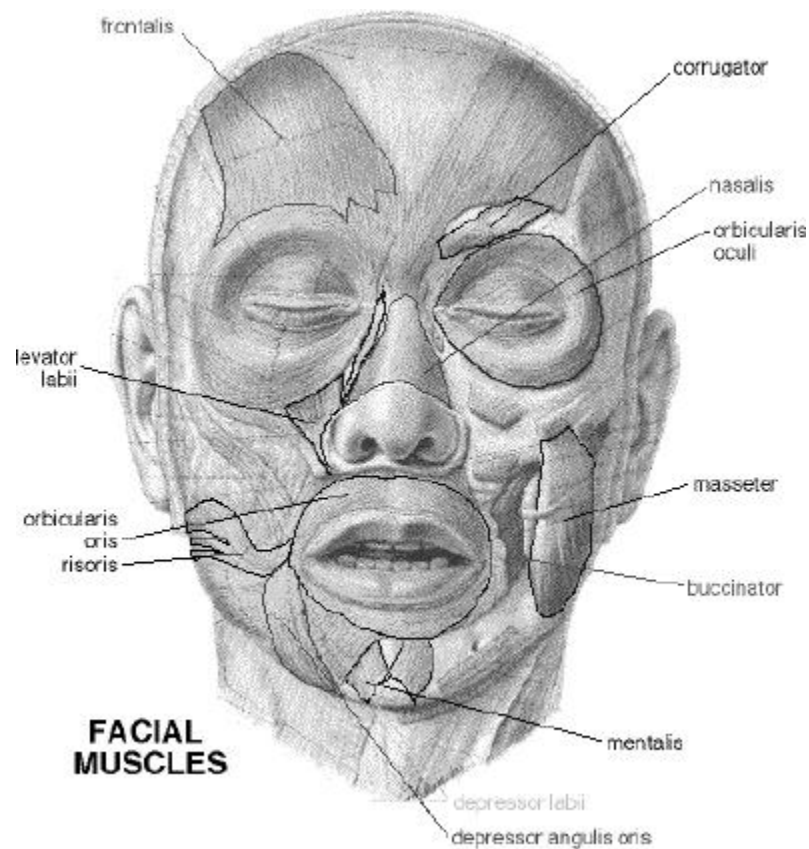
Ekman and Friesen (1971) compared an isolated, preliterate culture's (New Guinea) facial expressions with Western expressions of happiness, surprise, sadness, fear, disgust, and anger. The research team presented New Guineans with a brief emotional story and three photographs of

an individual expressing three of the six emotions. Various combinations of the emotional expressions were shown to the participants. Participants were asked to select which expression best matched the emotional story (e.g., an individual is happy because friends are coming to visit). New Guineans were able to distinguish between all six Western expressions of emotion, with one exception: when a fearful situation was presented and a surprise expression was included in the photograph set, participants were unable to correctly distinguish between fear and surprise expressions (Ekman and Friesen 1971). While this research has limitations with respect to fear and surprise expressions, it signifies a clear distinction of various emotions and cross-cultural agreement consistency of these emotions regardless of previous exposure to the other culture's expressions. These findings have since been replicated with greater, consistent, cross-cultural agreement for all six emotions (Ekman et al. 1987).

Ekman and Friesen (1976, 1978) created the Facial Action Coding System to systematically identify facial movements and eventually, emotional expressions. Happiness is largely marked by two movements: orbicularis oculi (or the raising of cheeks) and zygomaticus major (or the pulling of the lip corners). Surprise is marked by the raising of both the inner (frontalis pars medialis) and outer brow (frontalis pars lateralis), a slight raise of the levator palpebrae superioris (i.e., the upper eyelid), and a dropping of the jaw (masseter). Sadness occurs with the raising of the inner brow (frontalis pars medialis), the lowering of the brow (corrugator supercilli), and the lowering of the lip corners (depressor anguli oris). Fear occurs with the raising of the inner and outer brow (frontalis), the lowering of the general brow (corrugator supercilli), the raising of the upper eyelid (levator palpebrae superioris), the stretching of the lips (risorius and platysma), and the dropping of the jaw (masseter). Disgust is marked by the wrinkling of the nose (levator labii superioris alaeque nasi), and the lowering of the lip corners (depressor anguli

oris) and lower lip (depressor labii inferioris). Finally, anger is depicted by the lowering of the brow (corrugators supercillii), the raising of the upper lid (levator palpebrae superioris), tightening the eyelids (orbicularis oculi), and tightening the lips (orbicularis oris) (Ekman and Friesen 1978). A representation of the facial muscles involved in emotional expressions is depicted below:

Figure 3.1 – Depiction of the Facial Muscles



Graphic used with permission from Eric Armstrong, York University

For further examples of each muscular movement important to the six basic emotions, see Appendix A.

After Ekman's seminal work, emotional expression research moved beyond identification and classification of expressions to investigate why there is substantial cross-cultural agreement

(Shariff and Tracy 2011). Darwin's hypotheses of adaptive functionality and social communication (Darwin 1872) have since been examined. The evolutionary function of emotions is particularly apparent in the movements and bodily reactions associated with fear and disgust. When an individual is frightened, heavy breathing, blood redistribution through an increased heart rate, and resource attention prepare an individual to move quickly in an effort to escape harm (Shariff and Tracy 2011). The expression of fear, marked by the widening of the eyes, serves as an evolutionary function to enlarge the optical field and allow the eyes to move more quickly to heighten one's ability to detect threat (Susskind et al. 2008). Disgust performs an opposing adaptive function. Rather than augment the perception and alertness to stimuli, movements associated with disgust attempt to reduce the perception of stimuli. The expression of disgust is marked by the scrunching of the nose and mouth. This movement serves an adaptive function by constricting the flow of air through the nose and mouth - guarding an individual from unpleasant (or even harmful) stimuli (Shariff and Tracy 2011).

While there is evidence that facial expressions are a derivative of physiological and adaptive functions, the modern existence and use of expressions is largely communicative. For example, Chapman and colleagues (2009) conducted a study to explore the movements associated with physical and moral disgust. The researchers recorded facial electromyography (EMG) of participants drinking various solutions (bitter, salty, sour, sweet, and water), finding movement in the levator labii after consumption of the bitter, salty, and sour solutions, but not for the controls (sweet and water). Participant ratings of unpleasantness were significantly related to the amount of levator labii movement, providing further evidence of evolutionary-based sensory regulation to protect an individual from unpleasant or dangerous stimuli. Chapman and colleagues' second study examined more abstract disgust stimuli – recording EMG data from participants viewing

pictures of “disgusting” (e.g., feces) versus sad or neutral stimuli. Disgusting stimuli evoked levator labii movement and participant ratings of the disgustingness of the photographs significantly correlated with levator alibi activation. Sad and neutral stimuli and ratings were nonsignificant. Finally, their third study examined facial reactions to moral transgressions in an Ultimatum Game, whereby an opponent proposes how to divide a \$10 pot. If the participant accepts the offer, the \$10 is divided as offered. If the participant rejects the proposed split, both players receive nothing. EMG data were collected through 20 rounds of the Ultimatum Game. Participants also rated the extent to which each round coincided with pictures of seven facial expressions (disgust, anger, contempt, fear, sadness, surprise, and happiness). Results indicated that as unfairness of the offer increased (\$5:\$5 versus \$7:\$3 versus \$9:\$1), activation of the levator labii and self-reported disgust ratings also increased. These three studies point to both adaptive and communicative functions of facial expressions (Chapman et al. 2009). Displaying disgust when witnessing morally aversive actions signals that the expresser does not agree with the transgressor and that the transgressor should alter their behavior. This can be explained by the process of ritualization – an evolutionary adaptation of internal signals to exaggerated, external signals (Eibl-Eibesfeldt 1989).

The widening of the eyes in a fearful expression then serves two functions: 1) an internal signal to expand one’s visual field in order to scan for threats and 2) an external signal to communicate danger to others. Both functions have been shown to be instinctual and learned in primates, infants, and adult humans. For example, one study examined the adaptation of monkeys raised in a lab after exposure to wild monkeys. The lab monkeys developed a fear of snakes only after viewing the fearful reactions of the wild monkeys (which previously learned to fear snakes in the wild). This study indicates that primates are able to both identify fearful expressions and to

adapt their behavior accordingly (Ohman and Mineka 2001). Similarly, infants are more (less) likely to cross a visual cliff if they viewed a happy (fearful) expression from their parents. This study indicates that infants are also able to distinguish between facial expressions and adjust their behavior adaptively, displaying communicative and adaptive abilities (Klinnert et al. 1983). Wilkowski and Meier (2010) conducted a reaction time study examining participant approach and avoidance reactions to expressions of anger and fear. Approach movements (moving the joystick toward a face) were significantly faster than avoidance movements (moving the joystick away from a face) for angry faces, while avoidance movements were faster than approach movements for fearful faces. Approaching a face in this study indicates a confrontation, or “fight” mode, while avoiding a face indicates evading confrontation, or “flight” mode (Shariff and Tracy 2011). Fearful expressions across these three studies served communicative and adaptive purposes.

Tear production associated with sad expressions may also serve communicative and adaptive functions. Hasson (2009) argues that tears serve two functions. First, tears blur vision, rendering the individual handicapped and susceptible to attack. This vulnerability serves as a communicative signal of capitulation (to an aggressor) and helplessness (to social partners). Secondly, tears (and the associated redness of the eyes) blur others’ view of eye gaze and pupil movement, which individuals often use to infer intention (Hasson, Cohe, and Shmida 1992). The blurring of the eyes may then serve an adaptive function in its ability to hide intent.

More research is needed on the physiological and communicative functions of happiness and surprise. Preliminary evidence suggests physiological functionality of the surprise expression, whereby the widening of the eyes expands the visual field, preparing an individual for unexpected or surprising stimuli (Shariff and Tracy 2011) and communicative functionality of happiness, where a smile signals the absence of threat (Preuschoft and van Hoof 1997).

With the establishment of the universality of the six basic emotions, it would be useful to understand the role of perceiving emotions (i.e., viewing another person's facial expressions) in consumer judgment and decision making. The subsequent chapter outlines how emotion and emotional expressions might influence consumer judgments and choice.

CHAPTER 4 – THE ROLE OF EMOTION IN JUDGMENT AND CHOICE

“The emotions aren’t always immediately subject to reason, but they are always immediately subject to action.” – William James

4.1 Individual Emotions Impact Choice

Emotions influence judgments. A wide variety of research has been dedicated to understanding the role of affect in decision processes (Batra and Ray 1986; Adaval 2001). For example, Edell and Burke (1987) examined the role of feelings in advertising effects and found support for Zajonc’s (1980) previous hypotheses that feelings differ from thoughts. Furthermore, much research has been devoted to identifying affective responses and their effects on attitudes and intentions (Batra and Ray 1986). These effects have been shown to have direct and indirect effects (Adaval 2001) as well as conscious and unconscious effects (Winkielman et al. 2005). By using the affect-as-information framework, Pham and colleagues (2001) suggest that people monitor their affective responses to stimuli and that these responses are faster, more consistent across individuals, and more predictive of behavior than reason-based assessments.

Consumer research has consistently identified a positive relationship between mood and product evaluation. For example, Gorn, Goldberg and Basu (1993) played liked (“Stand by Me”) and disliked (“Police Story”) music to induce positive and negative moods, respectively. Participants were asked to evaluate a product (i.e., the stereo speakers from which the music played). Positive (negative) mood was found to predict more positive (negative) product evaluations. Schwarz and Clore (1983) attribute this phenomenon to the feelings-as-information theory, where consumers use their feelings as a source of information to determine “how they feel about” a product. In service encounters, an individual’s mood has also been linked with

evaluation of the service encounter. For example, Mattila and Enz (2002) observed and surveyed hotel guests during service interactions. The customer's self-reported mood and displayed facial expressions (as recorded by the observational researchers) were both positively related to their evaluation of the service encounter and to their overall evaluation of the hotel. Interestingly, the hotel employee's ratings of their performance in the service encounter were not related to the customer's evaluation, suggesting potential individual differences in the ability to read client facial expressions (Mattila and Enz 2002). This differential ability will be explored further in Chapter 5. The next section illuminates how others' emotions influence judgments.

4.2 Others' Emotions Influence Judgments

Others' emotions influence our judgments. There is much evidence pointing to the existence of emotional contagion, whereby the emotion of an individual influences another individual in a social comparison process (Gump and Kulik 1997), through mimicking and synchronizing body movements and speech patterns to emotionally converge (Hatfield 1992). This phenomenon has been found to explain how expressions from others can affect a receiver's product attitudes (Howard and Gengler 2001).

4.3 Marketplace Applications of Others' Emotions Influencing Judgments

Products. In Howard and Gengler's (2001) study, participants paired into dyads completed emotion measurements at time one, and were told that they would evaluate a new product. Researchers then manipulated sender emotion (happy vs. neutral) by making the sender think they won the product or an even better alternative and receiver liking of the sender (like vs. neutral) by making the receiver think that the sender is sharing the winnings with the receiver. Finally, both senders and receivers evaluated the product, completed a second round of emotion

measures, and rated the other person in the dyad. Results showed that 1) when senders are happy and the receiver likes the sender, sender emotions predicted receiver emotions, 2) product attitudes of senders were higher in the happy vs. neutral condition, 3) receiver attitudes of the product were more favorable when given information from a happy/liked sender, 4) and liked sender smiling predicted receiver smiling.

While this study provides evidence that emotions of others influence our judgments, it only focuses on one emotion: happiness and neglects to identify how other emotions might influence product judgments via emotional contagion.

Retail. Retailers can utilize emotional displays to enhance the customer experience and influence purchasing behavior (Arnould and Price 1993; Price and Arnould 1999). Baker, Levy and Grewal (1992) extend the Mehrabian-Russell affect model (Mehrabian and Russell 1974), which includes environmental stimuli affecting emotional states and leading to either approach or avoidance behaviors (e.g., willingness to buy). The Baker framework also includes a social factor, which represents the employees and the customers within the retail environment. According to this framework, the number, type, and behavior of the employees and customers will likely influence consumer behavior (Baker 1986).

While there has been little research on the effect of various emotional expressions in the retail environment, some work has examined the impact of store atmosphere and friendliness of employees on store evaluation. For example, Baker, Levy, and Grewal (1992) manipulated ambient factors (i.e., lighting and music) and the number and friendliness of employees. High ambient factors included soft lighting and classical music, while low ambient factors included bright lights and a top-40 music selection. The social environment was manipulated by having

three employees, one who served as a greeter by smiling and welcoming the customer to the store (for high social environment) or by having one employee who ignored the customer (for low social environment). Four five-minute video illustrations of combinations of ambient (high vs. low) and social levels (high vs. low) in a card and gift store were shown to participants. After watching one of the four videos, participants completed a questionnaire with measures of pleasure, arousal, and willingness to shop at the store. Results demonstrated that higher social levels (i.e., having more store employees, one of whom greeted the customer upon entrance into the store) increased participant arousal. A two-way interaction was found between ambient and social factors, leading to increased pleasure when ambient was low and social environment was high. Finally, heightened arousal and pleasure were significant predictors in predicting willingness to buy.

While this study provides evidence for the influence of social factors in the retail environment, the experiment failed to isolate factors within the social environment that might influence consumers' willingness to buy. Was it the friendliness of the employees or the number of employees in the videotape that affected the participants? Did the employee possess commonly over-generalized traits, such as attractiveness, which could have influenced the store evaluation? Was the face trustworthy or untrustworthy? Furthermore, employee goals may differ depending on whether he/she earns commission or flat hourly rate, and a consumer knowing that salary is commission-based may be less receptive to employee friendliness. These questions and many others are left unanswered.

Negotiation. Studying the role of emotions and expressions of emotion in a more interactive environment might give further insight into the dynamic nature of the consumer environment. While there is little research on the effect of facial expressions in the consumer

behavior literature, negotiation research provides interesting and novel connections due to both the cooperative and competitive goals (Thompson 1998) that translate into a retail environment (e.g., the desire to get a good deal).

Elfenbein and colleagues (2007) examined the effects of participant abilities to evaluate and manage one's counterpart in a negotiation setting. Unacquainted pairs of students participated in 4 simulated negotiation transactions. One student in each dyad was randomly selected to play the role of a purchasing manager and the other played the role of a sales manager. Each participant was rated on the performance outcome of the four negotiations. Two weeks later, participants completed a culturally specific emotion recognition task (as measured by participant identification of static photographs of facial expressions (see Elfenbein et al. 2006)), personality inventories, and a self-report measure of a previous standardized test score. Findings indicate that individuals who have higher emotion recognition abilities performed better on both cooperative tasks (to achieve mutually beneficial outcomes) and competitive tasks (to achieve greater personal value in a negotiation.) This study provides evidence of the predictive validity of emotion recognition tasks to actual performance.

Andrade and Ho (2009) found that people are likely to “game” emotions in a negotiation setting if it is likely to provide beneficial outcomes. Participants were brought into the lab and randomly matched with another participant. Each participant was assigned the role of either “proposer” or “receiver” for two games: a dictator game and an ultimatum game. Participants were told that they would maintain the same role and partner for both games. During the dictator game, the proposer was given money and told to divide it between himself/herself and the other participant. The receiver must accept the proposed offer. The receivers then reported their level of anger. Both groups were informed that during the second game, receivers were allowed to accept

or reject the proposed offer. After a short distraction task, receivers reported their levels of anger for a second time. Half of the participants were told that the proposers would view this information about their emotional state (displayed emotion condition) and the other half were not given any further information (control condition). Results indicate that when a receiver became aware that their level of anger would be shared with the proposer, their level of anger during the second response was significantly higher than the first report. However, this was not the case for the control group, who reported lower levels of anger during the second report. Furthermore, proposers who were informed of higher levels of receivers' anger gave more generous offers (higher amounts of money) to the receivers.

In essence, individuals realize the power of their displayed, or in this case reported, emotions and utilize them in order to gain better outcomes.

Kopelman and colleagues (2006) went further by examining the strategic display of positive, negative and neutral emotions in negotiation. In one experiment, the researchers examined the various emotions in a dispute resolution context. Dyads of participants were placed in three conditions: positive, negative and neutral emotional display and coached to act in the respective emotion-consistent manner (e.g., neutral displays were coached to control their emotions and use rational negotiation strategies). Half the dyads were assigned to have both participants coached to act in an emotionally-consistent manner, and in the other half, only one member of the dyad was coached. Participants were given background material on the content of the negotiation and had one hour to negotiate. Results indicated that all groups were able to come to a conclusion, but positive emotional display groups were more likely to report an expected future relationship.

While the Kopelman (2006) study had several limitations, it provides some insight into the effects of strategically displaying emotion in negotiation contexts. Positive emotional displays had the best outcome in the dispute resolution scenario. Additional experiments by the same researchers showed further beneficial effects of positive emotional displays. Participants who displayed positive emotions were better able to persuade another to accept their offer and more likely to obtain concessions from their opponent.

Van Kleef, De Dreu, and Manstead (2004) also examined anger, happiness, and neutral emotions in a computer-mediated environment. Researchers experimentally manipulated opponent emotion (angry, happy, or neutral) and placed participants in two categories based on a median split of a measurement that assessed their need for cognitive closure (high or low). Participants went through a negotiation task adapted from previous work which consisted of six demand levels. Participants were led to believe they were negotiating with a real person through the computer, although their opponent was actually a computer program. Results indicate that participants who were presented with an angry opponent gave more concessions and participants who encountered a happy opponent gave fewer concessions. Participants with a low need for closure were found to be more affected by opponent emotion.

4.4 Marketing Implications

This research demonstrates that emotions play a role in our own decisions and influence other people's decisions. As marketers already use emotion in advertising (cue in standard picture of baby and/or puppy) to elicit consumer favorable consumer response (e.g., brand awareness, liking, loyalty, and purchase), the use of emotion in the retail environment and in negotiation is likely to affect purchase.

Given that people are likely to use emotions strategically (Van Keelf, De Dreu, and Manstead 2004; Kopelman et al. 2006; Andrade and Ho 2009), retailers and salespeople are likely to use emotional expressions to influence, persuade, and even deceive consumers. But just how good are consumers at interpreting emotional expression in a salesperson's face when negotiating the price of a new car? What do consumers infer from a smile versus a frown after a bid is offered on the car? And if salespeople are good at masking their emotions or strategically using emotional displays in negotiation settings, how good are consumers at detecting face deception in the marketplace?

Individuals vary in their ability to identify and interpret emotional expressions in everyday life (e.g., Goleman 1995) and in the marketplace. This individual difference further suggests that individual ability (or lack thereof) may differentially impact choices and judgments. The next chapter introduces this idea of emotional intelligence and outlines current scales used to measure the construct.

CHAPTER 5 – EMOTIONAL INTELLIGENCE

“The question is not what you look at, but what you see.” – Henry David Thoreau

5.1 Introduction

Emotional intelligence (EI) is “the ability to monitor one’s own and other’s feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions” (Salovey and Mayer 1990). There is a rapidly developing literature on emotional intelligence and the varying abilities individuals possess to deal with emotions within themselves and others. (Similar to the notion that individuals vary in their abilities to deal with cognitive aspects of decisions). While this concept initially began in psychology in the early 1990s and was popularized by Daniel Goleman in 1995, EI has roots in Thorndike’s idea of social intelligence (1920), which is the ability to “act wisely in human relations” (Thorndike 1920, 228) and Gardner’s idea of multiple intelligences, including interpersonal intelligence, which are not covered under traditional conceptualizations and measures of intelligence (Gardner 1983).

Critics of emotional intelligence equated the construct with existing measures of personality traits (Davies, Stankov, and Roberts 1998), which inspired a division between types of EI models and their respective qualities. Specifically, researchers differentiated ability models from mixed models, labeling the former as ideal for its focus on cognitive ability (Mayer, Salovey, and Caruso 2000).

5.2 Mixed Models of Emotional Intelligence

Mixed models of emotional ability define emotional intelligence as both perceived abilities and traits (Schutte et al. 1998; Bar-On 1997). More specifically, mixed models combine

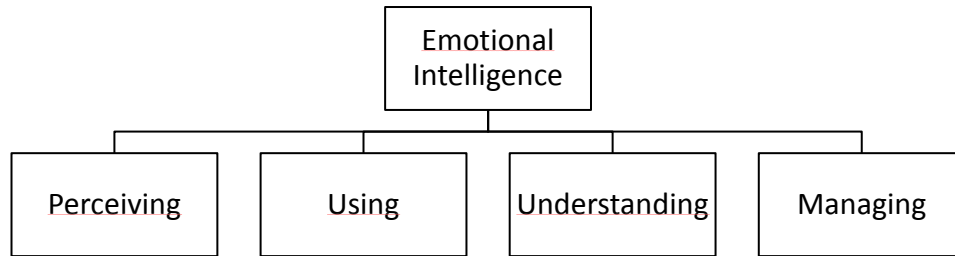
emotional intelligence abilities (e.g., emotional self-awareness) with personality traits (e.g., service orientation). However, by operationalizing this definition, mixed models are comparable to personality measures. One well cited mixed model self-report measure is the Emotional Quotient Inventory (EQ-i) which includes 133 items, 5 composite scales, and 15 subscales (Bar-On 2006).

Bar-On's scale effectively measures his conceptualization of emotional intelligence, "psychological well-being," using 5 dimensions of emotional and social competencies that include abilities and stable traits: intrapersonal (which includes self-regard, emotional self-awareness, assertiveness, independence, and self actualization), interpersonal (which includes empathy, social responsibility, and interpersonal relationship), stress management (which includes stress tolerance and impulse control), adaptability (which includes reality testing, flexibility, and problem solving) and general mood (which includes optimism and happiness) (Bar-On 1997).

5.3 Ability Models of Emotional Intelligence

Ability models define emotional intelligence as a cognitive ability, rather than a function of personality (Mayer, Salovey, and Caruso 2000). This cognitive ability allows an individual to process emotion-relevant information (Mayer, Salovey, and Caruso 2002). The concept of emotional intelligence as defined by Mayer, Salovey and Caruso is diagramed below.

Figure 5.1 – Branch Model of Emotional Intelligence



The first and most basic component of the ability model of emotional intelligence is perceiving emotion, which consists of the ability to accurately perceive and express emotions. Possessing this ability will allow an individual to identify and differentiate emotions (and relevant thoughts) in themselves and others (Mayer, Caruso, and Salovey 1999; Roberts, Zeidner and Matthews 2001). The second component is using emotion, which entails the ability to employ an emotion to facilitate thought or to problem solve, which implies that an individual can select an appropriate emotion to accomplish a goal (Mayer and Salovey 1997; 2004; Mayer, Caruso, and Salovey 2000; Roberts, Zeidner, and Matthews 2001). The third dimension, understanding emotion, includes the ability to comprehend mixed or complex emotions, which involves understanding the nuances between similar emotions and how emotions might change with time (Mayer and Salovey 1997; 2004). Finally, the ability to manage emotion includes emotion regulation in the self and others to accomplish a goal. This is the most complex component of the ability model (Mayer and Salovey 1997; 2004; Mayer, Caruso, and Salovey 1999).

One popular scale incorporating this ability based model of emotional intelligence is the Mayer Salovey Caruso Emotional Intelligence Test (MSCEIT) (Mayer, Salovey, and Caruso

2002). This is a proprietary measure which includes 141 items across the four aforementioned branches with a completion time between 30 and 45 minutes. Items are scored using normative data, whereby a social consensus determines the correct answer (Mayer, Salovey, and Caruso 2002).

5.4 Limitations and the Need for a New Measure

Both the ability and the mixed models have their respective strengths and weaknesses. Current scales of emotional intelligence provide various underlying dimensions of interest to consumption contexts, namely, perceiving emotion in others and understanding those emotions within a given context. The variance in individual abilities to manage their own emotions and the emotions of others is likely to impact the decision process and ultimately, the quality of the consumption decision. An instrument to determine how consumers can use their nonverbal skills (i.e., emotional expression recognition and interpretation) would be useful to better understand sales encounters, negotiations, and other consumer contexts. One important component of such an instrument would be identifying expressions in static pictures of a face. Yet one criticism of research using static versions of facial expressions (as used in the MSCEIT scale) is the unrealistic nature of the evaluation. Indeed the majority of research examining facial expression recognition has employed static photographs of intense expressions which ignores “unique temporal information about the expressions that is not available in static displays” (Ambadar, Schooler, and Cohn 2005). Facial expression research and existing scales use solely static photographs of expression, threatening ecological validity (Carroll and Russell 1997; Tian, Kanade, and Cohn 2001) and intense expressions, which may mask the subtle effects of dynamic displays, thereby failing to include the importance and authenticity of motion to facial expression and perception (Ambadar et al. 2005). Furthermore, there is evidence that the use of dynamic

views in face perception research assists in emotion recognition, producing greater levels of accuracy than static views (Back, Jordan, and Thomas 2009).

The theories of face perception outlined in Chapter 2 identified emotion recognition as a neurological process whereby the perceiver with his/her varying abilities (ecological approach) encodes the motion and action of the face (dual process model) and uses this as a source of information (EASI model). These three theories all point to the need to include active, dynamic expressions, providing a more natural and realistic test of whether an individual is able to recognize and correctly interpret emotion in a face. More specifically, evaluating an individual's emotional intelligence based on their ability to identify emotions from viewing photographs of a facial expression for an extended period of time ignores the 1) difficulty of viewing emotion as it is expressed on the face in real time and 2) the importance of motion as an additional piece of information.

There is much research demonstrating that faces and facial expressions impact inferences, judgments and subsequent behaviors, however little evidence exists of what role emotional expressions play in consumer contexts. Kidwell and colleagues created a scale to measure consumer emotional intelligence (CEIS), which includes a task where participants rate emotional expressions. Preliminary evidence shows that this domain-specific scale predicts food choice beyond cognitive abilities and domain-general emotional intelligence scales (i.e., MSCEIT) (Kidwell, Hardesty, and Childers 2008). This measure, as other measures of emotional intelligence, fails to address the dynamic aspects of emotional expression and how that might unfold in marketplace face-to-face interactions. This area of research is currently of particular concern as consumers begin to switch towards computer-mediated environments for their shopping experiences versus face-to-face interactions. The proposed research might demonstrate

which consumers will have better outcomes in face-to-face encounters (perhaps those scoring high on FEIS) and which consumers should limit their exposure to the more persuasive and influential face-to-face environment.

The MSCEIT, CEIS, EQ-i, and similar measures focus on the construct of emotional intelligence. Emotion recognition is just one aspect of this construct, which is included in some measures of emotional intelligence (e.g., MSCEIT), but not in others (e.g., EQ-i). The construct of emotion recognition is the most consistent with Branch 1, or Perceiving Emotion, of the Mayer, Salovey, and Caruso model of emotional intelligence (Mayer, Salovey, and Caruso 2004). Tasks for this branch involve identifying emotions in pictures of faces, landscapes, and designs. Identifying and interpreting facial expressions is a complex process, as evidenced by the theories of face perception outlined in Chapter 2. The proposed instrument (FEIS) distinguishes expression recognition as its focal construct and further develops limited past measures by including contextual and dynamic displays of emotional expression.

CHAPTER 6 – STUDY OVERVIEW

The overall purpose of this research is to create an instrument that will include dynamic and natural stimuli to identify whether individuals vary in their ability to identify and interpret facial expressions. We anticipate that individuals will vary in these abilities, which will have implications on marketplace outcomes (e.g., performance in a negotiation).

Five studies will examine individual differences in the ability to identify and interpret facial expressions. Study 1 includes the development of a three component instrument (FEIS): static recognition of facial emotional expressions, accuracy of interpreting emotional expressions in different contexts, and the impact of dynamic facial expressions in emotion recognition. We expect those with higher ability to identify and interpret facial expressions will exhibit this by scoring higher on the facial expression intelligence scale (FEIS). Study 2 compares the FEIS with the MSCEIT. The purpose of study two is to test the convergent and discriminant validity of the FEIS by comparing it with an existing scale of emotional intelligence. We hypothesize that the instruments measure two distinct constructs: facial expression intelligence (FEIS) and emotional intelligence (MSCEIT). Study 3 tests the reliability of the FEIS measure, while Study 4 examines the face validity of the FEIS by comparing the performance of socially oriented versus technical majors. Study 5 applies the instrument to a negotiation context to assess the predictive validity of the instrument. Specifically, these studies will provide insight as to how the FEIS can be used to determine the consequences of an (in)ability to interpret facial expressions by examining negotiation success. We hypothesize that individuals who score highly on the FEIS will exhibit successful outcomes, such as the ability to obtain better outcomes in a negotiation task.

CHAPTER 7 – STUDY 1

Study 1: Instrument Development

7.1 Introduction

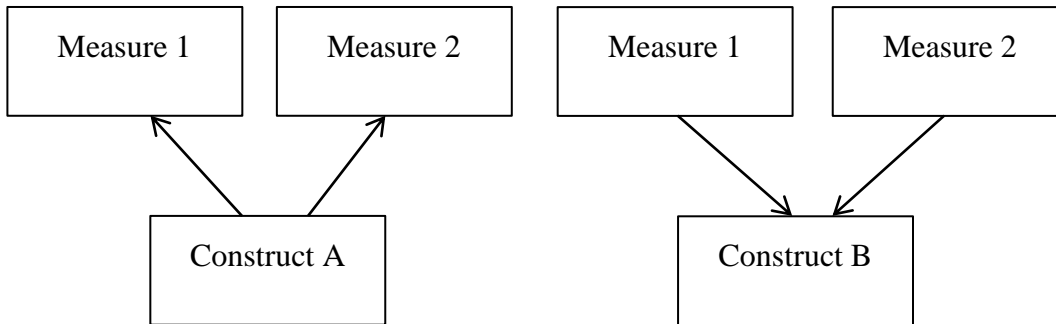
The FEIS instrument is composed of three underlying components. The first component consists of the ability to identify the emotion in a variety of static facial expressions (photographs). To measure this component, subjects will be presented with a set of faces that express the six distinct universal emotions (anger, sadness, happiness, surprise, fear, disgust). Subsequently, subjects will rate the degree of each emotion they believe is present in the face. The second component consists of the ability to interpret a facial expression within a specific context. To measure this component, subjects will be presented with a facial expression and a context and then asked to select the emotion that best matches the expression. Subjects will also be presented with an emotion and a context and then asked to select the facial expression that best matches the emotion. The third component is the ability to identify the emotion in dynamic representations of the face (videos). To measure this component, subjects will be presented with muted videos and asked to identify the emotion being expressed.

7.2 Reflective versus Formative Measures

Two types of measurement models have been specified in the literature: reflective measures, where the measures reflect the construct and formative measures, where the measures form the construct (Diamantopoulos, Riefler, and Roth 2007). These models can be distinguished by the direction of the relationship between the construct and its measures. In Figure 3, Construct A represents a reflective measure, where the direction of the relationship (or causality) goes from the construct to the measure, while Construct B represents a formative measure, where the

direction of the relationship (or causality) goes from measure to construct (for a review, see Diamantopoulos et al. 2007).

Figure 7.1 – Reflective versus Formative Measures



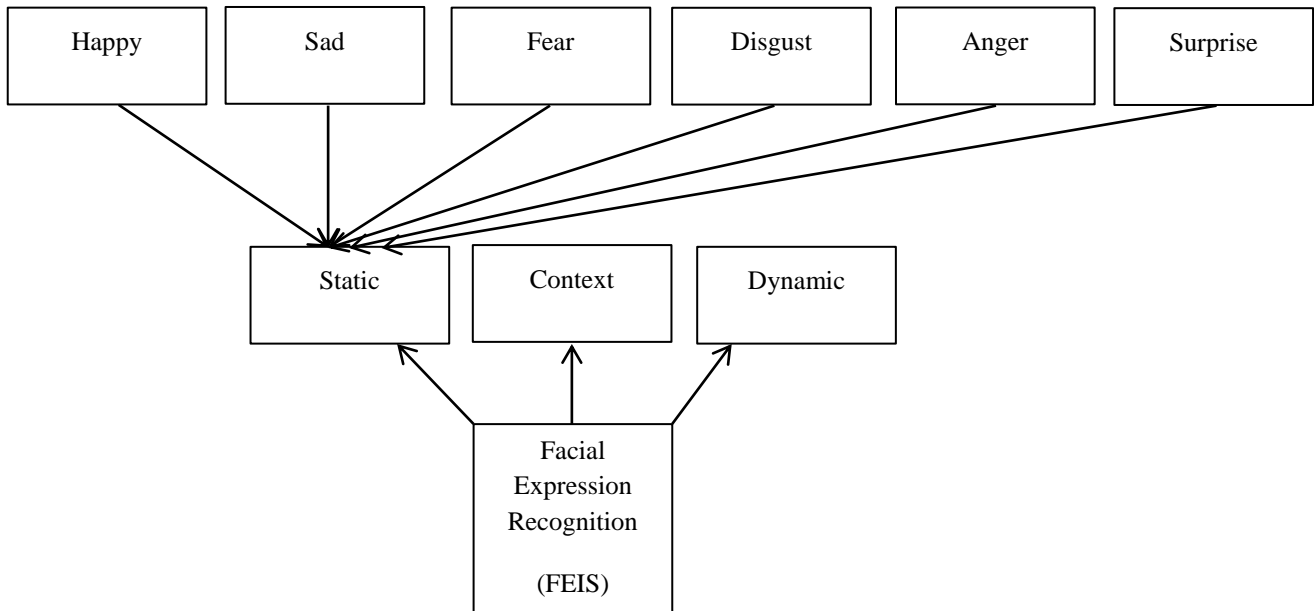
While measures in a reflective model should be positively correlated (Bollen 1984), measures in a formative model do not need to be correlated (Curtis and Jackson 1962). A formative construct is defined by its measures, which are not interchangeable (Diamantopoulos and Winklhofer 2001; Jarvis et al. 2003).

Bollen and Lennox (1991) suggest that eliminating a measure could change the nature of the construct. Misspecifying a formative model as reflective risks under or over-specifying parameters or incorrectly identifying measures. Jarvis et al. (2003) found nearly one third of studies published in the top four marketing journals (*Journal of Marketing*, *Journal of Marketing Research*, *Marketing Science*, and *Journal of Consumer Research*) contained measurement model misspecification.

Given the extensive literature on the six universal emotions, the distinction between the six basic emotions (see Chapter 3) indicates they contribute individually to the measure of emotion recognition. We therefore argue that the individual emotions form each component of the

FEIS scale, while the three components (identify, interpret, and dynamic) reflect the construct of facial expression recognition – this is referred to as a formative first-order, reflective second-order model (Jarvis et al. 2003). Figure 4 provides a graphical representation of the FEIS model. In the interest of clarity, only the measures (emotions) for the first component are included in the diagram. A complete diagram would include the six emotions for each of the three components.

Figure 7.2 – Formative First-Order, Reflective Second-Order Model of FEIS



The nature of formative measurement makes measures of internal consistency less relevant (Bollen and Lennox 1991; Bagozzi 1994). While reflective measures benefit from the use of exploratory factor analysis (EFA) and inter-item correlations to identify the reliability and internal consistency of the items, formative items can positively or negatively correlate or not correlate at all (Nunnally and Bernstein 1994). Internal consistency measures (e.g., Cronbach’s alpha and inter-item correlations) do not provide information for scale development and will not be used to evaluate the FEIS instrument. Diamantopoulos, Riefler, and Roth (2007) suggest item-total

correlations as an indicator for item elimination. The remainder of Study 1 will discuss the development of the FEIS instrument and scale refinement using the recommended formative measurement techniques. The psychometric properties of the FEIS model are tested in Study 2.

7.3 Item Selection and Development

The static identification component items were initially selected from a set of faces from Ekman, Friesen, and Hager (2002), which were coded using the Facial Action Coding System. This system measures facial expressions by analyzing 44 distinct facial action units, or muscular movements (Ekman and Friesen 1978). High correlations between expert ratings (i.e., FACS scores) and novice ratings (e.g., undergraduate students) have been reported (Suzuki and Naitoh 2003). Photographs were cropped to remove identifying and distracting traits, such as hair and clothing, and jewelry. Six emotions have been identified (in both literate and preliterate cultures) as universally recognizable in facial expressions: happiness, sadness, anger, fear, surprise, and disgust (Ekman and Friesen 1971; Ekman et al. 1987). While considerable research speaks to this universality (Ekman 1972; Izard 1971), there is also evidence of some cross-cultural differences (Elfenbein and Ambady 2003; Russell 1994). In order to maintain cultural consistencies, both the participants in the following studies and the faces selected for the stimulus material use American subjects.

Two streams of research have identified that emotional expression is processed or perceived regardless of context: the discrete category view (Ekman 1992) and dimensional view (Russell 1980, 1997). Ekman's discrete category view posits that facial expressions emit distinct emotions and can be identified without context (Ekman 1992; Ekman and O'Sullivan 1988; Nakamura, Buck, and Kenny 1990). Russell argues that facial expressions merely transmit

varying levels of valence and arousal, but are also unaffected by context (Carroll and Russell 1996; Russell 1997; Russell and Bullock 1986). Recent research suggests some malleability of emotion perception given contextual cues as evidenced by the inaccuracy of emotion identification when rating the same emotional expression with various body and scene contexts (Aviezer et al. 2008) and when given incongruent facial expressions with contextual vignettes (Carroll and Russell 1996). The second component to facial expression identification will ask the participant to select an emotion and a facial expression, given a context with emotional information (various consumption scenarios).

Material development for the dynamic component consisted of videoing trained actors expressing a series of the basic emotions (happy, sad, angry, disgust, surprise, fear). The actors were trained in the Stanislavski method of acting, a method whereby actors use their own previous emotional experiences to portray a character or emotion through a process called emotional recall (Stanislavski 1938). This process, known as “method acting,” was popular during the Actors Studio in the 1940s and 1950s and has been used by many famous actors including Robert DeNiro, Al Pacino, Marilyn Monroe and James Dean.

The actors were asked to think about an event where they felt a particular emotion (happy, sad, angry, disgust, fear, or surprise) or to portray a character that was experiencing a particular emotion. The actors were instructed to take as much time as they needed to prepare and were provided with pen and paper to help elicit emotional thoughts.

The actors orally presented the emotional event on camera. Each actor portrayed the six basic emotions in two to four iterations.

Brief clips ranging from 3 to 9 seconds were extracted from the sets of videos. Clips were selected using the Noldus FaceReader software, which tracks the muscular movements in the face to measure emotion. FaceReader was developed using FACS coded emotional expressions of European and Asian Americans. The software isolates 55 key points on a participant's face to identify and measure the intensity of emotional expressions (Noldus Information Technologies, 2008). The software distinguishes between happiness, surprise, fear, anger, disgust, sadness, and neutral expressions. Den Uyl and van Kuilenburg (2005) demonstrated high correlations amongst the software's output and FACS experts. The software has been used in personality psychology (Chentsova-Dutton and Tsai 2010), education (Drape et al. 2009), cognition (Truong 2007), and product evaluation (Chu, Wong, and Khong 2011) research and has demonstrated an accuracy of 89% (den Uyl and van Kuilenburg 2005).

The software provides an output of how much each emotion is being expressed during each frame of video. Sample output can be viewed in Appendix B. The videos of each actor were organized into shorter clips of each basic emotion. The emotional clips were then entered into the FaceReader software, which provided a measure of each emotion's strength during each frame. Clips (which last 3 – 9 seconds) were then selected based on the highest emotion-specific reading from the FaceReader software. For example, when analyzing an angry clip, the FaceReader output for the 45 seconds of video was sorted by the highest emotional output of anger. Clips of the highest anger-oriented output were then selected as stimuli for the third component of the FEIS.

7.4 Sample and Data Collection

A total of 167 undergraduate students at a large, public university completed an online questionnaire in a behavior lab in exchange for extra credit in their course. Participants filled out

the three parts of the online questionnaire (static identification, static interpretation given a context, and dynamic identification) in addition to demographic measures.

7.5 Measures

Static identification. Participants were presented with static views (photographs) of faces, representing six emotions using stimuli developed by Paul Ekman and colleagues (Ekman, Friesen, and Hager 2002). The stimuli were coded based on the Facial Action Coding System (FACS) system. Participants were asked the degree to which each emotion is present in the face (happy, sad, anger, fear, surprise, disgust) on a seven-point scale from *not at all* to *a lot*.

Static interpretation given a context. Scenarios were selected to represent various consumer contexts (e.g., a product recall, salesperson interaction, customer service interaction, product purchase, food consumption, and sales promotion/sweepstakes) and the six basic emotions. See Appendix F for a detailed description of the scenarios. Participants were presented with a brief context/scenario and were asked to select the option that best represented the individual's mental state (angry, sad, disgusted, happy, surprised, and fearful). Subjects were then asked to select a facial expression (using FACS coded photographs) that best matched the emotion they had previously indicated. Additional scenarios were presented where participants were asked to select the facial expression that best represented the individual's mental state given the context. Participants were then asked to select the emotion that best matched the facial expression they had previously indicated.

Dynamic identification. Participants were presented with video clips of people expressing the six basic emotions without the audio component of the video. After watching the video,

subjects were asked to rate how much each emotion (happy, sad, disgust, anger, surprise, and fear) were being expressed in each video.

Demographic variables, including age and gender, were also assessed.

7.6 Scoring

In the emotional intelligence literature, three scoring methods have been employed: expert, consensus, and target scores. Expert scores are obtained by asking an expert panel to identify the correct answer, while consensus scores are obtained by comparing the individual's response with the majority response for each item. Both of these scoring methods increase an individual's score by the percentage to which the experts and majority agree (respectively). For example, if 75 percent of the expert panel (sample consensus) were in agreement, then the individual's score would increase by .75. Target scores are obtained by using self-reported emotions of the writer of an emotional scenario, which are later read and evaluated by participants. For example, Joe writes about a time when his grandmother passed away and reports that his grandmother's death made him particularly sad. This item would have a target score or correct score of sad. Mayer et al. (2003) suggest that expert scoring methods are more consistent with emotion research than consensus scoring methods.

The FEIS uses a variation of the expert scoring method, by employing the Facial Action Coding System (Ekman and Friesen 1978), whereby muscle movements are coded to identify emotions presented in the face. Trained experts coded the photographs used in components one and two. As previously mentioned, high correlations between expert ratings (i.e., FACS scores) and consensus or novice ratings (e.g., undergraduate students) have been reported for these photographs (Suzuki and Naitoh 2003). The third component employs a hybrid version of the

target and expert scoring methods. To develop the videos, trained actors were asked to describe a time where they felt each particular emotion (happiness, anger, sadness, surprise, disgust, and fear). This method is similar to that of the target score. Software based on the Facial Action Coding System (FACS) was used to select clips from the videoed emotional expressions which indicated high ratings of the target emotion. A more detailed description of the scoring for each component is outlined below.

Static identification. Each facial expression presented in section one was coded using the Facial Action Coding System (Ekman and Friesen 1978). The faces presented in section one consisted of pure emotions, therefore there was only one correct answer. In the instrument, a happy face consists of only happiness and is void of other emotions (as indicated by the FACS score). The FEIS scoring method (described below) attempts to award more points to an individual who has identified the photograph as pure happiness, award fewer points to an individual who has identified the photograph as a mixed emotion (e.g., judging the face as both happiness and surprise), and even fewer points to an individual who identified the photograph incorrectly (e.g., judging the face as anger rather than happiness).

Each item was scored by taking the rating of the actual emotion presented in the photograph (e.g., happiness) and subtracting the ratings of the other emotions.

$$\{\text{Happy} + [\text{Happy-Sad}] + [\text{Happy-Disgust}] + [\text{Happy} - \text{Anger}] + [\text{Happy-Surprise}] + [\text{Happy-Fear}]\}$$

The highest achievable score would therefore look like this:

$$\{7 + [7-1] + [7-1] + [7-1] + [7-1] + [7-1]\} = 37$$

If, however a subject answered higher than 1 on other expressional dimensions (for example, surprise) the scoring could look more like this:

$$\{7+ [7-1] + [7-1] + [7-1] + [7-4] + [7-1]\} = 34$$

Higher scores therefore indicate higher static identification ability.

Static interpretation given a context. The photographs used in the second component were FACS coded. A response was considered to be “correct” if the face and the emotion selected was consistent. In the following scenario, for example:

Joe went to a car dealership to shop for a car. He hadn’t fully made up his mind about which car to buy. A salesperson approached him and promised to help. But soon the salesperson started getting a little pushy and tried to get Joe to make up his mind quickly.

The participant could choose from six emotions (happy, angry, sad, fearful, surprised, or disgusted). Suppose a participant selected ‘surprised at the salesperson’s aggressiveness,’ then they had to select the face expressing surprise to score correctly.

A second set of scenarios were presented in the reverse order – where participants were given the scenario and then had to select the appropriate facial expression along with the matching emotion. These questions were also scored based on ability to correctly match the face and the emotion.

Dynamic identification. Scoring of the final section was completed using FaceReader software. This software is an objective measure of emotion in that it codes the muscular movements of the face to identify emotional expressions (based on the Facial Action Coding System). Participants were shown videos of both male and female actors expressing the six basic

emotions. Responses regarding the various emotions were compared to the emotions indicated by FaceReader and scored using the algorithm outlined in component one.

7.7 Results

Item-to-total correlations were calculated to test the internal consistency of the instrument and each individual component. Component one (identify) consists of six tasks or evaluations of facial expressions. All six scores are significantly correlated with the overall score for component one at the $p < .01$ level. The table below provides the correlations for individual scores and the overall component score.

Table 7.1 – Correlation Matrix for Component 1

	Happy	Anger	Disgust	Sad	Surprise	Fear	Identify Score
Happy	1						
Anger	.336**	1					
Disgust	.526**	.475**	1				
Sad	.571**	.329**	.538**	1			
Surprise	.679**	.344**	.539**	.716**	1		
Fear	.295**	.100	.162*	.275**	.164*	1	
Identify Score	.777**	.610**	.740**	.791**	.766**	.549**	1

* indicates significance at the $p < .05$ level; ** indicates significance at the $p < .01$ level

Component two (interpret) consists of ten tasks or evaluations of facial expressions given a context. See Appendix F for detailed descriptions of stimulus material. The majority of the scores are significantly correlated with the overall score for component two at the $p < .01$ level. The table below provides the correlations for individual scores and the overall component score.

Table 7.2 – Correlation Matrix for Component 2

	Car	Gift	Camera	Burger	Toy	Credit	Check	Dentist	Grocery	Vacation	Interpret Score
Car	1										
Gift	.121	1									
Camera	.243**	.134	1								
Burger	.167*	.063	.057	1							
Toy	.152*	.105	.126	.134	1						
Credit	.114	.066	.035	.178*	.044	1					
Check	.182*	.097	.099	.224*	.140	.191*	1				
Dentist	-.020	.152	.076	.031	-.029	.017	.057	1			
Grocery	.166*	.129	.093	.197*	.083	.263**	.335**	.260**	1		
Vacation	.231**	.049	.048	.154*	.062	.106	.292**	.039	.231**	1	
Interpret Score	.595**	.448**	.220**	.566**	.498**	.228**	.388**	.109	.482**	.569**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

Component three (dynamic) consists of fifteen tasks or evaluations of videoed facial expressions. All individual item scores are significantly correlated with the overall score for component two at the p< .01 level, with the exception of the sad female video score (see Table 3). The tables below provide the correlations for individual scores and the overall component score.

Table 7.3 – Correlation Matrix for Component 3 (Female)

	Anger F	Disgust F	Surprise F	Disgust F2	Happy F	Fear F	Sad F	Surprise F2	Dynamic Score
Anger Female	1								
Disgust Female	.162*	1							
Surprise Female	.202**	.119	1						
Disgust Female2	.164*	.107	.461**	1					
Happy Female	.116	.044	.106	.127	1				
Fear Female	.103	.004	.080	.108	-.030	1			
Sad Female	-.097	-.074	-.075	.027	.063	-.067	1		
Surprise Female2	.008	.109	.202**	.069	-.086	.003	-.006	1	
Dynamic Score	.492**	.434**	.564**	.535**	.343**	.307**	.088	.355**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

Table 7.4 – Correlation Matrix for Component 3 (Male)

	Happy M	Anger M	Surprise M	Disgust M	Anger M2	Sad M	Fear M	Dynamic Score
Happy Male	1							
Anger Male	.185*	1						
Surprise Male	.130	.219**	1					
Disgust Male	.230**	.150	.036	1				
Anger Male 2	.095	.542**	.133	.122	1			
Sad Male	.059	.140	-.013	.183*	.134	1		
Fear Male	.028	.059	.006	.176*	-.057	-.004	1	
Dynamic Score	.408**	.553**	.412**	.296**	.548**	.464**	.242**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

Quartiles of the *overall identify score* were computed. Approximately forty participants were categorized into each quartile. We expect individuals who score poorly on component one

(i.e., at the 25th percentile or lower) to score poorly on each individual item. A one-way between subjects ANOVA was conducted to compare the effect of each item on the overall component score. There was a significant effect of item on the overall component score (i.e., belonging to a particular quartile) at the $p < .01$ level for happy ($F(3,163)=37.91, p < .01$), anger ($F(3,163)=30.83, p < .01$), disgust ($F(3,163)=41.19, p < .01$), sad ($F(3,163)=37.39, p < .01$), surprise ($F(3,163)=21.47, p < .01$), and fear ($F(3,163)=27.05, p < .01$). The mean scores by quartile demonstrate a linear trend. The graphical representations of happy, anger, disgust, sad, surprise, and fear can be found in Appendix G.

Quartiles of the *overall interpret score* were computed. The four quartiles captured how good an individual was at interpreting facial expressions given a context. A one-way between subjects ANOVA was conducted to compare the effect of each task on the overall component score. There was a significant effect of item on the overall component score (i.e., belonging to a particular quartile) at the $p < .01$ level for car ($F(3,163)=33.06, p < .01$), gift ($F(3, 163)=13.56, p < .01$), burger ($F(3, 163)=23.04, p < .01$), toy ($F(3, 163)=15.71, p < .01$), credit ($F(3, 163)=3.60, p < .01$), check ($F(3, 163)=7.73, p < .01$), grocery ($F(3, 163)=11.85, p < .01$), and vacation ($F(3, 163)=27.53, p < .01$). The camera ($F(3, 163)=1.87, p=.14$) and dentist ($F(3, 163)=1.04, p=.38$) scenarios were non-significant.

The mean scores by quartile demonstrate a linear trend. The graphical representations for the scenarios can be found in Appendix H.

Quartiles of the *overall dynamic score* were computed. The four quartiles captured how good an individual was at interpreting dynamic views (i.e., videos of) facial expressions. For example, belonging to the first quartile meant scoring amongst the bottom twenty-five percent of

all dynamic scores. We would expect individuals who score poorly on component three (i.e., at the 25th percentile or lower) to score poorly on each individual item. A one-way between subjects ANOVA was conducted to compare the effect of each item on the overall component score. There was a significant effect of item on the overall component score (i.e., belonging to a particular quartile) at the $p < .01$ level for female anger ($F(3,157)=13.91, p < .01$), female disgust ($F(3,157)=11.06, p < .01$), female surprise ($F(3,157)=15.78, p < .01$), female disgust 2 ($F(3,157)=14.88, p < .01$), female happy ($F(3,157)=10.32, p < .01$), male happy ($F(3,157)=7.80, p < .01$), male anger ($F(3,157)=25.03, p < .01$), female fear ($F(3,157)=5.44, p < .01$), male surprise ($F(3,157)=8.68, p < .01$), male disgust ($F(3,157)=3.99, p < .01$), male anger 2 ($F(3,157)=23.01, p < .01$), male sad ($F(3,157)=13.28, p < .01$), male fear ($F(3,157)=3.01, p < .05$), surprise female 2 ($F(3,157)=7.40, p < .01$). Female sad ($F(3,157)=1.53, p=.21$) was non-significant.

The mean scores by quartile demonstrate a linear trend. The graphical representations for the video items can be found in Appendix I.

The three overall component scores were compared. All components were significantly related at the $p < .01$ level. Identify (Component 1) and Interpret (Component 2) components were significantly related ($r(165) = .45, p < .01$); Identify and Dynamic (Component 3) components were significantly related ($r(159) = .55, p < .01$). Interpret and Dynamic components were significantly related ($r(159) = .37, p < .01$). These significant, yet modest correlations suggest that the three components are measuring similar, yet distinct components of facial expression intelligence.

The demographic variables of age and gender were compared with FEIS scores. No significant relationships were discovered.

7.8 Scale Refinement

Reflective measures typically rely on an exploratory factor analysis (EFA) and inter-item correlations to identify the reliability and internal consistency of the items. Alternatively, formative measures cannot rely on EFAs or inter-item correlations because internal consistency in formative items is inconsequential (Bollen and Lennox 1991; Bagozzi 1994). Specifically, “internal consistency is of minimal importance because two variables that might even be negatively correlated can both serve as meaningful indicators of a construct (Nunnally and Bernstein 1994).”

While inter-item correlations cannot be used to eliminate items, the item-total correlations should give some reliable indication of the contribution of each item to the overall component score. According to Diamantopoulos, Riefler, and Roth (2007), “assuming that the overall measure is a valid criterion, the relationship between a formative indicator and the overall measure provides indicator validity (MacKenzie et al. 2005).” Given the nonlinear nature of some of item-total graphs (see Appendix H and I), several items were removed from the instrument. For the final indicators of the context component, one scenario for each of the six emotions remains. The final video component includes one male video and one female video for each of the six emotions, for a total of twelve videos. New item-total matrices for component two and three are presented below. The male and female videos are combined below to simplify the correlation matrix.

Table 7.5 – Revised Correlation Matrix for Component 2

	Car	Gift	Burger	Toy	Grocery	Vacation	Context Score
Car	1						
Gift	.121	1					
Burger	.167*	.063	1				
Toy	.152*	.105	.134	1			
Grocery	.166*	.129	.197*	.083	1		
Vacation	.231**	.049	.154*	.062	.231**	1	
Context Score	.595**	.448**	.566**	.498**	.482**	.569**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

Table 7.6 – Revised Correlation Matrix for Component 3

	Anger	Disgust	Surprise	Happy	Fear	Sad	Dynamic Score
Anger	1						
Disgust	.304**	1					
Surprise	.300**	.330**	1				
Happy	.160*	.203**	.232**	1			
Fear	.141	.154	.128	-.032	1		
Sad	.097	.108	.021	.197*	.010	1	
Dynamic Score	.641**	.646**	.602**	.531**	.431**	.431**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

7.9 Discussion

There are distinct differences in individual abilities to identify and interpret facial expressions, as indicated by the variance of scores across each section of the Facial Expression Intelligence Scale and overall. This measure can be used to indicate the varying levels of ability regarding facial expression intelligence. The ability to read facial expressions is formative in

nature, given the extensive literature claiming the universality of the six basic emotions (Ekman et al. 1987) and the identification of distinctive brain functioning for emotion recognition (Hoffman and Haxby 2000). We therefore argue that the ability to read facial expressions is comprised of: 1) the ability to detect and distinguish between emotions in photographs, 2) the ability to connect emotions and facial expressions given a context, and 3) the ability to detect and distinguish emotions in dynamic settings (videos). The six basic emotions are formative indicators for each of these components, as they cannot be replaced by or substituted for alternative indicators.

Test-retest reliability is the recommended analysis for formative indicators (Bagozzi 1994; Diamantopoulos 2005) in addition to examining the correlation with a supplementary measure of the construct (MacKenzie et al. 2005). Study 3 will therefore examine the reliability of the FEIS using these methods.

Additionally, researchers debate the necessity of validity assessments for formative measures, declaring that expert judgment should be sufficient (Rossiter 2002) and furthermore argue that there are no suitable validity assessments for formative indicators (Diamantopoulos, Riefler, and Roth 2007). We attempt to unravel convergent and discriminant validity in Study 2 through conducting a correlation analysis with existing measures. Subsequent studies will examine face and predictive validity.

CHAPTER 8 – STUDY 2

Study 2: Instrument Validation

8.1 Introduction

Study 2 involves the comparison of the FEIS with other existing scales. As indicated in the literature review, there are several scales in the existing literature that serve a similar, yet arguably incomplete function. In particular, the widely cited MSCEIT may have overlapping functionality to the FEIS, but lacks the dynamic component provided by the FEIS.

Another recent emotional intelligence scale is the Consumer Emotional Intelligence Scale (Kidwell, Hardesty and Childers 2008). This scale is specific to the consumer domain and intends to measure “consumers’ ability to use emotional information,” yet generalizes over various types of emotional information, including emotional information within a product. This scale is a domain specific measure of emotional intelligence. The MSCEIT is a domain general measure of emotional intelligence and will therefore be the comparison scale for the domain general FEIS (assessing individual ability to read facial expressions).

We are specifically interested in consumers’ ability to identify and interpret the emotional information provided in facial expressions and argue that a domain general scale will better indicate success or failure in a variety of face-to-face interactions in the marketplace.

8.2 Sample and Data Collection

A total of 98 undergraduate students from a large public university participated in the study in exchange for extra credit. Due to the length of the measures, participants were asked to complete two online questionnaires at separate times. Approximately half of the participants completed the MSCEIT at time one (42 participants) and the FEIS at time two, and the other half

completed the FEIS at time one (56 participants) and the MSCEIT at time two (with a 1-3 day delay).

8.3 Measures

Mayer Salovey and Caruso Emotional Intelligence Test. Participants completed the four components of the test: perceiving, facilitating, understanding, and managing emotions. The perceiving tasks involve viewing faces and identifying the degree to which each emotion is present in the face. This task is very similar to the first section of the FEIS. The final three sections involve linking sensations or behaviors to emotions (facilitating), combining emotions to create additional emotions (understanding), and using emotions to achieve personal and interpersonal outcomes (managing). The items are scored based on normative responses (i.e., using a consensus scoring method).

Facial Expression Intelligence Scale. As in study one, participants completed the three components of the instrument online: static identification, static interpretation given a context, and dynamic identification. The items are scored as in study one.

8.4 Results

Pearson correlations were calculated to test the relationship of the proposed instrument and its components with an existing scale (MSCEIT) and its four branches. The correlations are provided in the table below.

Table 8.1 – MSCEIT and FEIS Correlation Matrix

	MSCEIT Perceiving	MSCEIT Using	MSCEIT Understanding	MSCEIT Managing	MSCEIT EI_Total	FEIS IdentifyScore	FEIS ContextScore	FEIS VideoScore	FEIS Total
MSCEIT Perceiving	1								
MSCEIT Using	.561**	1							
MSCEIT Understanding	.342**	.369**	1						
MSCEIT Managing	.336**	.468**	.365**	1					
MSCEIT EI_Total	.757**	.817**	.660**	.724**	1				
FEIS IdentifyScore	.230*	.158	.171	.356**	.323**	1			
FEIS ContextScore	.120	.133	.126	.094	.165	.255*	1		
FEIS VideoScore	.067	.188	.022	.144	.182	.424**	.165	1	
FEIS Total	.154	.176	.120	.154	.225*	.674**	.830**	.627**	1

* indicates significance at the p<.05 level; ** indicates significance at the p<.01 level

Results indicate the first component of the FEIS (Identify) is correlated significantly with the MSCEIT total score ($r(96) = .323, p < .01$). This low-level correlation is expected given that both the first component of the FEIS and the MSCEIT measure a participant’s evaluation of a facial expression in a photograph. The second and third components (Context and Video), however, are not correlated with the total emotional intelligence score provided by the MSCEIT, suggesting there is minimal overlap between the two instruments. The overall score for the FEIS

and the MSCEIT exhibit a low-level correlation ($r(96) = .255, p < .05$). This pattern of results indicates that while the MSCEIT and the FEIS examine similar indicators, they are measuring distinct constructs.

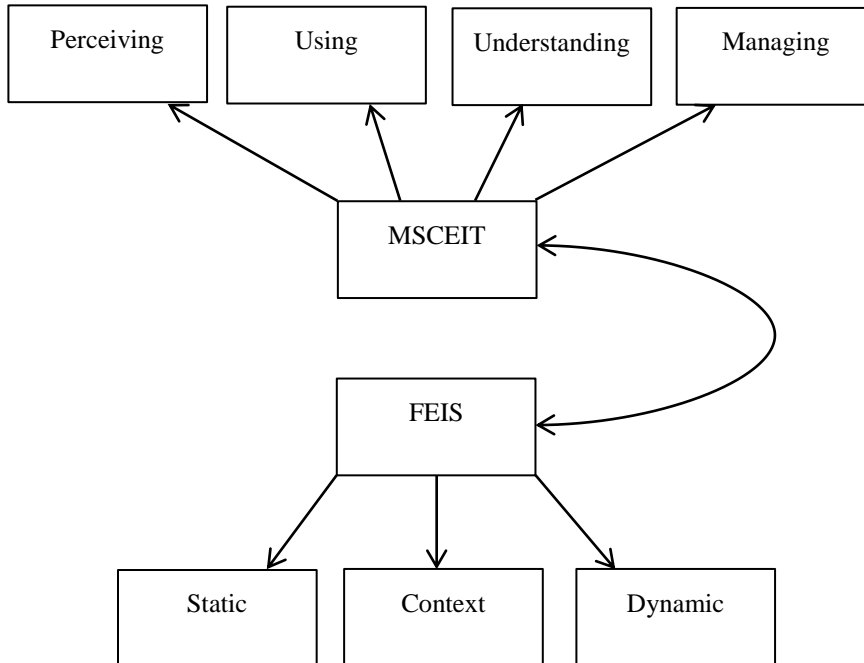
Structural equation modeling was applied using Amos to examine the structural characteristics of the FEIS model. According to Bollen and Lang (1993), the chi square test should be nonsignificant, have a Root Mean Square Error of Approximation (RMSEA) less than .08, have a Comparative Fit Index (CFI) greater than .95, and a Standardized Root Mean Square Residual (SRMR) less than .05. The model, including the three components of the FEIS scale and the MSCEIT (with its four components), fits well ($\chi^2(13) = 14.364, p = .35$; CFI = .987, TLI = .980, SRMR = .047, RMSEA = .033 [90% CI = .000, .109]). All regression coefficients for the model components were significant at the .05 level. Regression coefficients can be found in Table 7 below.

Table 8.2 – Path Coefficients/Regression Weight Estimates for the FEIS Model

Path	Estimate
Perceiving ← MSCEIT	1.000
Using ← MSCEIT	1.180
Understanding ← MSCEIT	.551
Managing ← MSCEIT	.753
Identify ← FEIS	1.000
Context ← FEIS	.647
Video ← FEIS	.699

Given the good fit between the hypothesized and observed model, re-specification of the model was unnecessary. This evidence provides support for the discriminant validity of the FEIS and its hypothesized structure. The model is depicted below.

Figure 8.1 – Structural Equation Model of the Facial Expression Intelligence Scale



8.5 Discussion

Evidence from study two suggests that the FEIS exhibits both convergent validity, in its low-level correlations for the first component and the overall score instrument with the MSCEIT, and discriminant validity, in its lack of correlation between the second and third component with the MSCEIT. The structural equation model exhibits no crossloading and good fit indices, indicating a good fitting model. The results suggest that the FEIS is a valid scale that can be used to assess individual abilities to identify and interpret facial expressions. Future studies will

explore whether this measure can be used to better understand how individuals with varying abilities behave in the marketplace, particularly relating to face-to-face encounters.

CHAPTER 9 – STUDY 3

Study 3: Reliability Analysis

9.1 Introduction

Study 3 involves examining the reliability of the FEIS. Test-retest reliability is conducted to assess the reliability of the formative indicators as recommended by Bagozzi (1994) and Diamantopoulos (2005).

9.2 Sample and Data Collection

A total of 87 undergraduate students participated in a two-part study in exchange for extra credit. Participants completed the FEIS at time one and again at time two (with a 1-2 day delay). Participants completed both administrations of the FEIS under the same conditions (room, format, etc.).

9.3 Measures

Facial Expression Intelligence Scale. As in studies one, two, and three, participants completed the three components of the instrument online: static identification, static interpretation given a context, and dynamic identification. The items were scored using objective measures of muscular movement in the face: the Facial Action Coding System and a software package, FaceReader. Each participant completed the three components at two different points in time.

9.4 Results

Pearson correlations were calculated for each individual component and the overall score, comparing participant scores at time 1 and time 2. The FEIS demonstrated acceptable test-retest reliability with a significant Pearson correlation of .79 for the overall score ($r(85) = .79, p < .01$),

.71 for component one ($r(85) = .71, p < .01$), .68 for component two ($r(85) = .68, p < .01$), and .55 for component 3 ($r(85) = .55, p < .01$).

9.5 Discussion

Results of the test-retest reliability analysis for the FEIS indicate limited variability in administrations, demonstrating high test-retest reliability ($r = .79$). In the next chapter, additional studies will examine the validity of the FEIS by looking at the relationship between FEIS scores and college major (Study 4) and negotiation skills (Study 5).

CHAPTER 10 – STUDY 4

Study 4: College Major as an Indicator of Face Validity

10.1 Introduction

Study 4 involves examining the face validity of the FEIS. A large body of research has investigated the determinants of vocational and academic major selection. Holland (1959) created the theory of vocational choice through a typology of six occupational environments, suggesting that individuals select an occupation based on how well they think they will fit (or feel comfortable) in a particular type of occupational environment. The six environments include motoric (e.g., laborers), intellectual (e.g., physicists), supportive (e.g., social workers), conforming (e.g., bookkeepers), persuasive (e.g., salesmen), and esthetic (e.g., artists). The current study analyzes differences among business majors (i.e., accounting, business information technology, finance, marketing, and management). Within this subset, Holland's conforming and persuasive environments are particularly relevant. The conforming orientation is attractive to individuals who prefer structure and rules, while the persuasive orientation attracts individuals who prefer ambiguity and sociality. In his typology, Holland suggests that accountants tend to embody a conforming orientation, while marketers or salespeople tend to have a persuasive orientation (Holland 1959).

More recent research has investigated individual differences relating to academic major selection (Noël, Michaels, and Levas 2003). One study examined the relationship between business majors and the Myers-Briggs personality inventory. Management and marketing students reported more extroverted personality traits, compared to other business majors, and favored a temperament consistent with creative problem solving, while non marketing majors preferred

practicality (Morgan and Barbour 2008). Another study examined the relationship between Cattell's 16 Personality Factor (1970, 1989) and Lennox and Wolfe's Revised Self-Monitoring Scale (1984) with academic major. Marketing majors were found to have significantly higher scores on emotional orientation to others than accounting students. Individuals with high emotional orientation to others prefer to be around and work with others. Marketing majors were also more likely to "control the impressions that they made on others, portray a deliberate image, adjust their behavior to a situation, read others' emotions, have good intuition, tell whether others considered a joke in poor taste, and spot lying through other peoples' expressions." While this study was limited by self-report rather than ability-based measures, the results indicate a clear distinction between marketing and accounting majors.

It is hypothesized that students enrolled in a socially-oriented degree program (e.g., marketing), seeking employment in more social professions will perform better than students enrolled in technical degree programs (e.g., accounting), seeking employment in more technical or computer-mediated fields, on emotion recognition tasks.

10.2 Sample and Data Collection

A total of 148 undergraduate students participated in a study in exchange for extra credit. Participants completed the FEIS scale and indicated their academic major.

10.3 Measures

Facial Expression Intelligence Scale. As in studies one and two, participants completed the three components of the instrument online: static identification, static interpretation given a context, and dynamic identification. The items were scored using objective measures of muscular movement in the face: the Facial Action Coding System and a software package, FaceReader.

Academic Major. Participants were asked to indicate their academic major.

10.4 Results

The FEIS scores for marketing majors and accounting majors were compared using an independent samples t-test. Marketing majors ($M=.63$, $SD=.10$) performed significantly better on the FEIS scale than accounting majors ($M=.54$, $SD=.12$); $t(57) = -2.94$, $p < .01$). Similarly, the FEIS scores for marketing majors ($M=.63$, $SD=.10$) are significantly higher than accounting and business information technology majors ($M=.59$, $SD=.12$); $t(73) = -2.04$, $p < .05$). This provides evidence that students who are enrolled in a more socially oriented major (i.e., marketing) demonstrate higher levels of facial expression recognition than students enrolled in more technical majors (e.g., accounting and business information technology). To further investigate this hypothesis, the scores for several socially-oriented majors were combined (marketing, management and communication) and compared with technical majors (accounting, business information technology, finance, and engineering). An independent sample t-test demonstrated that socially-oriented majors ($M=.64$, $SD=.10$) performed significantly better on the FEIS than technical majors ($M=.59$, $SD=.12$); $t(113) = -2.64$, $p < .01$).

10.5 Discussion

Results indicate that students enrolled in more socially-oriented academic majors, enroute to more socially-oriented careers, exhibit greater abilities to identify and interpret facial expressions than students enrolled in technical majors. Whether students have learned the ability through marketing-related courses or whether individuals who have higher abilities to read facial expressions self-select into socially-oriented degree programs requires further investigation.

CHAPTER 11 – STUDY 5

Study 5: Predictive Validity: Applying the FEIS to Negotiation Outcomes

11.1 Introduction

Study 5 investigates the predictive validity of the FEIS. Extant research has linked the ability to read emotions with a variety of successful outcomes including academic performance (Mayer, Salovey, and Caruso 2004), healthy food choice (Kidwell, Hardesty, and Childers 2008), and job performance for realtors, insurance agents, and salespeople (Kidwell et al. 2011). Kidwell and colleagues (2011) collected emotional intelligence measures and sales revenue from real estate agents and found that emotional intelligence predicted sales revenue (over gender, age, and sales experience).

Another important marketing context for facial expression recognition is a negotiation setting. Negotiations can involve a wide array of emotions (e.g., Barry et al. 2004), however these emotions may or may not be appropriately perceived or understood (Elfenbein et al. 2007). Elfenbein et al. (2007, 210) indicate that “effective negotiating requires parties to develop an understanding of their counterparts’ interests and preferences, in a context in which such information may be explicitly hidden but implicitly revealed.” The implicit revelation of the counterpart’s motives could be through nonverbal cues, such as facial expressions. The ability to read the expressions of one’s counterpart will likely impact the efficiency of communication and the accuracy of the social judgments necessary in a negotiation. Elfenbein et al. (2007) conducted a study to examine the relationship between emotion recognition accuracy and negotiation outcomes. Emotion recognition accuracy, as evidenced by appropriately identifying emotions in

photographs, was significantly related to better negotiation outcomes in both competitive and cooperative tasks in same-sex dyads.

It is hypothesized that individuals with greater abilities to identify and interpret facial expressions will be better at reading the expressions of their counterpart and exhibit better negotiation outcomes.

11.2 Sample and Data Collection

A total of 112 undergraduate students participated in a study in exchange for extra credit. Participants were coupled with another participant upon entrance into the lab. Participants were randomly assigned to either a buyer or seller role and were asked to read a one page description of a negotiation task. Participants completed questions pertaining to the task to ensure understanding prior to the negotiation and were told that they could earn a monetary reward if they performed well (i.e., earned the most negotiation points) on the negotiation task. Participant dyads engaged in the negotiation task, and were escorted into individual rooms to evaluate their own and their counterpart's performance as well as complete the FEIS.

11.3 Measures

Facial Expression Intelligence Scale. As in studies one and two, participants completed the three components of the instrument online: static identification, static interpretation given a context, and dynamic identification. The items were scored using objective measures of muscular movement in the face: the Facial Action Coding System and a software package, FaceReader.

Negotiation Points. Participants were provided with a table indicating the number of points they would receive if they reached various contractual terms in the negotiation. Participants

were informed that their goal was to earn as many points as possible and would be awarded a monetary reward if they were among the participants who scored the most points.

Negotiation Time. Participants recorded the time they began and completed the negotiation task.

Demographics. Participants were asked to indicate their own and their counterparts' gender.

11.4 Results

Data from the negotiation study was analyzed at the individual and group level.

Individual Analysis. In male-male dyads, participants with a higher FEIS score received significantly more negotiation points ($r=.40$, $p < .05$). Similarly, in male-male dyads, participants with a higher FEIS score (than their opponent), were more likely to “win” the negotiation ($r=.44$, $p=.055$). In female-female dyads, participants with a higher FEIS score (than their opponent), received marginally more negotiation points ($r=.26$, $p=.087$).

Dyadic Analysis. A regression analysis was conducted with efficiency (negotiation time) and FEIS score as predictors of negotiation points. For male-male dyads, the model was significant ($R^2=.245$, $F(2,21)=3.416$, $p=.052$). FEIS score significantly predicted negotiation points ($\beta=.498$, $p=.016$). Similar analyses were conducted for female-female and male-female dyads. The results were nonsignificant.

11.5 Discussion

Results of the negotiation study indicate that individuals who are better at reading faces are more likely to produce better negotiation outcomes. This outcome occurs in male-male

negotiations, but not in female-female or male-female negotiations, providing partial support for the hypothesis.

The literature provides some insight into the gender dynamics associated with negotiations. King and Hinson (1994) argue that gender is a particularly important variable to consider in negotiations. When negotiating, women are less confident (Watson 1994), set lower goals for themselves (Stevens, Bavetta, and Gist 1993), and avoid initiating the negotiation (Small et al. 2007). In salary negotiations, for example, women expect lower compensation (Jackson, Gardner, and Sullivan 1992; Stevens, Bavetta and Gist 1993) than men. These studies provide some evidence that females are more deficient negotiators. When gender is made salient, as in male-female dyads, this deficiency might be especially apparent.

In distributive negotiations (i.e., when one participant's gain is the other participant's loss – as is the case in the current study), gender differences abound (Bowles, Babcock and McGinn 2005). A meta-analysis of gender outcomes in negotiations (Stuhlmacher and Walters 1999) found that men outperformed women in distributive negotiations. This type of negotiation setting favors a masculine approach to negotiations, where the participant achieves better outcomes with a more assertive and competitive style, rather than a collaborative, stereotypically female, style (Kolb 2007). Women use less distributive strategies, such as “threats, heavy commitments, put-downs, and arguments that bring in extraneous issues in an effort to persuade the other to concede” (Kimmel et al. 1980, 15) and use more equivocal and cooperative language (Womak 1987; Walters, Stuhlmacher, and Meye 1998).

The non-significant findings for the male-female dyads of the current study may be explained by the gender schemas that conflict with successful performance in a distributive

negotiation. The self-promotion and authoritativeness required to achieve positive negotiation outcomes in the current study are incongruent with the feminine schema (Kolb 2007). In negotiations, women are more compelled to behave according to gender schemas and stereotypes, which constrain them from advocating for themselves (Stuhlmacher and Walters 1999) and makes them more susceptible to social backlash (Rudman and Glick 1999).

Cross and Madson (1997) explain that a woman's self-concept is interpersonally oriented, causing her to more readily respond to the needs of others. One stereotype is that women are generally deficient negotiators. This stereotype may influence expectations regarding a female's behavior in a negotiation, which may further lead to expectation confirmation (Rosenthal and Jacobson 1968). More specifically, if a male is expecting a female to behave in a stereotypical manner, females then feel more obligated to behave accordingly – thus rendering them more likely to comply in a male-female negotiation setting.

One study examining these gender stereotypes had participants engage in a “Prisoner's Dilemma” task with an unknown counterpart. When the counterpart used a competitive (cooperative) strategy, participants attributed the counterpart to be male (female) (King, Miles, and Kniska 1991). Similarly, in a computer-mediated negotiation, participants believing their counterpart was female (male) rated their counterpart as more cooperative (exploitive) (Matheson 1991).

The results of the current study provide support for the role of facial expression recognition in negotiations of male-male dyads. When both parties behave competitively (as is the nature of men in negotiations), the participant who was better able to read their opponent's facial expressions produced more successful negotiation outcomes. The marginal results evidenced in

the female-female dyads may be explained by the propensity of females to think relationally rather than competitively (King and Hinson 1994). While the current study explicitly stated that the participant's goal was to earn as many points as possible (i.e., win the negotiation), females may have had an additional personal goal of relationship maintenance or satisfaction and perceived this goal as more important than winning. Gender research provides support for this hypothesis, finding that females evaluate social and person-oriented values more importantly than males (Feather 1984; Sutherland and Veroff 1985). Alternatively, males focus on the task of earnings or outcome maximization – an individual or impersonal goal (Neu, Graham, and Gilly 1988). One study investigating male-male, male-female, and female-female negotiation dyads found that females rated four statements of relationship preference (“I treated my opponent fairly during this negotiation”; “I wanted to maintain a good relationship with my opponent during this negotiation”; “Having my opponent think well of me is an outcome I sought during this negotiation”; “I was concerned with my opponent's feelings during this negotiation) higher than males. In the same study, males were found to achieve better negotiation outcomes than females. This effect was most pronounced in male-female dyads (King and Hinson 1994).

The non-significant results in mixed gender dyads may be further explained by the nature of a mixed gender interpersonal interaction. According to Stuhlmacher and Walters (1999, 658), “opposite gender opponents may reinforce gender stereotypical behavior more than same gender negotiation partners” and these differences occur with greater frequency in face-to-face negotiations (Walters et al. 1998).

While the relationship between expression recognition and negotiation success is limited to male-male negotiations, the literature indicates that there may be several situational constraints inherent in female-female, mixed gender, and distributive negotiation settings that might interfere

with the ability to examine the research hypothesis. The significant findings in a small sample size of male-male negotiations speak to the robustness of the effect.

CHAPTER 12 – CONCLUSION

12.1 Summary of Findings

Study 1. Study 1 developed an instrument to measure individual ability to identify and interpret facial expressions: the Facial Expression Intelligence Scale (FEIS). The instrument has three components. Component one consists of photographs of individuals expressing the six universal emotions (happy, sad, anger, disgust, fear, and surprise). This component contains six items – one photograph depicting each emotion and is consistent with previous work on emotion recognition (e.g., Biehl et al. 1997). Respondents must correctly identify the emotion present in the face. Component two consists of various marketing contexts (e.g., a toy recall), emotional responses to this context (e.g., fear that someone will get hurt from the toy), and photographs of individuals expressing the six universal emotions and a neutral face. Respondents must match their emotional response to the marketing context and the appropriate facial expression that accompanies the emotional response. This component contains six items, representing the six universal emotions and various marketing contexts. Component three consists of videos of emotional expressions. Respondents must correctly identify the emotion present in the face. This component contains twelve items, including male and female representations of each of the six universal emotions. Research to date has relied on static photographs of emotions, lacking the realism of dynamic (video) expressions. Item-total correlations for the 6 items in component one, 6 items in component two, and 12 items in component three are all significant. Item-total correlations for each component and the overall measure are also significant. Participant scores were divided in quartiles, with individuals scoring in the 25th percentile or below belonging to quartile one and individuals scoring in the 75th percentile or above belonging to quartile four. As expected, individuals belonging to quartile one (i.e., having low overall FEIS scores) scored the

lowest on each individual item, while individuals belonging to quartile four (i.e., having high overall FEIS scores), scored the highest on each individual item.

Study 2. Study 2 examined the convergent and discriminant validity of the FEIS instrument. Participants completed the FEIS instrument and the MSCEIT, a widely used measure of emotional intelligence. Pearson correlations of the three FEIS components and the MSCEIT indicate a significant, low level correlation for the first component of the FEIS instrument with the MSCEIT. This correlation provides evidence of convergent validity because both measures require participants to evaluate photographs of emotional expressions. The non-significant relationships between the second and third components of the FEIS instrument and the MSCEIT provide evidence of discriminant validity, demonstrating that these components are measuring distinct constructs. A structural equation model examined the three FEIS components and the four MSCEIT branches. The model exhibits no crossloading between the three FEIS components and the four MSCEIT branches and displays good fit indices, indicating that the FEIS model is a good fitting model.

Study 3. Study 3 examined the test-retest reliability of the FEIS instrument. Participants completed the FEIS instrument twice, during two separate research sessions. The FEIS instrument demonstrated acceptable test-retest reliability with a Pearson correlation of .79 for the overall FEIS score ($r(85) = .79, p < .01$).

Study 4. Study 4 examined the face validity of the FEIS instrument. Education literature indicates individual differences in social versus technical orientations of individuals in marketing versus accounting degree programs and professions (e.g., Holland 1959). In Study 4, participants completed the FEIS instrument and indicated their academic major. Socially-oriented majors (i.e.,

marketing, management, and communication majors) exhibited higher facial expression recognition skills through their FEIS scores than technical majors (i.e., accounting, business information technology, finance, and engineering majors). The results provide support for the face validity of the FEIS instrument. The instrument is able to detect well-documented differences in social orientation and skills.

Study 5. Study 5 examined the predictive validity of the FEIS instrument. Participants were paired into dyads to complete a buyer/seller distributive negotiation task. Individuals with higher emotion recognition abilities (higher FEIS scores) achieved more successful negotiation outcomes (more negotiation points) in male-male dyads. Marginal and non-significant results in female-female and male-female dyads may be explained by differential female orientations to negotiations and social interactions and the activation of gender stereotypes (for a detailed discussion, see Chapter 11).

The results across five studies indicate that the FEIS instrument is a reliable and valid tool to assess individual differences in facial expression recognition.

12.2 Implications

The results of five studies indicate individual differences in facial expression recognition. This individual difference may have significant implications for managers in a variety of contexts. When considering hiring salespeople to interact with customers or to engage in relationship marketing with other firms, marketing (versus accounting) majors will display more facial expression recognition skills (Study 4) which may lead to more satisfactory outcomes for the company (as evidenced by the more successful negotiation outcomes in Study 5) and more satisfactory outcomes for the customers, if the salesperson can more accurately read the customer

and adjust their behavior accordingly. Sales force training would benefit from incorporating instruction on how to read emotions in customer faces.

Individual differences in facial expression recognition may also have consumer implications. In this internet age, computer-mediated retail environments (i.e., online shopping) and negotiation contexts are becoming increasingly popular. Individuals who possess poor emotion recognition skills may be better suited for these contexts, while individuals who possess greater emotion recognition skills may benefit from the additional information (i.e., facial expressions) gathered in face-to-face settings. Preliminary evidence from Study 5 indicates that individuals with lower emotion recognition ability are more susceptible to unsatisfactory outcomes. Future research may investigate the impact of emotion recognition skills on other interpersonal outcomes such as likeability or susceptibility to persuasion or deceit.

12.3 Limitations

This scale does not include potentially important variables such as eye gaze, head angle, head movement, hand gestures, posture, and other nonverbal behavior. A more comprehensive scale of nonverbal intelligence might consider including these additional cues. Secondly, this scale focuses on anger, fear, happiness, sadness, surprise, and disgust due their universality. While this is a first step to understanding individual differences in emotion recognition, additional emotions that do not have consistent cross-cultural agreement may be a fruitful avenue for future research. Further scale development may consider including additional emotions (e.g., pride, embarrassment, guilt), mixed emotions (e.g., feeling happy and sad at the same time in a bittersweet situation such as graduation), masked emotions (e.g., trying to suppress fear or anxiety in an interview), or false emotions (e.g., when trying to deceive another).

These studies were further limited by sample selection. Participants in all five studies were enrolled in an undergraduate program at Virginia Tech. The student population at Virginia Tech is largely homogenous. Given the homogeneity of the sample, the FEIS instrument's ability to detect individual differences is notable. Future research, however, should investigate the viability of the instrument amongst a more heterogeneous sample, including individuals of various ages, ethnicities, educational backgrounds, and socio-economic statuses. Furthermore, the FEIS instrument would benefit from a cross-cultural validation of the measures. American subjects evaluated American expressions of emotion because perceivers have been found to be more accurate when identifying emotional expressions of the same national in-group (Elfenbein and Ambady 2002). Further scale development might include emotional expressions from additional cultures and include these cultures in the participant sample.

12.4 Directions for Future Research

What consumer outcomes can we expect from people with varying abilities to identify and interpret facial expressions? Future research might investigate 1) how emotional displays affect customer willingness to pay, customer satisfaction, judgments regarding the service encounter and the brand, and likelihood of recommending and revisiting a store and 2) how individuals with varying expression recognition abilities behave in the marketplace. For example, individuals could complete the FEIS instrument and a purchasing scenario in either a computer-mediated environment or through an experimental manipulation. Measures of liking, satisfaction, willingness to pay, whether or not they think they got a good deal, and intentions to revisit the store or recommend the service to a friend should be considered.

Another interesting area for future research might be nonverbal intelligence calibration. For example do individuals who are well calibrated (e.g., they think they are good at judging facial expressions and they perform well on the scale) versus non-calibrated (e.g., they think they are good at judging facial expressions and they perform poorly on the scale) have better or worse consumption outcomes? Is it possible that non-calibrated individuals are more satisfied because they are more naïve?

Finally, additional predictive outcomes of the FEIS instrument should be investigated. For example, one could compare FEIS scores with job performance outcomes, such as tips in a restaurant setting, customer satisfaction in a service encounter, teacher evaluations in an education context, or sales records and commissions of car salespeople or realtors. Evidence across five studies indicates that individuals demonstrating high FEIS scores might also display greater job performance outcomes.

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APPENDIX A: MUSCULAR MOVEMENTS IMPORTANT TO THE SIX BASIC EMOTIONS

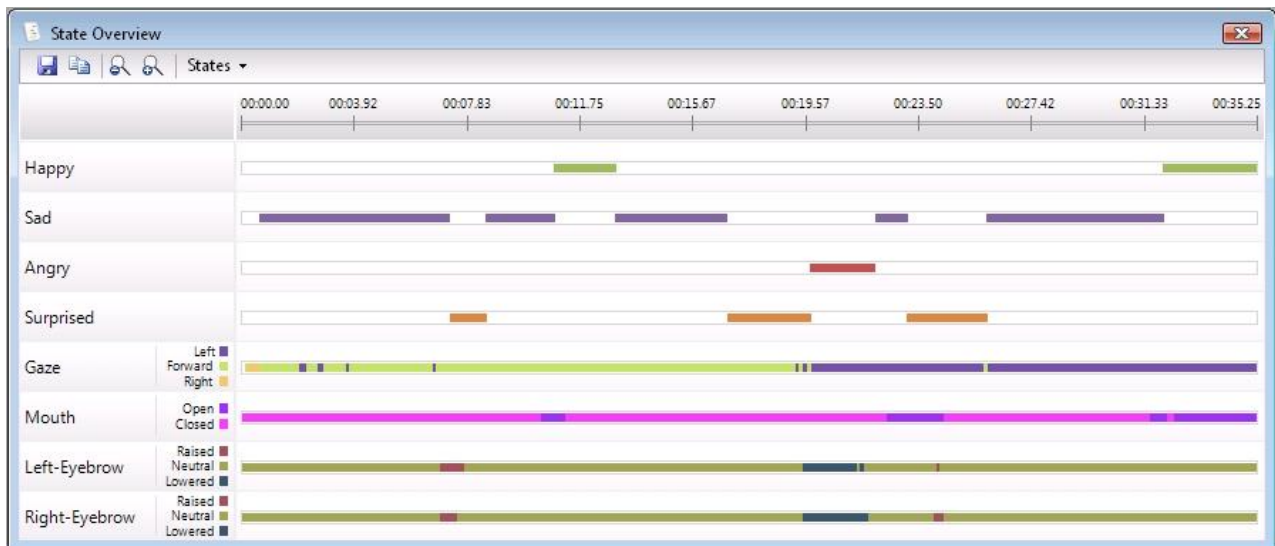
(Graphics used with permission from Meghan Pierce: researcher and subject of photographs; adapted from Ekman and Friesen, 1978)

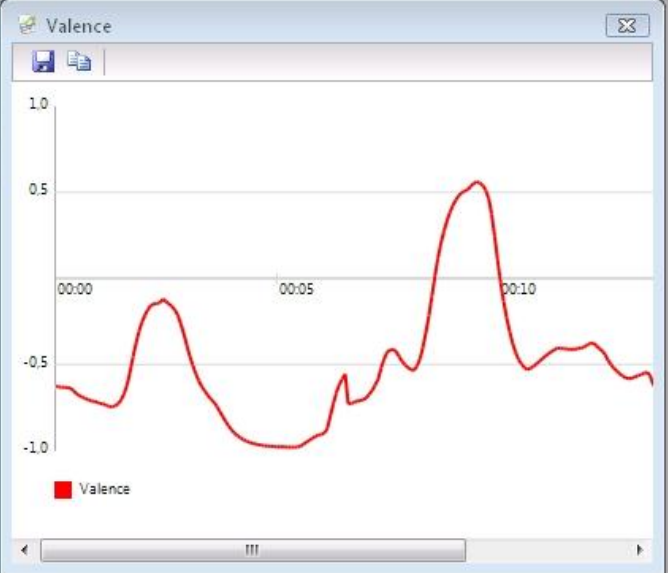
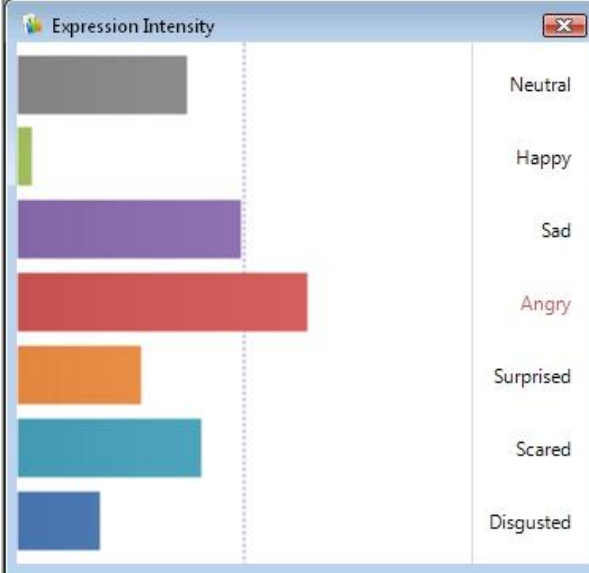
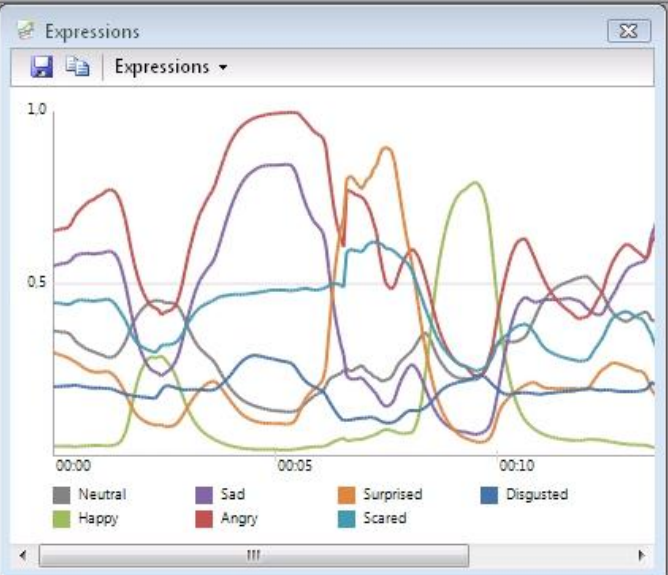
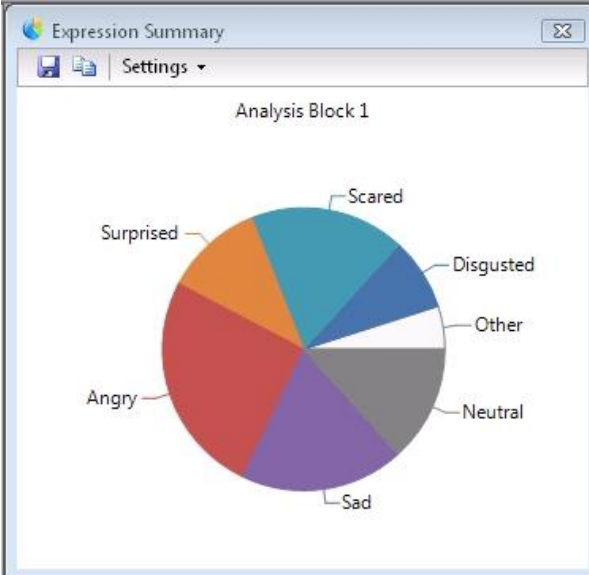
Emotion	Action Description	Muscle	Example Picture
Sadness, Surprise, Fear	Inner Brow Raiser	Frontalis, pars medialis	
Surprise, Fear	Outer Brow Raiser	Frontalis, pars lateralis	
Sadness, Fear, Anger	Brow Lowerer	Corrugator supercilii	
Surprise, Fear, Anger	Upper Lid Raiser	Levator palpebrae superioris	
Happiness	Cheek Raiser	Orbicularis oculi, pars orbitalis	
Anger	Lid Tightener	Orbicularis oculi, pars palpebralis	
Disgust	Nose Wrinkler	Levator labii superioris alaeque nasi	
Happiness	Lip Corner Puller	Zygomaticus Major	
Sadness, Disgust	Lip Corner Depressor	Depressor anguli oris	
Disgust	Lower Lip Depressor	Depressor labii inferioris	

Fear	Lip Stretcher	Risorius with platysma	
Anger	Lip Tightener	Orbicularis oris	
Surprise, Fear	Jaw Drop	Masseter, relaxed temporalis, and internal pterygoid	

APPENDIX B: EXAMPLE FACEREADER OUTPUT

(Graphics used with permission from Noldus Information Technology, Inc.; See Appendix Q for permission approval)





APPENDIX C: INFORMED CONSENT FOR STUDY 1 VIDEO DEVELOPMENT

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants in Research Projects Involving Human Subjects

Face Study

Rajesh Bagchi, Meghan Pierce

I. Purpose of this Research/Project

This study attempts to understand consumers' emotions and facial expressions. The overall purpose of this research project is to identify whether individuals have varying abilities in identification and interpretation of facial expressions. The goal of the study you will participate in today is to develop material, more specifically, video examples of facial expressions, to use in a subsequent study with another group of participants. You will be asked to respond to some scenarios and your responses will be videotaped. There will be a total of fifty undergraduate student participants over the age of 18 involved in this portion of the study. In a subsequent study, audio and video clips from this study will be presented to other participants.

II. Procedures

Your task in this study is to read the scenarios and respond to the questions provided. During the course of this study you will be asked to write about a time when you felt a particular emotion (happy, sad, anger, fear, surprise, disgust). After you write about this past emotional experience, you will be asked to orally present what you wrote. Your statement will be videotaped. After presenting the event, you will be asked to participate in a mock job interview, during which you will briefly describe yourself. The interview will also be videotaped. At the end of the interview, you will be asked to fill out a brief survey and demographic information. This study is expected to take 30 minutes to complete. Your videotapes will be viewed by the participants of the second portion of this research project to determine their ability to identify and interpret the emotions being expressed by you in the video.

III. Risks

There are no more than minimal risks involved to participants in this research. During the course of the study, you will be asked to recall an event where you felt a particular emotion. This might involve remembering an unpleasant experience. You are not required to discuss this experience. Your participation is completely voluntary and you may stop at any time.

IV. Benefits

Academic and consumer benefits of this study include understanding how people make judgments about facial expressions and how this affects various consumption and marketplace outcomes. It may also have societal benefits inasmuch as it can contribute to our understanding of how to teach consumers to make better decisions.

V. Extent of Anonymity and Confidentiality

In order to understand people's abilities to identify and interpret facial expressions, our research requires dynamic views (videos) of facial expressions. Video and audio taping will occur during the course of this study. Videos will be recorded in a classroom or laboratory. Data and video documents will be stored in a locked laboratory or office to which only trained researchers have

access. Dr. Rajesh Bagchi, the primary investigator, Meghan Pierce, and trained research assistants, all of whom have completed the Blackboard course on IRB procedures and have received a passing score on the quiz. The study data will be retained for 6 years in compliance with the APA guidelines for research. It is possible that the Institutional Review Board (IRB) may view this study's collected data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research.

VI. Compensation

As compensation for your participation in today's study, you will receive extra credit. Your instructor has decided to grant 5 points of extra credit towards the final examination. Alternate and equitable ways to earn the equivalent credit without participating as a subject in research will be provided by your course instructor.

VII. Freedom to Withdraw

Subjects are free to withdraw from a study at any time without penalty. If you choose to withdraw, you will be compensated for the portion of the time of the study. If you choose to withdraw, you will not be penalized by reduction in points or grade. You are free not to answer any questions or respond to experimental situations that you choose without penalty.

VIII. Subject's Responsibilities

I voluntarily agree to participate in this study.

IX. Subject's Permission

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date _____
Subject signature

Should I have any pertinent questions about this research or its conduct, and research subjects' rights, and whom to contact in the event of a research-related injury to the subject, I may contact:

Meghan Pierce 540-231-2691 mpierce@vt.edu
Rajesh Bagchi 540-231-7810 bagchi@vt.edu

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Chair, Virginia Tech Institutional Review
Board for the Protection of Human Subjects
Office of Research Compliance
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, VA 24060

Telephone/e-mail

APPENDIX D: RENEWED INFORMED CONSENT FOR STUDY 1 VIDEO DEVELOPMENT

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants in Research Projects Involving Human Subjects

Face Study

Rajesh Bagchi, Meghan Pierce

I. Purpose of this Research/Project

This study attempts to understand consumers' emotions and facial expressions. The overall purpose of this research project is to identify whether individuals have varying abilities in identification and interpretation of facial expressions. The goal of the study you will participate in today is to develop material, more specifically, video examples of facial expressions, to use in a subsequent study with another group of participants. You will be asked to respond to some scenarios and your responses will be videotaped. There will be a total of fifty undergraduate student participants over the age of 18 involved in this portion of the study. In a subsequent study, audio and video clips from this study will be presented to other participants.

II. Procedures

Your task in this study is to read the scenarios and respond to the questions provided. During the course of this study you will be asked to write about a time when you felt a particular emotion (happy, sad, anger, fear, surprise, disgust). After you write about this past emotional experience, you will be asked to orally present what you wrote. Your statement will be videotaped. After presenting the event, you will be asked to participate in a mock job interview, during which you will briefly describe yourself. The interview will also be videotaped. At the end of the interview, you will be asked to fill out a brief survey and demographic information. This study is expected to take 30 minutes to complete. Your videotapes will be viewed by the participants of the second portion of this research project to determine their ability to identify and interpret the emotions being expressed by you in the video.

III. Risks

There are no more than minimal risks involved to participants in this research. During the course of the study, you will be asked to recall an event where you felt a particular emotion. This might involve remembering an unpleasant experience. You are not required to discuss this experience. Your participation is completely voluntary and you may stop at any time.

IV. Benefits

Academic and consumer benefits of this study include understanding how people make judgments about facial expressions and how this affects various consumption and marketplace outcomes. It may also have societal benefits inasmuch as it can contribute to our understanding of how to teach consumers to make better decisions.

V. Extent of Anonymity and Confidentiality

In order to understand people's abilities to identify and interpret facial expressions, our research requires dynamic views (videos) of facial expressions. Video and audio taping will occur during the course of this study. Videos will be recorded in a classroom or laboratory. Data and video documents will be stored in a locked laboratory or office to which only trained researchers have

access. Dr. Rajesh Bagchi, the primary investigator, Meghan Pierce, and trained research assistants, all of whom have completed the Blackboard course on IRB procedures and have received a passing score on the quiz. The study data will be retained for 6 years in compliance with the APA guidelines for research. It is possible that the Institutional Review Board (IRB) may view this study's collected data for auditing purposes. The IRB is responsible for the oversight of the protection of human subjects involved in research.

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VIII. Subject's Responsibilities

I voluntarily agree to participate in this study.

IX. Subject's Permission

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

_____ Date _____
Subject signature

Should I have any pertinent questions about this research or its conduct, and research subjects' rights, and whom to contact in the event of a research-related injury to the subject, I may contact:

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Chair, Virginia Tech Institutional Review
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Blacksburg, VA 24060

Telephone/e-mail

APPENDIX E: INFORMED CONSENT FOR STUDY 1

Informed Consent for Study Participation

Thank you for agreeing to participate in this study. This study attempts to understand how consumers interpret facial expressions. This study is expected to take 30 minutes to complete.

Your task in these studies is to read the scenarios and respond to the questions provided. In some cases, you will be presented with a short video and asked to respond to the questions provided. Your responses will remain anonymous and will only be reported in aggregate fashion. Your participation is voluntary. Should you have any questions or comments please contact the experimenter directly (rbagchi@vt.edu or mpierce@vt.edu).

Thank you again for your participation.

APPENDIX F: STUDY 1 STIMULUS MATERIAL

[Screen 1]

Instructions

We are interested in people's emotions and the role that they play in everyday situations. Please keep in mind there are no right or wrong answers. We are only interested in your honest responses.

[Screens 2-7]

Please rate how much the following emotions are being expressed in this face:

[Screen 2 - Face 1: Happy]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 3 – Face 2: Anger]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 4 – Face 3: Disgust]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 5 –Face 4: Sad]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 6 – Face 5: Surprise]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 7 – Face 6: Fear]



Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot

Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screen 8]

Instructions: For the next set of questions, please read the scenario and choose the emotion that you feel is most likely to occur. Then select the facial expression that coincides with this emotion. There are no right or wrong answers-we are interested in your honest opinions.

[Screen 9]

Joe went to a car dealership to shop for a car. He hadn't fully made up his mind about which car to buy. A salesperson approached him and promised to help. But soon the salesperson started getting a little pushy and tried to get Joe to make up his mind quickly.

What is Joe feeling?

- 1) Angry that the salesperson was getting in his face, he wanted to bring it up with the manager
- 2) Sad that he wasn't having as easy of a time shopping for a car as he expected
- 3) Disgusted at the salesperson's off-putting behavior
- 4) Happy that he was going to get a new car
- 5) Surprised at the salesperson's aggressiveness
- 6) Feared that the salespersons actions were becoming so aggressive that the situation might escalate

Given the feeling you selected, which expression is likely to appear on Joe's face?

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

[Screen 10]

Kim thought long and hard about what to get for his best friend's birthday. When he gave the gift to his friend, the friend didn't seem to appreciate the effort he put into picking out the gift.

What is Kim feeling?

- 1) Angry that her friend didn't realize how much time and energy she put into picking out the gift
- 2) Sad that she wasn't able to give her friend something that she would really use or enjoy
- 3) Disgusted at how ungrateful her friend was behaving
- 4) Happy that she brought something to give her friend for her birthday
- 5) Surprised that her friend didn't seem to like the gift
- 6) Feared that her friend didn't like the gift and that she would no longer be her friend

Given the feeling you selected, which expression is likely to appear on Kim's face?

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

[Screen 11]

Tom purchased a new digital camera. After a week of using the camera, the screen suddenly stopped working. Tom brought the camera back to the store and the sales clerk agreed to replace the camera.

What is Tom feeling?

- 1) Angry that he had to make another trip to the store to resolve the issue
- 2) Sad that his new camera was broken
- 3) Disgusted at the fact that he was sold a faulty camera in the first place
- 4) Happy that the store was willing to replace the camera
- 5) Surprised that the sales clerk interaction was so pleasant
- 6) Feared the replacement camera would also malfunction

Given the feeling you selected, which expression is likely to appear on Tom's face?

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

[Screen 12]

Jen went to a sit down restaurant with her boss for lunch. She ordered a cheeseburger, a side of french fries, and a diet soda from the menu. She picked up her cheeseburger to take a bite; it was oozing with grease and dripped onto her pants.

What is Jen feeling?

- 1) Angry that she was so careless in front of her boss
- 2) Sad that she might have ruined her pants
- 3) Disgusted at how greasy the burger looked
- 4) Happy that she was finally able to eat just what she was craving
- 5) Surprised at how much grease was coming off the burger
- 6) Feared that the burger was made improperly and might make her sick

Given the feeling you selected, which expression is likely to appear on Jen's face?

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

[Screen 13]

Jim bought a toy for his 4-year-old niece. After he gave it to her, he heard a news report on television, saying that the toy was recalled for safety reasons. The small pieces of the toy were a choking hazard and a few unattended children were seriously injured.

What is Jim feeling?

- 1) Angry that he purchased a toy that was being recalled
- 2) Sad that he has to take the toy away from his niece
- 3) Disgusted that the toy could do such damage and was put on the market in the first place
- 4) Happy that nothing has happened with his niece and the toy
- 5) Surprised that the toy he bought is being recalled
- 6) Feared that his niece might get hurt before he is able to take the toy away

Given the feeling you selected, which expression is likely to appear on Jim's face?

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

[Screen 14]

Instructions: For the next set of questions, please read the scenario and choose the facial expression that you feel is most likely to occur. Then select the interpretation that coincides with this expression. There are no right or wrong answers-we are interested in your honest opinions.

[Screen 15]

Ann noticed a charge on her credit card that looked suspicious. She called the credit card company and learned that she had accidentally signed up for account protection. When she told the agent she didn't want this service, the agent cancelled the service and cleared the charge.

Of the following, please select the expression that best represents the emotion that Ann is feeling:

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

Of the following please select the option that best represents Ann's mental state?

- 1) Angry that if she hadn't looked at her credit card statement, she would have been charged
- 2) Sad because she thinks the credit card company might have tried to take advantage of her
- 3) Disgusted that she could be charged for something she didn't remember agreeing to
- 4) Happy that the agent was so helpful and she got her money back
- 5) Surprised there was this charge on her credit card
- 6) Feared that similar charges would show up on future account statements

[Screen 16]

Bill just found out one of his checks bounced. He called the bank and they told him that he had an insufficient balance. He had transferred the money from another account, but it hadn't cleared yet. The bank agreed to waive the return check fees if it didn't happen again

Of the following, please select the expression that best represents the emotion that Bill is feeling:

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

Of the following please select the option that best represents Bill's mental state?

- 1) Angry that the transfer hadn't cleared yet
- 2) Sad that the check bounced
- 3) Disgusted that he might be known as the 'guy who's checks bounce'
- 4) Happy that the bank agreed to waive the fees
- 5) Surprised that this could happen to him
- 6) Feared that this might happen again and next time the fees might not be waived

[Screen 17]

May has been going to the same dentist for ten years. She received a statement from her dentist saying the receptionist overcharged her on her last visit. The dental office informed her that she could come pick up a check or that she could put the money towards her next visit.

Of the following, please select the expression that best represents the emotion that May is feeling:

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

Of the following please select the option that best represents May's mental state?

- 1) Angry that she now has to arrange a way to get her money back
- 2) Sad that they overcharged her in the first place
- 3) Disgusted that the receptionist couldn't do her job properly in the first place
- 4) Happy that she is getting back some money that she was not expecting
- 5) Surprised that they called her telling her they overcharged her, when she probably would have never known
- 6) Feared that they might overcharge her again. She wondered if she could continue to trust her dentist.

[Screen 18]

After a road trip, John stopped at a grocery store an hour from his house. He normally didn't shop there, but today it was on his way home. All of a sudden, a loud bell went off and confetti fell from the ceiling. The sales clerk told John, "Congratulations! You are our one-millionth customer! You won free groceries for the rest of the year!"

Of the following, please select the expression that best represents the emotion that John is feeling:

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

Of the following please select the option that best represents John’s mental state:

- 1) Angry that the store was so ostentatious; John hates to be the center of attention.
- 2) Sad that the store is so far from his house
- 3) Disgusted at the ridiculousness of the confetti and the loud noises
- 4) Happy that he will be getting free groceries for the year
- 5) Surprised that he won
- 6) Feared that there was some sort of gimmick involved

[Screen 19]

Laura finally gets a week off to go on vacation to the beach. She is so excited to get there and relax, but when she gets to the airport, her flight is delayed five hours. After complaining to the airline customer service, the ticket agent tells her that they will upgrade her ticket from economy to first class.

Of the following, please select the expression that best represents the emotion that Laura is feeling:

Happy Expression: Photo Available Upon	Sad Expression: Photo Available Upon	Fear Expression: Photo Available Upon	Anger Expression: Photo Available Upon	Disgust Expression: Photo Available Upon	Surprise Expression: Photo Available Upon	Neutral Expression: Photo Available Upon
--	--	---	--	--	---	--

Of the following, please select the option that best represents Laura’s mental state:

- 1) Angry that the flight is delayed and she has to wait in the airport
- 2) Sad that she will get to her destination five hours late
- 3) Disgusted that she needs to complain in order to get an upgrade
- 4) Happy that she gets to travel in luxurious style
- 5) Surprised to be upgraded from economy to first class
- 6) Feared that the flight might be further delayed or cancelled

[Screen 20]

Instructions: For the next set of questions you will be shown a variety of video clips. Once the video is finished, it will automatically advance to the next page. You might experience a brief delay while the video or the next page loads.

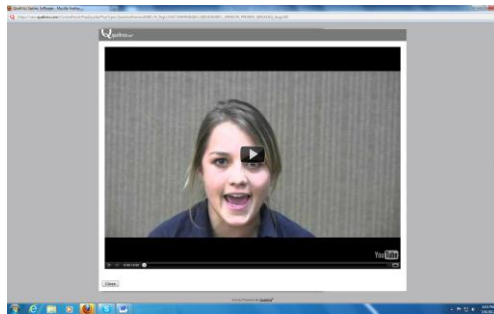
IMMEDIATELY CLICK ON THE VIDEO TO PLAY.

There will be NO AUDIO.

DO NOT CLICK ON ANYTHING AFTER THE VIDEO HAS FINISHED. THE PAGE WILL AUTOMATICALLY ADVANCE.

You will be asked to select which emotion(s) were being portrayed in the video. There are no right or wrong answers-we are interested in your honest opinions.

[Screen 20 – Anger Female]



Please rate how much the following emotions are being expressed in this video:

Happiness	Not at all	1	2	3	4	5	6	7	A lot
Sadness	Not at all	1	2	3	4	5	6	7	A lot
Disgust	Not at all	1	2	3	4	5	6	7	A lot
Anger	Not at all	1	2	3	4	5	6	7	A lot
Surprise	Not at all	1	2	3	4	5	6	7	A lot
Fear	Not at all	1	2	3	4	5	6	7	A lot

[Screens 21-35]

Items presented randomly, followed by the scale used for Screen 20.



Disgust Female 1

Surprise Female

Disgust Female 2



Happy Female

Happy Male

Anger Male 1



Fear Female

Surprise Male

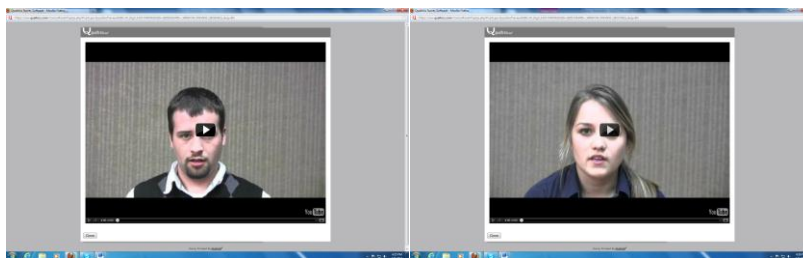
Disgust Male



Anger Male 2

Sad Female

Sad Male



Fear Male

Surprise Female 2

[Screens 36]

Please answer the following questions:

How realistic were the scenarios?

Not at all realistic

Very realistic

1 2 3 4 5 6 7

How difficult was it to select the appropriate expressions?

Not difficult at all

Very difficult

1 2 3 4 5 6 7

How well did you do in identifying the appropriate expressions?

Not very well

Very well

1 2 3 4 5 6 7

What is your gender?

Male

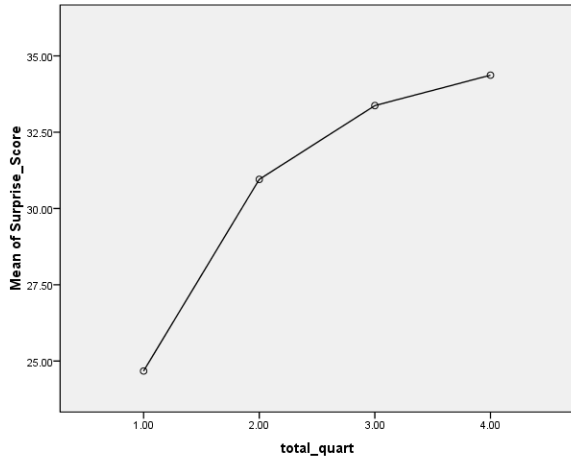
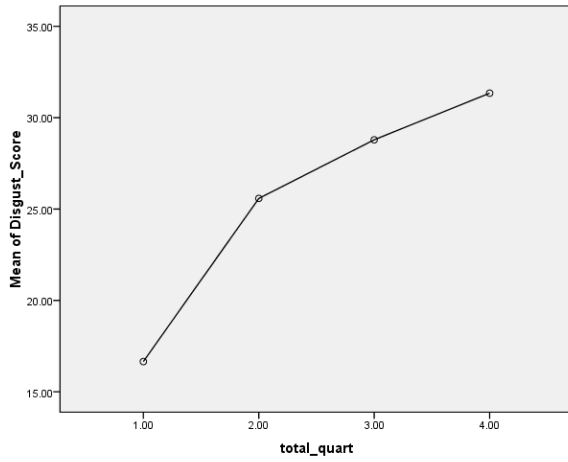
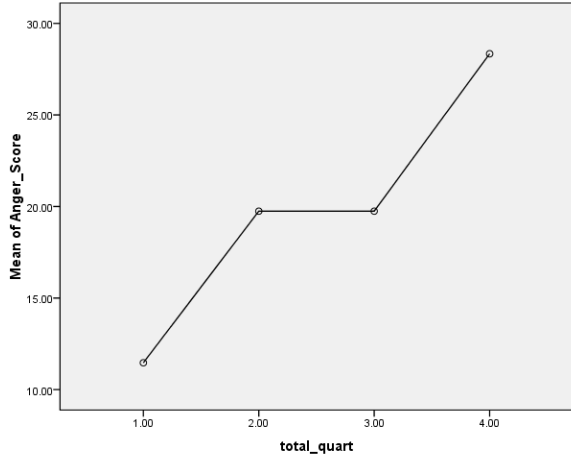
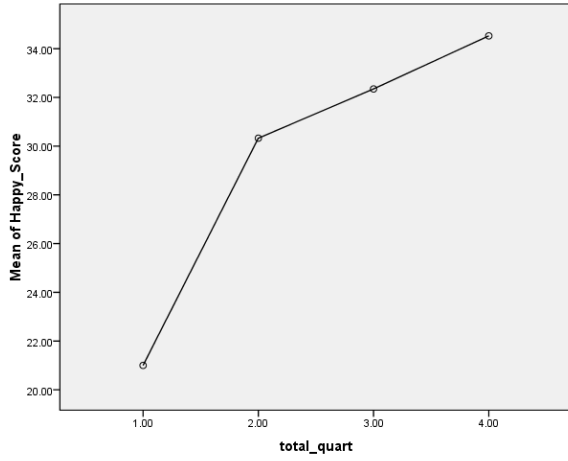
Female

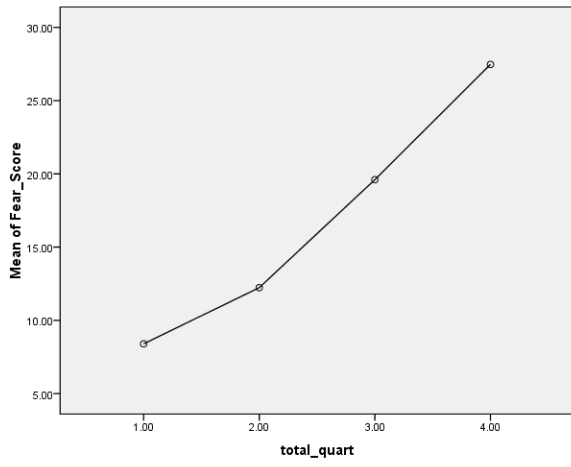
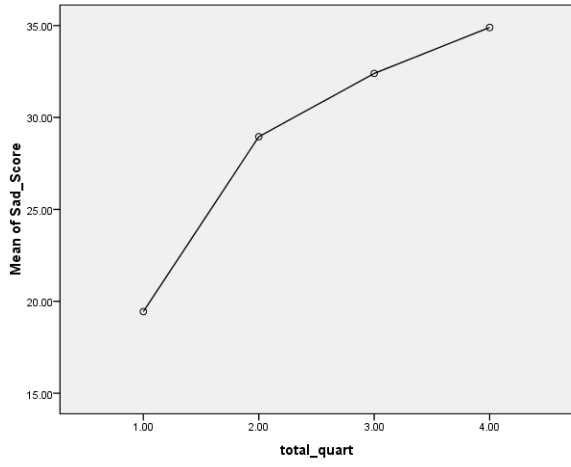
How old are you?

[Screen 37]

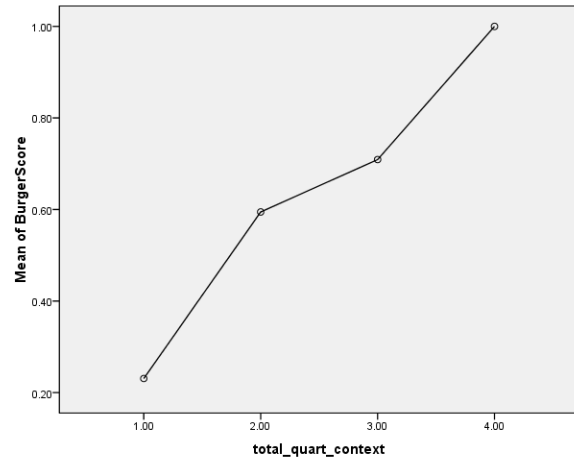
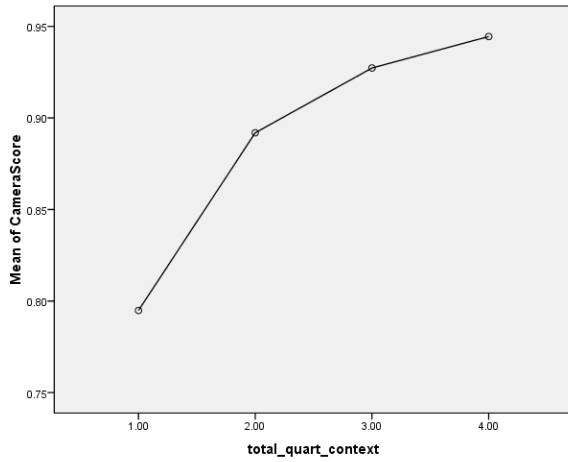
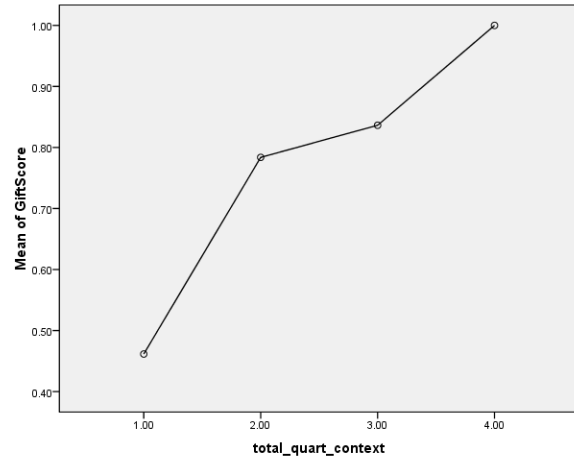
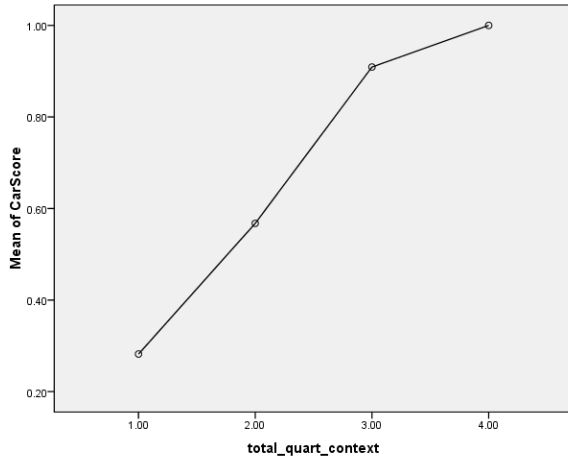
You have successfully completed this survey. Thank you for your participation.

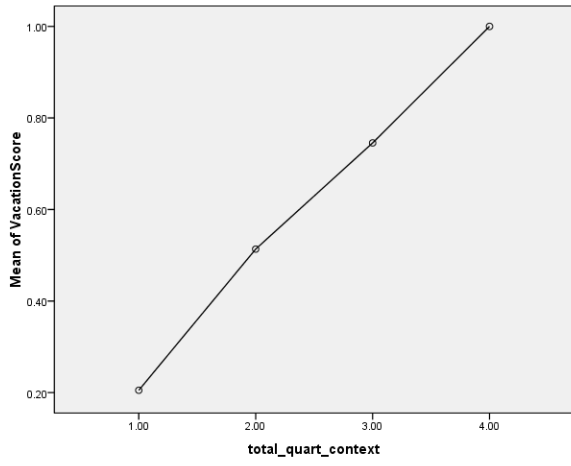
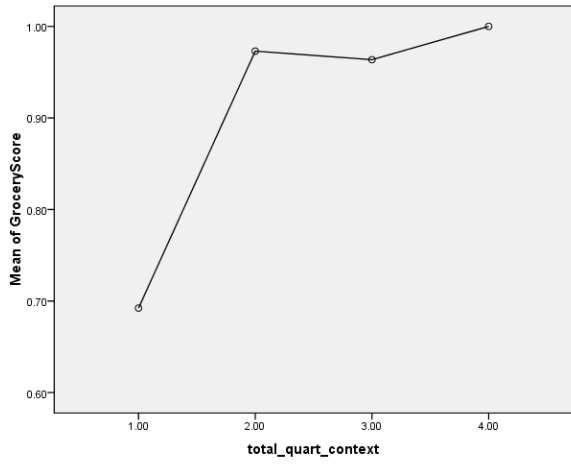
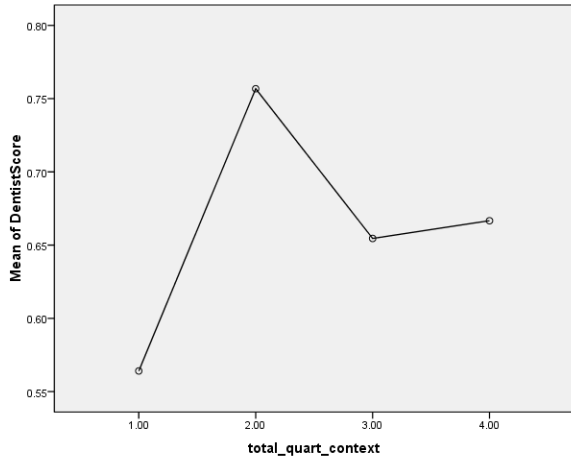
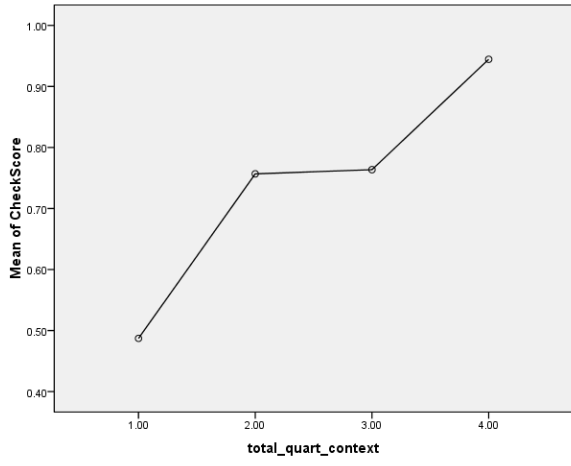
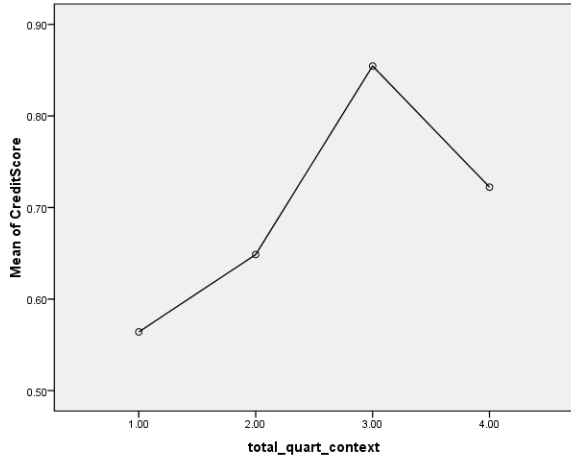
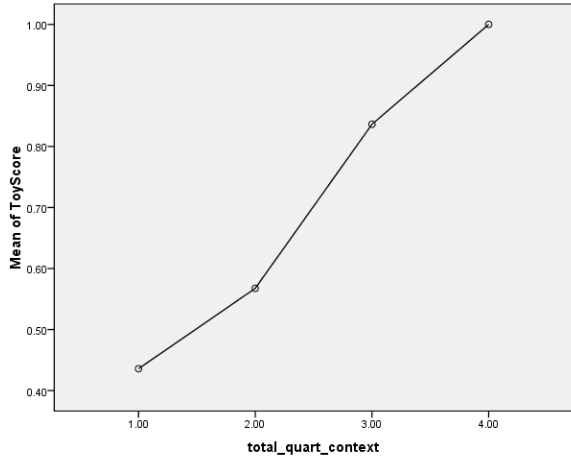
APPENDIX G: GRAPHICAL REPRESENTATIONS OF ITEM-TOTAL ANALYSIS FOR COMPONENT 1



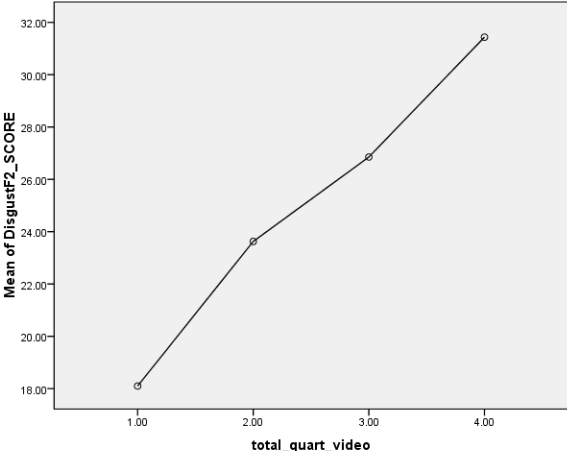
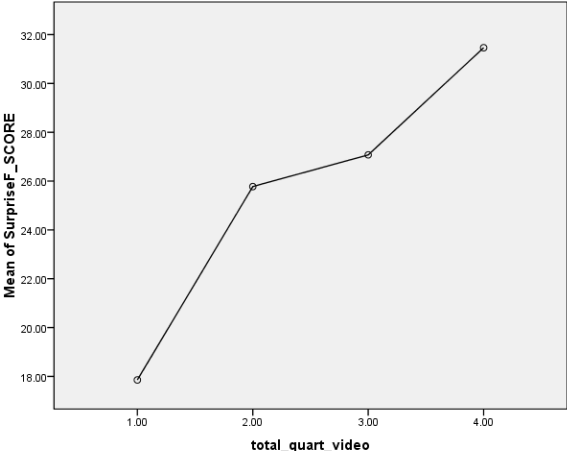
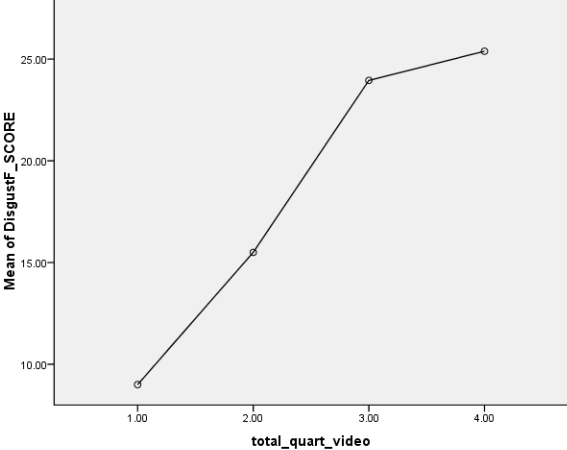
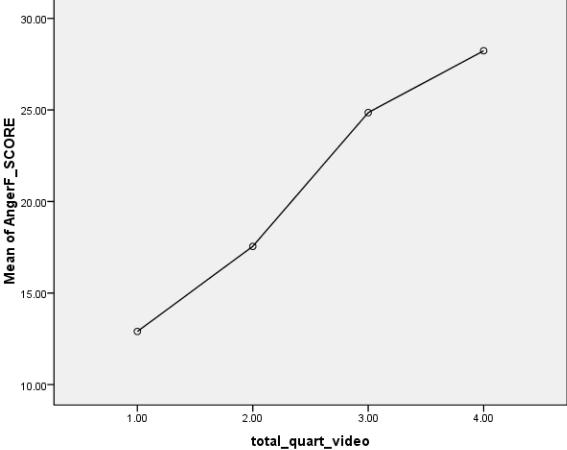


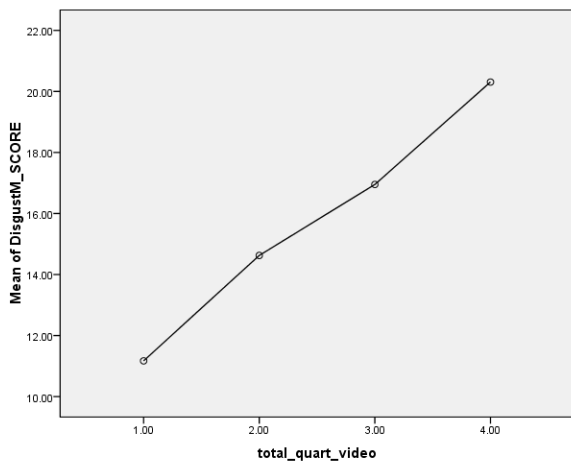
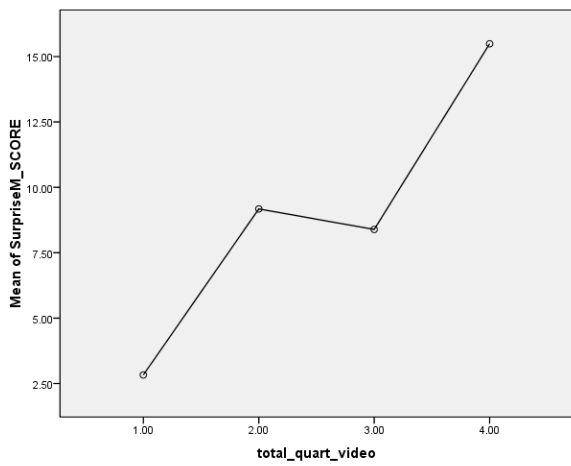
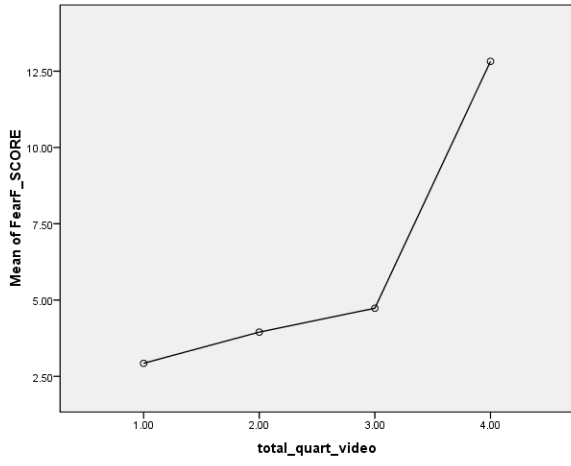
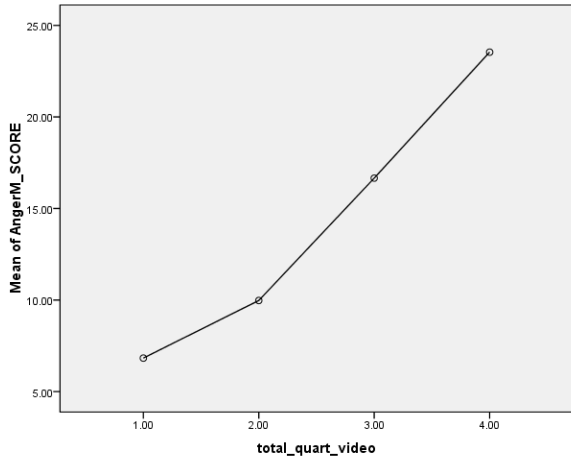
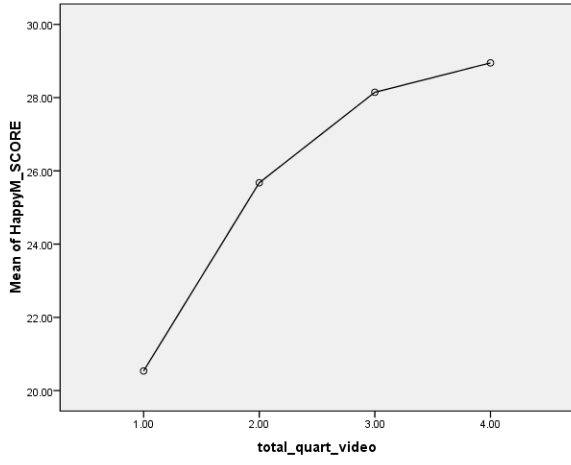
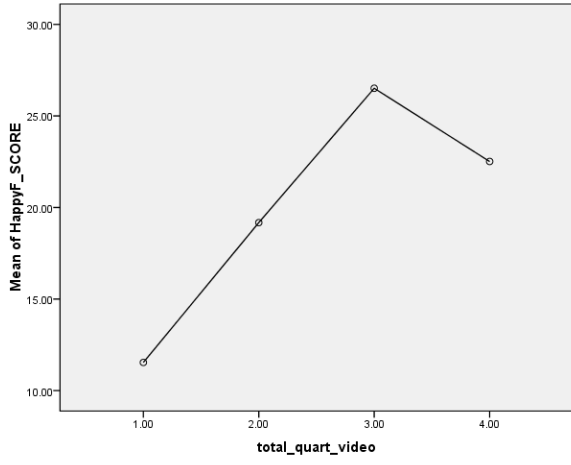
APPENDIX H: GRAPHICAL REPRESENTATIONS OF ITEM-TOTAL ANALYSIS FOR COMPONENT 2

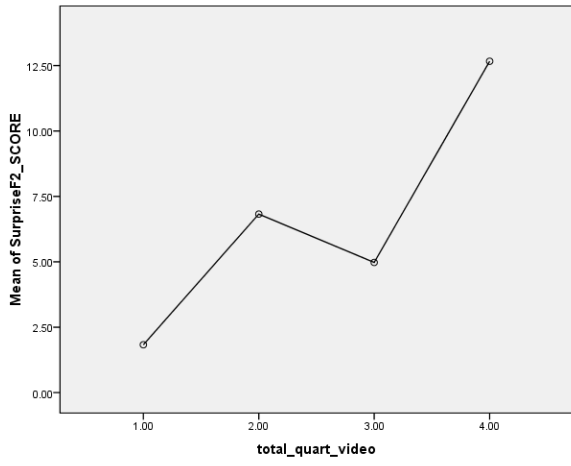
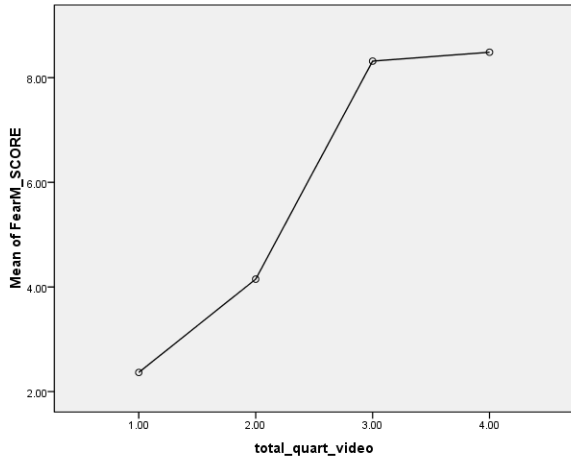
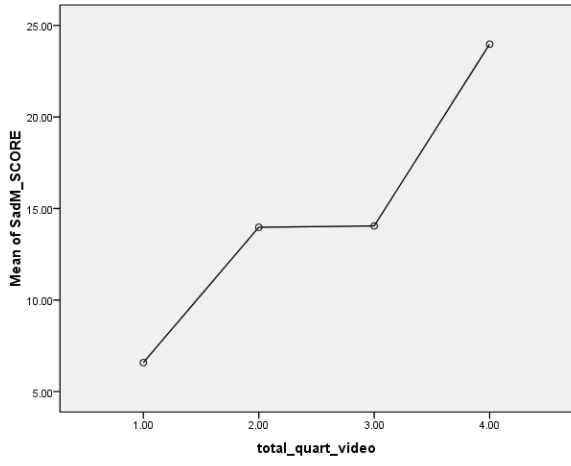
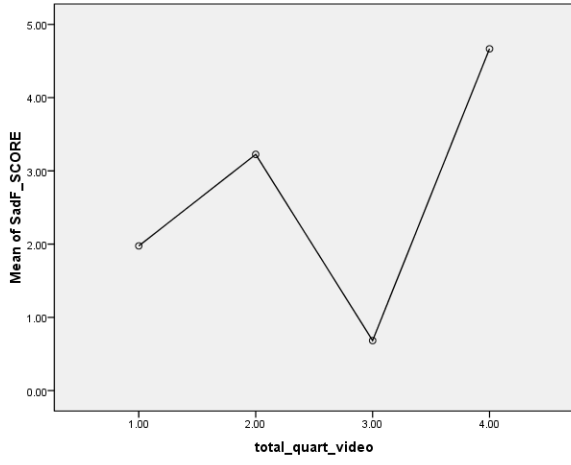
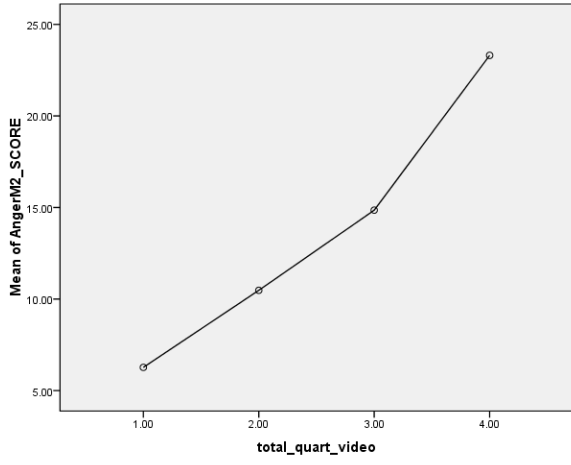




APPENDIX I: GRAPHICAL REPRESENTATIONS OF ITEM-TOTAL ANALYSIS FOR COMPONENT 3







APPENDIX J: IRB APPROVAL LETTER FOR STUDY 1




Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24061
540/231-4991 Fax 540/231-0959
e-mail moored@vt.edu
www.irb.vt.edu
FWA00000672 (expires 6/13/2011)
IRB # is IRB00000667

DATE: February 10, 2010

MEMORANDUM

TO: Rajesh Bagchi
Meghan Pierce

FROM: David M. Moore 

SUBJECT: **IRB Exempt Approval:** "Emotion Study", IRB # 10-108

I have reviewed your request to the IRB for exemption for the above referenced project. The research falls within the exempt status, CFR 46.101(b) category(ies) 2.

Approval is granted effective as of February 10, 2010.

As an investigator of human subjects, your responsibilities include the following:

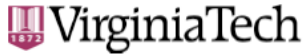
1. Report promptly proposed changes in the research protocol. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File

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APPENDIX K: IRB AMENDMENT APPROVAL LETTER FOR STUDY 1




Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24061
540/231-4991 Fax 540/231-0959
e-mail moored@vt.edu
www.irb.vt.edu
FWA00000572 (expires 6/13/2011)
IRB # is IRB00000667

DATE: February 15, 2010

MEMORANDUM

TO: Rajesh Bagchi
Meghan Pierce

FROM: Carmen Green 

SUBJECT: **IRB Amendment 1 Approval:** "Emotion Study", IRB # 10-108

This memo is regarding the above referenced protocol which was previously granted approval by the IRB on February 10, 2010. You subsequently requested permission to amend your IRB application. Approval has been granted for the requested protocol amendment, effective as of February 15, 2010.

As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in the research proposal. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

cc: File

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APPENDIX L: IRB APPROVAL LETTER FOR VIDEO DEVELOPMENT



VirginiaTech

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
Website: www.irb.vt.edu

MEMORANDUM

DATE: June 25, 2010

TO: Rajesh Bagchi, Meghan Pierce

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires June 13, 2011)

PROTOCOL TITLE: Face Study

IRB NUMBER: 10-526

Effective June 25, 2010, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **6/25/2010**

Protocol Expiration Date: **6/24/2011**

Continuing Review Due Date*: **6/10/2011**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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Date*	OSP Number	Sponsor	Grant Comparison Conducted?

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File

APPENDIX M: IRB RE-APPROVAL LETTER FOR STUDY 1



VirginiaTech

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
Website: www.irb.vt.edu

MEMORANDUM

DATE: June 9, 2011

TO: Rajesh Bagchi, Meghan Pierce

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Face Study

IRB NUMBER: 10-526

Effective June 25, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the continuation request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **6/25/2011 (protocol's initial approval date: 6/25/2010)**

Protocol Expiration Date: **6/24/2012**

Continuing Review Due Date*: **6/10/2012**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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Date*	OSP Number	Sponsor	Grant Comparison Conducted?

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File

APPENDIX N: IRB AMENDMENT APPROVAL LETTER FOR STUDIES 2-4



VirginiaTech

Office of Research Compliance
Institutional Review Board
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
e-mail irb@vt.edu
Website: www.irb.vt.edu

MEMORANDUM

DATE: January 25, 2012

TO: Rajesh Bagchi, Meghan Pierce

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Emotion Study

IRB NUMBER: 10-108

Effective January 25, 2012, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Exempt, under 45 CFR 46. 101(b) category(ies) 2**

Protocol Approval Date: **2/10/2010**

Protocol Expiration Date: **NA**

Continuing Review Due Date*: **NA**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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APPENDIX O: IRB APPROVAL LETTER FOR STUDY 5



VirginiaTech

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Blacksburg, Virginia 24060
540/231-4606 Fax 540/231-0959
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Website: www.irb.vt.edu

MEMORANDUM

DATE: February 14, 2012

TO: Rajesh Bagchi, Meghan Pierce

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Negotiation Study

IRB NUMBER: 12-153

Effective February 14, 2012, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Exempt, under 45 CFR 46.101(b) category(ies) 2**

Protocol Approval Date: **2/14/2012**

Protocol Expiration Date: **NA**

Continuing Review Due Date*: **NA**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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APPENDIX P: STUDY 5 STIMULUS MATERIAL

BUYER

In this study, you will negotiate with an opponent. You will be provided with all the information required for completing this task. The main purpose is to understand how people negotiate with each other. Remember, there are no right or wrong answers. You can discuss all the issues relevant to this study with your opponent. However, you cannot exchange any of the material provided to you with your partner. You can earn monetary rewards based on your performance. Thank you for your participation.

Negotiation Task

You are the purchasing manager of ABC Co. located in New York. Your company has been interested in buying 10 computers for the marketing department of your firm for some time. You have spent considerable time talking to potential vendors and have evaluated their offers. Based on a review of all the important attributes, you have selected AST Technologies as the vendor whose product is compatible with your requirements. After a set of preliminary talks, you have called AST's sales executive for the final negotiations.

As you prepare for this important negotiation there are three main issues for bargaining:

- Free technical service offered by AST (longer the service, greater the profits to your firm)
- Price of the computers (lower the price, greater the profits to your firm)
- Delivery time (shorter the delivery time, greater the profits to your firm)

The most important issue for your firm is **price**. A settlement of \$10,000 on price provides you with more bonus points (400) than any other settlement. The next important issue is **free technical service** and the least important issue is **delivery time**.

A table of settlement points and their associated payoffs is listed below (see table below). For example, if both you and the seller agree on a price of \$12,000, you would obtain 330 bonus points. The profits obtained by your company are directly related to the number of bonus points obtained by you in this negotiation. **Your main objective in this game is to obtain as many bonus points as you can.** However, you and ABC have to agree on all the three issues. An example of the final settlement offer might be 36 months on free technical service, \$16,000 on price, and 8 weeks on delivery time. From Table 1, your total bonus points for this settlement would be 320 (150+150+20). Remember, you can earn a **monetary reward** based on your performance.

Free technical service in months	Price in \$	Delivery time in weeks
60(200)	10,000(400)	2(80)
36(150)	12,000(330)	4(60)
12(100)	14,000(250)	6(40)
6(50)	16,000(150)	8(20)
3(5)	18,000(5)	10(5)

The figures in parentheses indicate the bonus points. For example, if you settle for price at \$14,000, you would get 250 bonus points.

SELLER

In this study, you will negotiate with an opponent. You will be provided with all the information required for completing this task. The main purpose is to understand how people negotiate with each other. Remember, there are no right or wrong answers. You can discuss all the issues relevant to this study with your opponent. However, you cannot exchange any of the material provided to you with your partner. You can earn monetary rewards based on your performance. Thank you for your participation.

Negotiation Task

You are the sales manager of AST Technologies. Your company has been selling personal computers for 5 years. You have been reasonably successful in this market. ABC co. located in New York is interested in buying 10 computers for their marketing department. You had sent them preliminary details about the technical aspects of the computer. After a set of preliminary talks, you have been called by ABC's purchasing manager for final negotiations.

As you prepare for this important negotiation there are three main issues for bargaining:

- Free technical service offered by AST (shorter the service, greater the profits to your firm)
- Price of the computers (greater the price, greater the profits to your firm)
- Delivery time (longer delivery time, greater the profits to your firm)

The most important issue for your firm is **price**. A settlement of \$18,000 on price provides you with more bonus points (400) than any other settlement. The next important issue is **delivery time** and the least important issue is **free technical service**.

A table of settlement points and their associated payoffs is listed below (see Table 1). For example, if both you and ABC agree on a price of \$12,000, you would obtain 150 bonus points. The profits obtained by your company are directly related to the number of bonus points obtained by you in this negotiation. **Your main objective in this game is to obtain as many bonus points as you can.** However, you and ABC have to agree on all the three issues. An example of the final settlement offer might be 36 months on free technical service, \$16,000 on price, and 8 weeks on delivery time. From Table 1, your total bonus points for this settlement would be 500 (20+330+150). Remember, you can earn a **monetary reward** based on your performance.

Free technical service in months	Price in \$	Delivery time in weeks
3(80)	18,000(400)	10(200)
6(60)	16,000(330)	8(150)
12(40)	14,000(250)	6(100)
36(20)	12,000(150)	4(50)
60(5)	10,000(5)	2(5)

The figures in parentheses indicate the bonus points. For example, if you settle for price at \$14,000, you would get 250 bonus points.

INDIVIDUAL PACKET 1 – NEGOTIATION TASK

1. I was assigned the role of (circle one):

BUYER

SELLER

2. Please rank order the three issues to be negotiated from the most important to the least important?

_____ (most important issue)

_____ (least important issue)

3. What is your main objective in this task?

4. How many bonus points would you obtain for the following?

a. Price at \$10,000 _____

b. 60 months of free technical service _____

c. 4 weeks of delivery time _____

Remember, if you perform well on the negotiation task, compensation can range between \$10 and \$25 based on your performance of this negotiation.

Please enter the exact current time: _____

	Offers made by you	Offers made by your opponent
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Once you have completed the negotiation, please enter the exact time: _____

INDIVIDUAL PACKET 2 – NEGOTIATION EVALUATION

Please answer the questions below regarding your experience with the negotiation task. There are no right or wrong answers – we are interested in your honest opinions.

1. How would you rate your performance in this negotiation task?

1	2	3	4	5	6	7
Extremely Bad						Extremely Good
1	2	3	4	5	6	7
The best I can achieve						The worst I can achieve
1	2	3	4	5	6	7
Much better than my						Much worse than my opponent opponent

2. How satisfied are you with your outcomes in this negotiation task?

1	2	3	4	5	6	7
Not at all satisfied						Very satisfied

3. How would you describe your reactions to your opponent in this negotiation task?

1	2	3	4	5	6	7
Not at all satisfied						Very satisfied
1	2	3	4	5	6	7
I would not negotiate with him/her in the future						I would negotiate with him/her in the future

4. If you were given another person as an opponent in a similar task, how would your performance be affected compared to the present situation?

1	2	3	4	5	6	7
Would decrease			Would remain the same			Would increase

5. How likeable was your opponent?

1	2	3	4	5	6	7
Not at all likeable						Very likeable

What did you pay the MOST attention to when negotiating with your opponent? (Circle one)

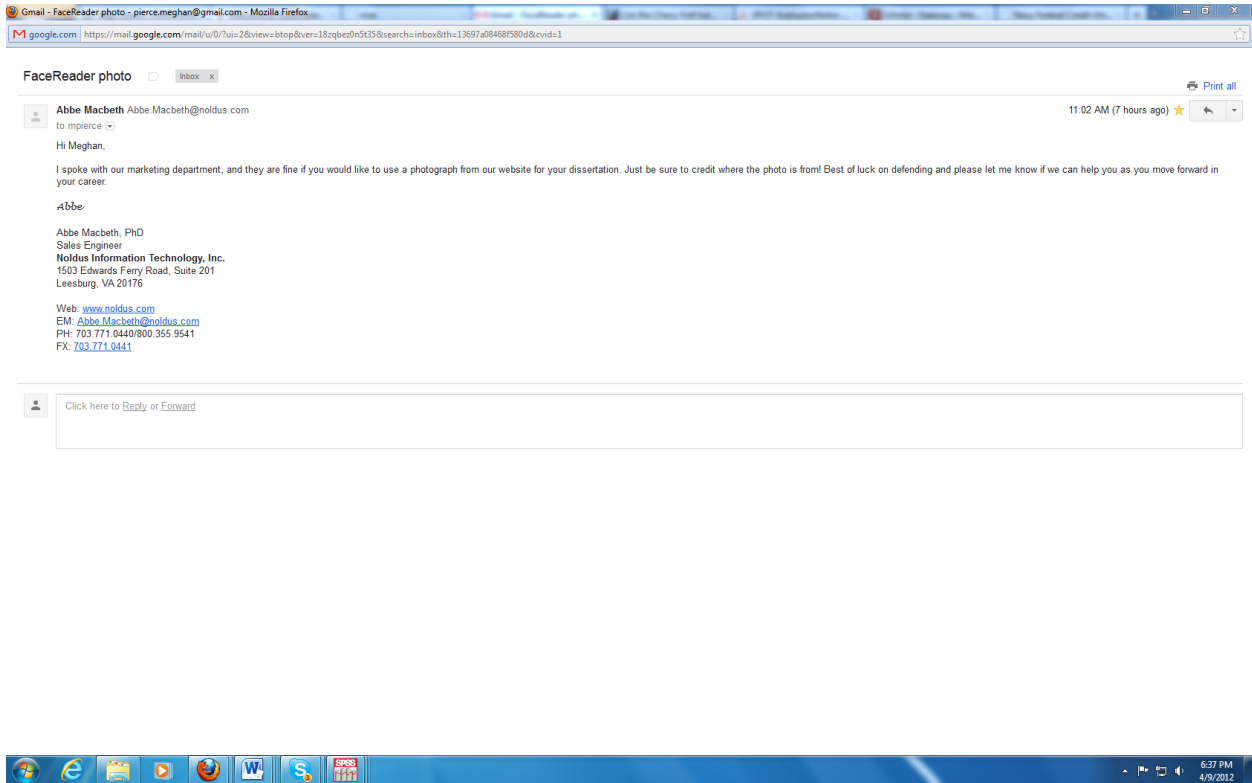
- a) Your opponent's words
- b) Your opponent's tone
- c) Your opponent's facial expressions
- d) Your own goals
- e) Other (explain): _____

How old are you?

What is your gender?

What is your major?

APPENDIX Q: PERMISSION TO USE GRAPHICS IN APPENDIX B



APPENDIX R: PERMISSION TO USE FIGURE 1 GRAPHIC

