MEANING ATTACHED TO HAND MOVEMENTS: GESTURES AND SELF-TOUCHING

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ABSTRACT

The current study was focused on impressions of hand movements. A specific emphasis was placed on distinguishing two common types of hand actions: hand gestures and self-touching actions. Undergraduates (N=100) rated video-only segments of other encoders describing past affective experiences. Segments varied with respect to hand movements displayed: gestures (self-pointing, rhythmic motion of the hands or baton, shape or size motion, etc.), and self-touching (rubbing eye, scratching nose, fidgeting with hands, etc.). Raters also judged how calm, thoughtful, expressive, happy, and attentive encoders appeared in each segment.

As expected participants accurately matched encoders' words with their hand movement at greater than chance expectations. Next, the accuracy of message decoding was greater for gesture movements compared to self-touching movements. Finally, as expected, participants highly rated gesture scenes with adjectives connoting a cognitive function ("thoughtful" and "attentive"); additionally, participants highly rated self-touching scenes on adjectives connoting an emotional function ("calm" and "happy"). Discussion was focused on participants' perceptions of hand movements (gesture and self-touching actions) in contribution to accurate recognition of phrases actually uttered by encoders.

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CHAPTER 1

INTRODUCTION

Nonverbal Behavior Defined as Communication without Words

Nonverbal behavior is sometimes used as the sole vehicle of expression and communication (Dittman, 1987), and generally includes facial expression, vocal tone and sounds, proxemics (use and perception of space), kinesics (body and head movement, posture), and gaze (eye fixation/ eye movement). Nonverbal behavior constitutes a broad area of research, and researchers have suggested it is not merely random movement, but instead is related to speech, affect, attitude, speaker turn-exchange, impression management, etc. (Ekman & Friesen, 1969; Harrigan, Rosenthal, & Scherer, 2005; Siegman & Feldstein, 1987).

Research shows that interpreting the subtle nonverbal cues displayed in everyday life in the absence of verbalizations is a common pattern in human interaction (Harrigan et al., 2005). Individuals display a variety of nonverbal behaviors. During interactions nonverbal cues are naturally displayed in combination or alone, whether through facial movements, vocalizations, gestures, posture, and/or gaze changes. The body actions that involve the most movement are the head/face and hands (Harrigan et al., 2005). With respect to the face, eyes, proxemics (use and perception of space), and vocal behavior, research has been thorough and fully developed in empirical studies, and research results

have come a long way in broadening our understanding of human behavior in social interaction.

The area of nonverbal behavior research that has been less studied is the area of hand movements. Hand actions have been usually harder to discern, code, and to separate from other nonverbal behaviors occurring simultaneously (e.g., face, feet, body posture). Various actions can be performed by the hands: task-oriented movements, speech illustrative gestures, object manipulations, touching others, and self-touching. The intent in the present work is to focus on hand gestures and self-touching which are very frequent actions during social interaction.

Hand Actions: Delineation of Hand Movements

Emblems. Ekman and colleagues have conducted a great deal of research in the area of nonverbal behavior over the years. Ekman and Friesen (1969; 1974) delineated five categories of nonverbal behaviors: emblems, illustrators (hand gestures), self-adaptors (self-touching), regulators, and affect displays. There is a general consensus with regard to these overall categories of hand actions described by Ekman and Friesen (Alibali, Heath, & Myers, 2001; Harrigan et al., 2005; Knapp & Hall, 1992).

Emblems are defined as symbolic gestures which have a specific function and a near-universal meaning to observers. Examples include head nods, shoulder shrugs, the "OK" or "victory" sign, eye winks, etc. (Ekman & Friesen, 1969). Efron (1941) first used the term 'emblem' in his study of hand actions displayed by members of different subcultures (generations of Jews and Italians in New York City). In his work, he demonstrated that gestural behavior is conditioned by culture, showing that non-

assimilated first-generation groups mostly preserved the gestural system of the country of origin even when speaking English, while assimilated groups adopted the gestural system of the newly assimilated environment (1941). Ekman and Friesen (1977) showed a high level of verbal translation accuracy in observers' interpretations of specific emblems.

To specifically study the multi-functionality of hand gestures, many investigators have conducted studies suggesting the importance of culture in hand actions and their meaning. The literature on cross-cultural variation of gestures has shown that the way gestures are displayed varies across cultures. Kendon (2004) studied the population of Naples (Italy) known for their large repertoire of gestures (especially emblems). He concluded that their display of emblematic gestures, or emblems has to do with the local ways of communication, for example, communicating at long distance in a noisy and busy environment (i.e., from a balcony on the top floor to the street; from a balcony to a balcony). Kendon suggests that in some cultures, such as in Naples, gesture use and gesture meaning vary within sub-cultures, marking different functions and interpreted differently. Kita (2009) conducted a literature review on cross-cultural variation of speech-accompanying gestures. Kita determined that in cross-linguistic utterances, gestures have different meanings. For example, the universal gesture of the "OK" sign (i.e., the ring shaped by the thumb and the index finger), will have a certain meaning of "OK" or "good" in some areas (Ireland, Britain, Scandinavia, southern and central Spain, and southern Italy), but the same "OK" sign is interpreted as "zero" in France, and "bodily orifice" in Greece and Turkey (Morris, Collett, Marsh, & O'Shaughnessy, 1979).

Emblems are important hand actions, but are not the focus of the present study and are described here only to help differentiate the various types of hand movements.

Gestures. An area of hand movement that has received considerable attention is hand gestures. Ekman and Friesen (1969) used the term 'illustrators' for these actions. Hand gestures or illustrators are defined as actions produced by a speaker when talking and which are patterned on the verbal content (Ekman & Friesen, 1969). An important concept in nonverbal behavior research, specifically hand movements, is the distinction between 'communication' or 'signification.' This distinction focuses on the idea that the person displaying the gesture may not be explicitly trying to communicate or add to the communication by using a specific gesture (implying awareness and intention), but rather the individual's gesture merely signifies a general attempt to verbalize information to another.

In general, unlike emblems, the display of gestures involves less awareness and intention on the part of the person exhibiting the gesture. These movements occur very frequently during social interaction, but the meaning attributed to these is far less specific than speech content (Kendon, 2004). This has led researchers to question whether the function of gestures is to aid to the speaker or the listener, or both (Kendon, 2004; Maricchiolo, Gnisci, Bonaiuto, & Ficca, 2009, Kita, 2009).

Empirical evidence on the hypothesis that gestures function to aid the listener in understanding the speaker's communication remains unclear. Cohen and Harrison (1973) investigated the frequency of gestures and found that speakers displayed gestures more often when a listener was present. However, gestures can appear even when the speaker

does not have a visible audience to observe the action, such as gesturing while on the telephone, or during monologues in front of a hidden camera (Bavelas, Gerwig, Sutton, & Prevost, 2008; Harrigan, Lucic, & Rosenthal, 1991). Krauss and Hadar (2001) also found that individuals exhibited a high rate of gesture when listeners were not present. Maricchiolo, Gnisci, Bonaiuto, and Ficca (2007) concluded that more times than not, gestures occur during speech, and receivers integrate the content of the message based on the visible gestures the speaker displays. In general, the coordination of hand gestures and speech delineates the content of the message and effects the perception of the gesture by the listener. In addition to the relationship between gestures and speech, a large body of work on gestures is related to speaker turn-exchange (Dittman, 1987; Kendon, 1967; Harrigan, 1980, 1983; 1985; Siegman & Feldstein, 1987). These results suggest that the timing and patterning of hand gestures together with gaze and speech changes function in the smooth exchange of speaker switching and flow of conversation (Duncan & Fiske, 1987).

Other investigators also have adopted the approach that there is a communicative utility of gesture by specifically investigating the tendency of two speakers to produce the same gesture for the same verbal content (Kimbara, 2006). In a study of gesture form convergence (i.e., monitoring of gesture during face-to-face interaction unconsciously or consciously), pairs of speakers described the content of cartoon clips to each other while being videotaped. Results showed that there was greater similarity in hand actions across speakers when speakers and listeners could see each other (i.e., visibility conditions) (Kimbara, 2006). Thus, gestures seem to play a role in the communication between two

speakers. In a follow-up study, Kimbara (2008) retested the hypothesis by controlling for linguistic context using two speaker visibility conditions. Results of Kimbara's study supported the original findings that speakers' gestures become similar as a result of monitoring (i.e., generating similar gestures). By keeping linguistic context constant across two conditions, Kimbara found that speakers' tendency to employ similar hand shapes (i.e., iconic-representational gestures) was higher for the visible condition than in the blind condition. They concluded that a shared linguistic context was not the single factor in the relationship between speech and form convergence in gesture, but that this convergence may be due to other factors.

To investigate the perceptions of gestures by observers, Marichiolo, Gnisci, Bonaiuto, and Ficca (2009) examined the effect of type of gesture in persuasive speech on the evaluations by observers. Five categories of hand actions (i.e., ideational, conversational, object-addressed, self-addressed, and no gesture) were included and these were displayed by a professional actress who held constant her verbal, vocal, and body expression; only the hand gesture differed. Evaluation of the speaker was based on five factors: speaker composure, speaker warmth, speaker competence, style effectiveness, and message persuasiveness. The intent of the study was to determine if the hand gestures related to a positive evaluation across the five factors. Results showed that participants paid more attention to the speaker's hand gestures in conditions where the gesture was present versus the no-gesture condition. Also, results showed that there was a significant effect for gesture type on four of the five factors (composure, competence, effectiveness of speaker, persuasiveness of message). Furthermore, higher evaluations resulted for

ideational gestures, conversational gestures, and the no-gesture condition, compared to self-addressed gesture and object-addressed gestures.

The functions of gesture have been studied using many methodologies. The three types of studies in which gestures have been examined most commonly are in clinical populations, deception studies, and studies investigating the relationship between gestures and encoder personality. (Encoder is a term used for the person displaying the nonverbal behavior, while decoder is the individual who interprets, judges, or evaluates the encoder.) Using different methodologies, researchers have sought to understand whether gestures serve to help the listener understand the speaker or help the speaker construct speech, or both.

These studies have shown several important results. Ekman and Friesen (1969) found that the frequency of gestures was related to individual psychopathology. In studying a clinical population, one of their findings showed that people with severe depression displayed fewer gestures than the non-depressed population, and those with anxiety disorders exhibited more agitated, rapid gestures than those without an anxiety disorders. Studies of gestures in deception research showed a relationship between the display of gestures and lying; 'liars' exhibited fewer gestures (Ekman & Friesen, 1969; Vrij, 1995). With respect to studies of gesture and personality, researchers examined particular characteristics of encoder personality, such as extraversion/introversion, trait anxiety/state anxiety, aggressive personalities, etc. (Allport, 1924; Harrigan, Harrigan, Sale, & Rosenthal, 1996; Nasby, Hayden, & DePaulo, 1980). These studies focused not only on encoder state, or personality attributes, but also on decoder's personality

characteristics in the judgment of nonverbal behavior. Berry and Hansen (2000) investigated the relation between the Big Five personality factors and social interaction in female dyads. Females in pairs videotaped during interaction, were observed on eighteen nonverbal behaviors, in particular gestural frequency, body openness, body orientation, gaze-related behaviors, etc. Results revealed a significant relation between dyad members for ten of eighteen nonverbal behaviors and personality; agreeableness and openness were positively associated with the use of gestures.

Different forms of gestures have also been described. Ekman and Friesen (1969) described several hand gesture (illustrator) subtypes to emphasize speech: batons, pictographs, ideographs, kinetographs, deictics, spatial, emblematic movements, and rhythmic movements. Batons relate to a movement that highlights a word or phrase in a sharp, non-descriptive motion like a 'beat' in rhythm with the speech. Pictographs refer to a movement which draws a shape from a specific point of reference (e.g., curving finger motion when describing curving chair back); others have called these iconic actions (Krauss & Hadar, 2001). Ideographs sketch a path or direction of thought. Kinetographs involve a movement that relates to a bodily action (e.g., hand moving fingers to mouth to indicate eating). Deictic actions pertain to a movement that indicates an object, place, or event (e.g., pointing), and spatial movements depict a size of an object or spatial relationship (e.g., how big a dog is, how far away something is) (Ekman & Friesen, 1969; 1972).

Research on Gestures and Meaning

While illustrators or gestures are thought to be directly linked to speech, serving to illustrate what is spoken, few studies have been able to show significant results in elucidating the content or meaning of gestures (not including emblems). This work has been less fruitful in part because of the nature of hand gestures: highly varied in movement configuration, speed, scope, timing, etc. More recent efforts have been aimed at understanding the specific meaning of gestures. For example, Hadar and Pinchas-Zamir (2004) examined the semantic specificity of gestures, indicating that the meaning behind a particular gesture is associated with the conceptual and semantic concept of speech. In a forced-choice format, participants were asked to choose the best word associated with a gesture clip. Results showed that participants selected 'correct' words (words that best reflected the meaning of gesture or lexical affiliate) over any of the other four distractor word-types at significantly greater than chance level.

A series of studies by Harrigan and colleagues (2007, 2008, 2009) was directed more specifically toward the meaning of selected hand gestures. This work was based on earlier work on observers' impressions of gestures (Harrigan, Weber, & Kues, 1986). In the recent studies, observers interpretations' attributed to encoders' gestures were analyzed. Participants were asked to view several individual encoders who displayed a gesture in video-only (no sound or speech) scenes. They then selected, using a multiple-choice format, which verbal phrase they believe the encoder uttered when talking in the videotaped scenes. Participants also rated each encoder and gesture using several adjective ratings related to their impressions of the encoder or physical attributes of the

gesture. The gestures displayed by each encoder were based on the fundamental types of gestures elucidated by Ekman and Friesen (1969, 1974), and based on an observational study of hand gestures (Barsotti, Larsen, Harrigan, & Malone, 2007). These included batons, self-pointing, depictions of time and size, iconic actions, and shrugs. The latter, shrug, is often considered an emblem, but it can also serve as a comment or emphasis on specific speech. Results indicated a remarkable level of accuracy in participants' selection of the correct phrase they believe the encoders uttered based only on viewing a very brief hand gesture; results were replicated in further work (Harrigan et al., 2008, 2009).

Self-touching

Self-touching is the second most frequent category of hand movements. This form of hand action has been studied under multiple labels, including self-adaptors (Ekman & Friesen, 1969), self-manipulators (Rosenthal, 1966), body focused movements (Freedman & Hoffman, 1967) and body manipulators (Ekman, 1977). For this study, the term for these hand movements was self-touching. Self-touching includes any hand-to-hand or hand-to-body/head contact, e.g., rubbing one' s hands, scratching one's forehead, touching one's chin, soothing one's arm, and so forth.

Self-touching has received less attention from researchers and many subscribe to the early work by Ekman and colleagues in assuming that self-touching represents one's inner affect and intended attempts to cope with unpleasant emotion in particular (Ekman & Friesen, 1969). These actions were believed to comfort the individual experiencing negative emotional arousal or sensory stimulation. Ekman and Friesen's notions regarding self-touching were based on interviews with psychiatric patients and participants in

deception studies (1969; 1974). Such situations were thought to entail negative affect or anxiety, and self-touching supposedly functioned as a coping strategy. Similarly, Dittman (1972) associated self-touching with general negative feeling such as anxiety, guilt, hostility, suspiciousness, and stress. Dittman also looked at speaker's body actions, such as fidgeting during non-fluent and fluent speech, proposing that body movements allowed for construction of speech merely during non-fluent speech (1972).

Interestingly, Freedman and colleagues (Barroso, Freedman, & Grand, 1980) found that self-touching behavior occurred with information-processing demands on speakers and listeners. The belief is that these actions occur when there is interference in the organization of thought (Freedman, 1977). Others also have pointed out that self-touching may be more complex than simply unintentionally, communicating negative affect (Harrigan, Weber, & Kues, 1986; Harrigan, Kues, Steffen, & Rosenthal, 1987).

While several studies have shown negative impressions of self-touching with clinical populations or those engaging in deception, results by Harrigan, Kues, Steffen, and Rosenthal (1987) showed that self-touching does not uniformly result in negative impressions by observers. In a study manipulating frequency and type of self-touching, participants rated confederates who exhibited self-touching more positively (i.e., honest, outgoing, expressive, well-adjusted, would enjoy working with the person, and somewhat more likeable) than those who did not display self-touching. In another study involving self-touching, participants attributed positive ratings (friendly, interested, sociable, etc.) to scenes of individuals who self-touched in actual or role-played medical consultations; individuals who self-touched were rated as somewhat less calm and relaxed, however

(Harrigan, Weber, & Kues, 1986). Subsequently, Harrigan, Lucic, Kay, McLaney, and Rosenthal (1991) showed that self-touching was given positive attributions depending on type of self-touching and role of the individual. For example, discrete self-touching (rubbing nose) was evaluated as more expressive and warm than unpatterned self-touching (rubbing hand or arm). This was particularly true when the individual was in the role of friend or stranger, but unpatterned self-touching was rated less negatively for job applicants and patients; in these situations it may have been more expected to show nervousness. Scenes with no movement were rated as more calm and dominant, but considerably less expressive, warm, and interested (Harrigan et al., 1991). Results showed that observers' perceptions of performers' self-touching were dependent on other variables such as performer role, location of self-touching, and other concomitant body movements (head nodding, leg crossing).

Harrigan (1985) studied the emotional and cognitive associations of self-touching in a study on physician-patient interactions during medical interviews; the focus was on negative affect, verbal expression, and frequency of self-touching. Results showed a higher tendency of self-touching by patients rather than physicians; the highest frequency of self-touching pertained to the head, face, or neck area for both physicians and patients; also, significant differences were found for the type of self-touching displayed. Physicians displayed self-grooming actions, such as readjusting their clothing or objects (e.g., stethoscope), while patients displayed more self-touching by performing hand-to-hand or hand-to-arm self-touching (Harrigan, 1985). With respect to speech content categories (i.e., questions, answers, statements), more self-touching was displayed by

patients than doctors when patients made statements rather than during other speech acts (Harrigan, 1985).

Others have also found substantial differences for self-touching based on the type of movement and the encoder's circumstances. Freedman and colleagues conducted a number of studies on the type of self-touching and interactant behavior. Freedman (1972, 1977) made a distinction between discrete movements and continuous movements in the study of self-touching actions. These two distinct forms of self-touching differentiate between hand-to-hand actions (continuous) and hand-to-face or hand-to-body actions (discrete). Barroso, Freedman, Grand, and Van Meel (1978) examined self-touching with regard to performance and attentional processes. To determine if hand movements were associated with attentional processes or attentional disruptions, and they studied whether self-touching was significantly related to three different performance tasks. The aim of the study was to examine whether the incidences of self-touching actions would occur more during attentional performance. Results indicated that one type of continuous self-touching was correlated to the three performance tasks.

Research on Self-touching

With regard to self-touching, early studies on the relation between self-touching and negative affect do not show a consensus in results. On one hand, early studies have demonstrated that self-touching was associated with negative affect, in other words, with perception of anxiety, nervousness, and in some cases deception (Ekman & Friesen, 1969; Henningsen, Valde, & Davies, 2005). But on the other hand, several recent studies have found no link between the perception of anxiety, nervousness, or deception and self-

touching actions (Caso, Maricchiolo, Bonaiuto, Vrij & Mann, 2006; Harrigan et al., 1986; 1987).

In an observational study, Grand, Freedman and Steingart (1973) conducted a study with schizophrenics on their performance on the Stroop Color and Word test. Grand et al. particularly distinguished between two groups, one group of participants being told that engaging in self-touching actions (i.e., rubbing their hands) would help them complete the Stroop task, while the other group of participants was not given any similar instructions. In the observation of clinical schizophrenic patients, Grand et al. showed that schizophrenics did significantly better on the Stroop Color test when they were encouraged to engage in self-touching (1973).

It appears that self-touching, both its display and attributions about it, is more complex than originally thought. Further examination of self-touching, particularly in comparison with hand gestures will provide greater understanding of the multi-functions of these hand actions.

Pilot Studies

In the series of six studies by Harrigan et al. (2007, 2008, 2009) on the perceptions of gestures and self-touching with respect to 'verbal content' accuracy, results showed different levels of accuracy in the selection of the 'correct' phrase participants believed the encoders uttered when gesturing or self-touching. For the first gesture study, the accuracy of detecting the correct answer was extremely high (Mdn = 56.1%), which suggests that the function of gestures may be to emphasize or enhance the communication of verbal content; test of significant proportions showed that eight of

fourteen scenes were selected correctly 50% of the time (N = 87; $p < .001$), with thirteen of fourteen scenes selected correctly 25% of the time. In a second and third study, which varied slightly in methodology, results replicated the level of accuracy ($p < .001$).

Results were different for self-touching. Compared to gesture studies, results for the self-touching studies were not as strong. It appears to be more difficult to detect verbal meaning from scenes of self-touching; test of significant proportions showed that five of twelve were accurately identified 25% of the time, but only one of twelve was accurate 50% of the time. In later studies on self-touching, results were generally replicated; four of the twelve scenes were accurately judged 25% of the time ($p < .001$) and one of twelve scenes was accurate 50 % of the time ($p < .001$).

The Present Study

The goal of the present study was to understand the function of these two hand actions with respect to speech. A unique tactic was used to permit examination of participants' decoding of the encoders' hand movements in association with the encoder's verbalization. The present study was unusual because it involved a nonclinical, non-deceptive monologue in which the encoder describes an emotional event and displays spontaneous gestures and self-touching actions. This study was an attempt to determine the meaning conveyed by such actions (i.e., accurate verbal phrase selection) by those who observe them and who may be influenced by them. The present study built on previous research in several ways and the purposes were twofold. The first purpose was to replicate the earlier findings of Harrigan et al. (2007, 2008, 2009) regarding the perceptions of gestures and self-touching with respect to 'verbal content' accuracy (i.e.,

matching verbalization and action). Second, self-touching and gestures have rarely been investigated together with regard to others' perceptions and it was hoped that the high accuracy for gesture interpretation would positively affect accuracy for self-touching interpretation.

Hypothesis 1. Based on the series of studies (three studies on gesture and three studies on self-touching) by Harrigan and colleagues (2007, 2008, 2009), it was hypothesized that Verbal Content Accuracy (i.e., matching an encoder's words with his/her hand movement) using video-only scenes, would be greater than chance expectations.

Hypothesis 2. When observing hand movements, it was hypothesized that accuracy of message (Verbal Content Accuracy) decoding would be greater for gesture movements compared to self-touching movements. In the present study, with both gesture and self-touching scenes presented to participants on the same DVD, it was hypothesized that the higher Verbal Content Accuracy for gestures (compared with self-touching scenes) would boost accuracy for the self-touching scenes.

Hypothesis 3. It was hypothesized that participants would give higher ratings on adjectives connoting a "cognitive" function (thoughtful and attentive) to gesture scenes compared to self-touching scenes. Additionally, it was hypothesized that participants will give higher ratings on adjectives connoting an "emotional function" (calm and happy) to self-touching scenes compared to gesture scenes.

CHAPTER 2

METHOD

Participants

Undergraduate students at California State University, Fullerton participated in the current study (N=100). Participants were Psychology 101 students, recruited via the participant management system, or Sona System. Students were 18 years or older and included both males and females. No other participant exclusion was made. Participants were given one credit unit for one hour and half of participation.

Measures

Demographic Sheet. Demographic information was gathered from participants asking questions such as students' age, gender, ethnicity, family size (number of siblings), language spoken fluently, second language, and academic major.

Stimulus Materials. Participants saw a DVD of 32 video clips, showing an individual (male or female) displaying either a hand gesture or self-touching action. Each segment represented a scene showing an individual between the ages of 18 to 22, sitting on a chair, and facing the camera. The camera was not visible in the segment, and the individual was alone, shown completely from head to foot. These individuals served as participants in a study of emotion that was previously videotaped (Harrigan, Lucic, & Rosenthal, 1991). This study aimed at detecting expressers' high and low state anxiety (1991).

This DVD included 8 females exhibiting 4 segments of self-touching and 4 segments of gestures, and 8 males exhibiting 4 segments of self-touching and 4 segments of gestures. These individuals were labeled "encoders" because they encoded or displayed the behaviors under study. The encoders were selected based on their display of either a gesture or self-touching action. Videotaped segments from this early study (Harrigan, 1987) have been used in a variety of previous studies (Harrigan, et al., 2005; 2007, 2008, 2009; Harrigan, Rosenthal, & Scherer, 2005; Harrigan, Wilson, & Rosenthal, 2004).

The specific segments used in the present study were carefully selected from entire monologues of the encoders describing emotional events from their past. The explicit rules used to decide on which gesture and self-touching to include were several. First, the hand actions were unaccompanied by other facial or body movements. Second, segments involved hand actions that were clear, large and long enough to see easily. The duration of the hand actions (i.e., timing from onset to offset), averaged approximately 3 to 4 seconds, which was preceded by and followed by a brief period of non-movement. Third, the selection of gestures was based on the most typical gestures observed in everyday communication. These were based on the work of Ekman and Friesen (Ekman & Friesen, 1969,; 1972, 1974), and observational work conducted by previous students (Barsotti, Larsen, Harrigan, & Malone, 2007). The selected gestures represented common types known as baton, iconic, pictograph, self-point (deictic), size (spatial), shrug, and time (ideographs). Fourth, self-touching actions were selected on the basis of two types: functional self-touching or nonfunctional self-touching. Functional self-

touching involves an action that appears to serve a purpose, i.e., scratching or rubbing the forehead, nose, ear, etc. Non-functional self-touching actions are more continuous movements involving rubbing or wriggling the hands or fingers, i.e., fidgeting with hands or fingers; these also lasted only 3-4 seconds and were preceded by and followed by a period of non-movement. Fifth, an encoder could only be presenting in one segment, either a gesture or a self-touching action. Finally, only eight of the 14 available gesture segments and eight of the 12 self-touching segments were used in the current study. This made a total of 16 separate segments, a number used in previous studies which permitted generalization, while not being too labor intensive for participants. The selection included an equal number of gestures and self-touching actions, and female and male encoders. Selection of the eight gestures were based on results from three studies on gestures (G1-3) and the selected self-touching actions were based on three studies on self-touching (ST1-3) (Harrigan et al., 2007, 2008, 2009). The eight selected gestures were based on the mean accuracy scores calculated across all three gesture studies. Extreme scores (low and high) were omitted. The same criteria were used for the selection of self-touching segments, and these were based on studies ST1-3.

A DVD was created including a randomized arrangement of both gesture and self-touching segments. A matched quadrant randomization procedure was used to be sure that each quadrant of the DVD includes a female, a male, a gesture scene, and a self-touching scene. As in previous studies, the DVD did not have an audio track and participants were instructed only to focus on hand movements when making their phrase choice, and using the adjective ratings to evaluate the encoder. Each segment was shown

twice, separated by 10 seconds between the first and second showing. This procedure allowed for adequate viewing of the very brief hand movements. Following the second showing, a 25-second period of blank screen was shown while participants made their selection of the verbal phrase and completed the adjective ratings for each segment (this time had been determined over the course of many similar studies). Two practice segments were shown initially to familiarize the participants with the two experimental tasks.

Segment Questionnaire. Participants were asked for their responses on the Segment Questionnaire which provides information for each segment viewed, and for both tasks: verbal phrase choices and adjective ratings. For the verbal phrase choice task, a multiple-choice format was used which allowed participants to choose from one of four verbal phrases that they believed the encoder said during the original videotaped segment. For the adjective rating task, participants were asked to rate the encoder with respect to five adjectives: how calm, thoughtful, expressive, happy, and attentive the person in the DVD appeared. The Segment Questionnaire was designed based on those used in the six earlier studies (Harrigan et al., 2007, 2008, 2009); it was only slightly modified in the current study (phrase choices, adjective choices).

Task order was counterbalanced: half of the participants first selected the verbal phrase, followed by the adjective ratings, and the other half had a version with the adjective ratings first, followed by the selection of the verbal phrase. The selection of verbal phrases included four choices: one "correct" phrase (phrase actually uttered by encoder), two distractor phrases ("correct" phrases for the other gestures or self-touching

segments), and none of the above. A sample of the phrase choices for a particular segment included a) it's been really upsetting at times, b) you're not the one who's calm, c) what carries you through the next show, and d) none of the above. For the adjective rating task, participants were asked to rate the person in the segment using 9-point, Likert-like scales that ranged between 0 and 8. The adjectives selected reflected work from the previous studies and an attempt to evaluate affective and cognitive aspects the hand movements displayed. Instructions for the rating task involved how much the encoder "looks… calm, thoughtful, expressive, happy, and attentive."

Procedure

Participants sat facing the projector screen. They were given two informed consent forms, which the experimenter read aloud. Participants returned a signed copy to experimenter, and kept one copy. Researchers followed the experimental instructions which included an explanation of the general purpose of the study: understanding the perception of hand movements. The experimenter explained the viewing of the DVD, how to complete the two tasks, and then proceeded to show the two practice segments. After each practice segment, the DVD was stopped and questions were answered. If there were no questions (or after questions have been answered), the experimenter started the DVD again and showed the 32 experimental segments. The researcher explained to participants that the DVD would not be stopped until all of the segments are all shown. After each segment was shown, participants chose the phrase, and rated the encoder using the adjectives (or vice versa for the task order). At the end of the experiment, participants were awarded course credit for their one hour and half participation. Course credit was

given through the Sona System online. Participants were dismissed from the study if they chose to leave in the middle of viewing the DVD segments. No participants were dismissed from the current study.

CHAPTER 3

RESULTS

Verbal Content Accuracy

Preliminary Analyses for Verbal Content Accuracy

A preliminary analysis was conducted to examine the potential influence that word format (original, edited) of the questionnaires, task order, and gender of the participants may have had on participants' Verbal Content Accuracy (i.e., correct verbal phrase selection to hand action). A 2 × 2 × 2 × 2 mixed-design analysis of variance was performed with (format, order, decoder participant gender) as between-subjects variables, and hand actions (gesture, self-touching) as a within-subjects variable, and Verbal Content Accuracy as the dependent variable.

The results of the ANOVA revealed that word format did not have an effect on the participants' Verbal Content Accuracy; format 1 (edited) (M= .35) did not significantly differ from format 2 (original) (M= .33), F (1,103) = .42, effect size r = .06, p = .52. The results did not reveal a significant gender effect; decoder female (M=.34) participants' Verbal Content Accuracy did not significantly differ from male (M=.35) participants' Verbal Content Accuracy; F (1,103) = .33, r = .06, p = .57.

The results did reveal that task order affected Verbal Content Accuracy: means for order 1 (phrases first) (M= .37) were significantly higher compared with order 2 (adjectives first) (M= .31), F (1,103) = 4.40, r = .20, p = .04. This result was not entirely

surprising considering that verbal phrase selection may have been easier when the visual memory of the hand action was not separated in time by the adjective rating task, but rather when the verbal phrase selection task directly followed the presentation of the hand action segment. There were no significant interaction effects among any of these three variables. Further analysis did not include word format, task order, and participant gender.

A further analysis was conducted to determine the cause of the unexpected effect for task order. To see where the difference lay, individual independent *t*-tests were computed to examine the potential influence of task order on each individual segment. Only one of 16 segments showed significant differences for order ($p = .017$), and another segment showed a tendency toward a significant difference ($p = .053$). The order difference appears to have been the result of these two segments. When removed, the ANOVA did not show a significant difference for order, $F(1, 103) = 2.08$, $r = .14$, $p = .153$.

Basic Results

Hypothesis 1: Verbal Content Accuracy and Chance Expectations

As expected, results showed that participants chose the correct verbal phrase for hand actions at greater than 25% accuracy for a majority of the 16 video segments. Tests of significant proportions showed that 10 of 16 segments exceeded chance expectations (25%), ($R = 29.0 - 92.5.7\%$) ($N = 107$), *M Verbal Content Accuracy*= 48%. A Z statistic was computed for these 10 segments and all were positive ($R = .96$-16.12). These results

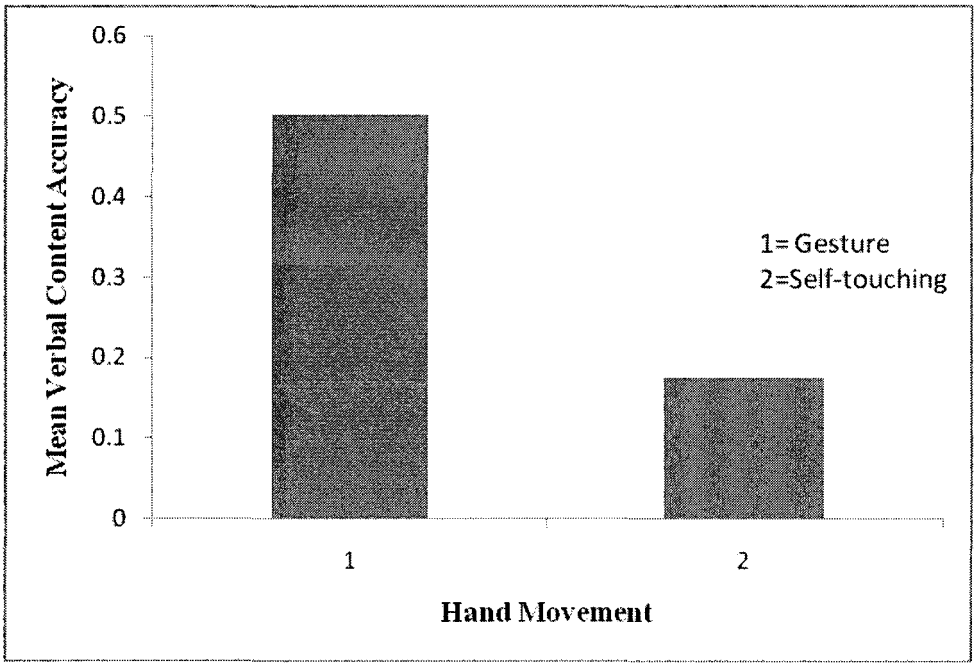
support the hypothesis that, overall, there was a high degree of Verbal Content Accuracy for judgments of hand actions (see Table 1).

Hypothesis 2: Verbal Content Accuracy differences for Gestures versus Self-touching Actions

As predicted, significant differences were found for hand movement type: gesture versus self-touching actions. Based on the earlier analysis under Preliminary Analysis for Verbal Content Accuracy, the ANOVA revealed a main effect of hand movement with significantly higher accuracy for gesture ($M = .50$, $SD = .17$) compared to self-touching actions ($M = .17$, $SD = .13$), $F(1, 100) = 267.73$, $r = .85$, $p < .001$.

FIGURE 1

Accuracy by Hand Movements



Tests of significant proportions were computed for each segment and showed that all 8 of the gesture segments exceeded chance expectations (25 %), while only 2 of the 8 self-touching segments exceeded chance expectations (see Table 1). Z statistics were significantly higher for gesture actions (R = 1.4-16.1) compared with self-touching actions (R = -5.7-.96). Results supported Hypothesis 2 that there would be a significant difference between the Verbal Content Accuracy with gestures resulting in higher scores than self-touching actions. The assumption that the higher accuracy for gesture actions might boost accuracy for self-touching actions was not supported. The mean accuracy for self-touching actions (M = 17.15) in the present study was lower compared to the mean accuracy (M = 23.86) in the previous pilot study (ST1; Harrigan, 2007).

Adjective Ratings

Preliminary Analysis for Adjective Ratings

A correlational analysis was performed to assess the relationships among the five rating scales used to rate the encoders in the DVD segments. The five items calm, thoughtful, expressive, happy, and attentive, were all positively correlated (see Table 2). However, since correlations were not as high as those seen in previous studies (mean r = .71; Harrigan, 2007), one aspect of this study addressed individual hypotheses for the adjectives, and each adjective rating scale was analyzed independently.

Hypothesis 3: Cognitive and Emotional Ratings of Gestures and Self-touching Actions

Comparisons were made between gestures and self-touching for two hypotheses for adjective rating scales. As predicted, comparisons of the means of "cognitive" adjective ratings (thoughtful and attentive) showed higher ratings for gesture than for self-touching segments. Gestures (M= 4.80) were rated as more thoughtful than self-touching actions (M = 4.17), $t(105) = 6.65$, $r = .54$, $p < .001$, and as more attentive than self-touching actions (Gestures; M = 4.96, self-touching actions; M = 4.02), $t(102) = 8.99$, $r = .66$, $p < .001$.

Comparisons of the means of the "emotion" adjective ratings (calm and happy) were significantly different for gestures and self-touching actions, though not completely as predicted. Self-touching actions (M= 5.05) were rated as more calm than gestures (M= 4.83), $t(105) = -2.13$, $r = .20$, $p = .036$, and gestures (M = 3.77) were rated as more happy than self-touching actions (M = 2.91), $t(103) = 8.79$, $r = .65$, $p < .001$. Self-touching was expected to result in lower calm scores as shown in previous research. Finally, gestures (M = 5.12) were also rated as more expressive than self-touching actions (M = 2.91), $t(105) = 19.27$, $r = .88$, $p < .001$.

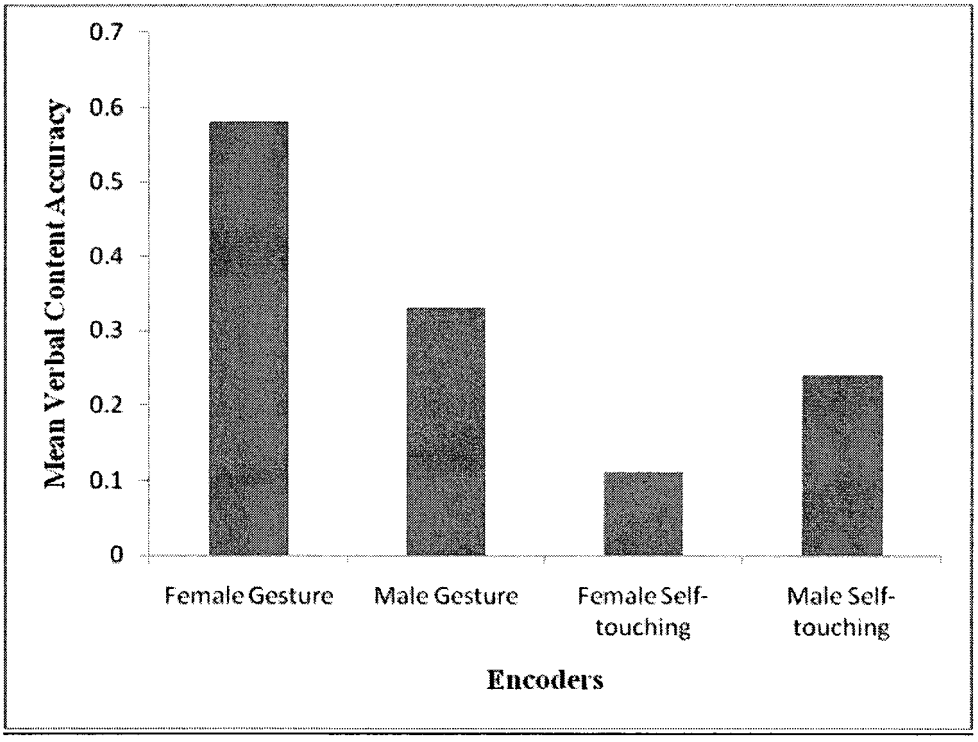
Comparisons of Encoder Gender and Hand Movement

Although differences for encoder gender were not specifically hypothesized, this variable was of interest and thus, was examined to assess the influence it may have had on Verbal Content Accuracy scores. Encoder gender (female, male) and hand movement (gesture, self-touching) variables were analyzed with a repeated (two-way) ANOVA on

Verbal Content Accuracy. Within-factor independent variables, encoder gender (two levels) and hand movement (two levels) were compared for Verbal Content Accuracy. There was no significant main effect for encoder gender, $F(1, 103) = .74$, $r = .08$, $p = .391$. There was a significant interaction between encoder gender and hand movement, $F(1, 103) = 59.23$, $r = .60$, $p < .001$ (see Figure 2). Participants had significantly higher Verbal Content Accuracy for gestures by female encoders ($M = .58$, $SD = .21$) than for male encoders ($M = .42$, $SD = .25$), but the opposite was true for self touching: Verbal Content Accuracy for self-touching by male encoders ($M = .24$, $SD = .21$) was higher compared with female encoders ($M = .11$, $SD = .15$).

FIGURE 2.

Interaction between Encoder Gender and Hand Movement



CHAPTER 4

DISCUSSION

Nonverbal behavior plays an important role in how individuals form their perceptions of others. By studying the meaning of hand movements to observers and the impressions hand movements portray, this frequent nonverbal is better understood. The current study is unique in that it specifically explored two important hand actions, gestures and self-touching actions, in one single study. This study examined the actions of gestures and self-touching actions, the perceptions of such actions, and the influence encoder gender on the perceptions of these actions.

Research studies exist more for gestures compared with self-touching actions. With regard to gestures, consistent findings have associated this type of hand movement with speech. A large body of work, including Ekman and Friesen's (1972) study has sought to understand whether gestures serve to help the listener understand the speaker or help the speaker construct speech, or both. Maricchiolo, Gnisci, Bonaiuto, and Ficca (2009) concluded that more times than not, gestures occur during speech, and receivers evaluate the content of a message based on the visible gestures the speaker displays. In general, results show a well-accepted notion that gestures together with other nonverbal behaviors or alone, are indicative of smoother verbal exchange between a speaker and a listener. However, no studies have shown a direct link between a specific gesture and specific speech content until the present study's results.

The contributions of past research on self-touching have been limited and those that are available have been primarily deception studies and studies based on interviews with psychiatric patients. Ekman and Friesen (1969) believed that the notion of self-touching acted as a coping strategy for inner negative arousal, discomfort, or sensory stimulation for individuals. Ekman et al. (1969) also reported that self-touching individuals were perceived as awkward, tense, and untrustworthy. However, Harrigan et al. (1986) found that impressions of self-touching were associated with measures of expressiveness, warmth, openness, and honesty; some of the latter results were replicated in the present study.

The range of results on perceptions of self-touching actions and gestures suggest that the different hand movements may function in very distinct ways. Therefore, a key aspect of this study was aimed at distinguishing whether or not having both hand actions in the same study would generate less difference in observers' perceptions of the two forms of hand actions. If accuracy results for self-touching are boosted in a study with both actions (gestures and self-touching actions), then a better understanding of self-touching will be provided. These results will add to the understanding of self-touching since the present study did not involve deception or self-touching actions represented with negative cues. Additionally, such findings help point out whether gestures or self-touching actions are related to emotion or cognitive processes. It was hypothesized that gestures would result in an association with "cognitive" adjective ratings whereas self-touching would result in an association with "emotional" adjective ratings.

In general, the findings of the study confirmed the hypotheses. The data provide significant information on the accuracy of gesture decoding using a unique design method: decoding gestures in this study involved the participants' ability to select a 5- to 7-word phrase (without audio) that was uttered at the time of the gesture (Verbal Content Accuracy). Results for accuracy were significantly better than chance. Previous studies on gestures examined common universal gestures known as emblems ("OK" sign, thumbs up sign, "stop" sign, etc.) in relation to direct verbal utterances, or involved discrimination of a described object. Segments were very brief, without audio, and the quality of the video did not permit participants to read encoder's lips. Despite this, participants were still able to accurately match the verbal message communicated at the time of the gesture. This suggests that gesturing provides information that is decoded in direct relation to the verbal message.

Another critical feature of the study was to explore the relative contributions of gestures and self-touching actions on observers' perceptions. Both types of hand-movements were used in this study for comparison purposes: a significant difference between the Verbal Content Accuracy for gestures versus the Verbal Content Accuracy for self-touching was found. The explanation for this finding is that gestures are easier to discern than self-touching actions. Gestures are usually larger and appear more expressive and overt. On the other hand, self-touching actions are often less easy to see since they are often more continuous and less discrete. Freedman distinguished two types of self-touching actions (i.e., discrete and continuous body focused movements (1977). In addition, gesture studies have delineated several categories of gesture content (i.e., iconic,

batons, etc.) while self-touching actions have rarely been discriminated as the two types suggested by Freedman.

The hypothesis that the higher accuracy for gesture actions would help boost accuracy for self-touching actions was not found. However, this self-touching study showed that Verbal Content Accuracy for decoding self-touching actions was better than chance expectations for several self-touching actions. Observers were able to select the verbal phrase uttered at the time of the self-touching action, seeing only that hand movement, without audio. Although the accuracy for recognizing the meaning of self-touching actions is not as high as that in studies involving gesture movements, studies on self-touching actions showed that observers' impressions of what self-touching actions conveyed was remarkably accurate, and surprising given past research results for these behaviors.

Comparisons were made between gestures and self-touching actions for two hypotheses for the adjective rating scales. As predicted, comparisons of the means of "cognitive" adjective ratings (thoughtful and attentive) showed higher ratings for gestures than for self-touching actions. This finding is consistent with results of prior research that has examined gesture with respect to the verbal message, or verbalization. Gestures seem to help the communication between two individuals. Thus, compared to self-touching, gesture seems to be directly related to speech and verbal utterances. Presenters and lecturers get their message across to an audience better when they display gestures (Holle & Gunter, 2007). Gestures seem to help the listener and it helps the person communicate the verbal message.

Comparisons of the means of the "emotion" adjective ratings (calm and happy) were expected to relate more to self-touching actions than gestures. In the past self-touching has been examined and linked to negative affect (Ekman & Friesen, 1974). As hypothesized, calm was related more to self-touching scenes, but not in the expected direction: higher ratings were attributed to self-touching rather than gesture actions. Usually, self-touching is related to feelings of nervousness (Ekman & Friesen, 1972). The explanation for this unexpected effect could be that the self-touching actions themselves were very small and many have appeared contained, and as if the encoder was attempting to maintain control.

Happy was more related to gestures. Perhaps gestures are considered other-oriented and participants regarded encoders who gestured as feeling more 'positive' in their behaviors. In addition, gestures were also rated as more expressive than self-touching actions.

Although there was no hypothesis addressing encoder gender, analyses were conducted to see if encoder gender affected Verbal Content Accuracy. Results showed that participants were more accurate when looking at female encoders versus male encoders, for gesture segments. Hall (1984) showed that several nonverbal behaviors, like facial expressions, were displayed more frequently by women and women were regarded as more positive than men when performing expressive behaviors (i.e., smiles, gestures). On the other hand, participants achieved significantly higher accuracy for male encoders in self-touching segments. Johnson and Shulman (1988) found that women were expected to display more positive emotions than men in an other-oriented

context (social interaction), but men were expected to display more positive emotions than women in a self-oriented context (self-oriented behaviors). It is also possible that participants judged female encoders more accurately when gesturing because gestures seem to be overtly expressive.

Limitations and Future Directions

One important change would be to examine the effect of cultural differences among encoders and decoders, as well as their perception of the hand movements. In this study, cultural variations were not taken into account. Research has shown that cultural factors affect various aspects of nonverbal behavior, such as turn-taking exchanges in social interaction (Duncan, 1972), the distance between speakers (Sussman & Rosenfeld, 1982), and the use of gestures during speech (Ekman, 1976). It would be desirable to investigate the meaning of hand movements from a cross-cultural perspective in social interactions.

Although both the gender of the encoder and the gender of the decoder (the participants) were examined with regard to the two types of hand movement, there was a discrepancy between the number of male and female participants. There was no significant gender effect. However, existing research on sex-role stereotypes, such as Broverman,Vogel, Broverman, Clarkson, & Rosenkrantz's study (1972) found that both males and females ascribe male-valued competency traits more to healthy male, whereas healthy females differ by being more submissive, more emotional, more excitable in minor crises, or less competitive. It would be beneficial in future research to investigate the probable effect of participant gender observing the nonverbal behaviors.

Another limitation to the study would be the methodology. Perhaps participants may have had difficulty evaluating the hand movements due to brief viewings of encoders and alternating between viewing the hand movements and making their selection of the correct verbal phrase and adjective ratings. One possible change would aim to allow for more adequate time for viewing the hand movements.

Conclusion

Empirical research has continually shown that the study of nonverbal behaviors is a valuable resource for the expression of emotion and attitude and the understanding of human affect. The present study contributes to the existing research on nonverbal behaviors and particularly to the limited investigation on the different forms of hand movements. The findings from the present study points out that the different types of hand movements (gesture, self-touching) may function in distinct ways. These discoveries may have implications in various sensitive social contexts including interpersonal relations, job interviews, or speech presentation, in which the perception one conveys can influence the desired outcome of the social situations.

APPENDIX A.

Participant Consent Form

Welcome! And thank you for agreeing to participate in this videotape and questionnaire survey. Before we begin, there are a few things you should know about your participation. To signify your understanding, please initial each of the following points.

1. I, the participant, understand that my participation is completely voluntary, and I may cease participation now or at any time, and will not be penalized for doing so._____

2. I will receive class credit for my participation in this study. _____

3. I understand that there are no foreseeable risks or discomforts, and that I will be given the opportunity to discuss my participation after the survey is complete. Any questions I may have will be answered and information will be provided for future correspondence if it is so requested. _____

4. If I need special accommodations or if I feel uncomfortable in any way, I understand that any reasonable request will be granted. _____

5. One copy of this signed consent form is mine to keep, and the other copy is to be retained by the surveyors. If I would like the surveyor to sign my copy as well as his/her own, I will not hesitate to ask. _____

6. The videotape and questionnaires will last approximately one hour and half. During that time, I will be exposed to 32 short clips of videotape segments and I will be asked to select the phrase I believe the person in the videotape said and then rate the person using five adjective scales. After this part is finished, I will be asked to complete four brief questionnaires regarding my opinions. The questionnaires will ask me various things about aspects of my personality._____

7. I fully understand that my participation in this survey is completely anonymous, and my identity will not be recorded anywhere except on a confidential list so that I may be given class credit. _____

8. Some data may be used in publications and/or presentations. However, the data will be presented in aggregate form with only key themes reported. All individual responses will be kept confidential. All research records will remain confidential to the maximum extent provided by law. _____

I, (Print your name)_____ certify that I am 18 years of age (or older), that I agree to participate, and have read and initialed the aforementioned eight points. I fully understand my rights and what I am about to experience.

If you have questions regarding this research project, please contact the Principal Investigator (Souraya Matar) at (626) 536-0898 or the Faculty Advisor (Jinni A. Harrigan, Ph.D.) at (714) 278-2580. If you have questions regarding your rights as a research participant, please contact the California State University, Fullerton IRB Coordinator at (714) 278-7640.

_____ _____

(Your signature) (Date)

_____ _____

(Surveyor's Signature) (Date)

APPENDIX B.

Experimental Instructions

Researchers, please read this point by point to ensure that the same instructions are given to each group of participants. You will only read aloud the parts that are not bolded.

Things that the 2nd researcher (who is not reading aloud) should be doing are italicized.

1. (Introduction): Hello, and thank you for participating in our study of perception of hand movements. My name is _____, and this is my fellow researcher _____. We are now passing around consent forms and a sign-in sheet for you to write your name on. You will each receive 2 copies of the consent form.

(The 2nd researcher should now pass out the Sign-in Sheet AND 2 copies of the Participant Consent Form to each participant.)

We would first like to extend our appreciation to you for your participation. The importance of your responses cannot be underestimated. This research, like others, helps advance our understanding of personality and social psychology. This study is not just an exercise, but will give us valid data that will help us further understand human communication. Your participation expands science and furthers knowledge. It is very important to us, and we ask for your best effort.

2. (Participant Consent Form): Before we begin, let's review the Participant Consent Form. You will receive out 2 copies, one copy for you and one copy for us. If at any time you have a question, please feel free to raise your hand and ask either myself or my fellow researcher. Please read along as I read aloud.

(Refer to the Participant Consent Form, and read the form aloud in its entirety.)

(Once the participants have signed on the final line of the consent form, the 2nd researcher should collect one copy of the consent forms AND pass out the packet with the Participant Questionnaire Demographic Information stapled to the front.)

3. (Participant Questionnaire): You will now refer to the Participant Questionnaire, which is currently being handed out. Please fill out the demographic information, and put your pen down after listing your possible major.

(The 2nd researcher should now be passing out the Segment Questionnaire packets.)

(Once the participants have finished listing their major, proceed.)

4. (DVD Description Overview): The DVD you are about to view is approximately 20 minutes long. There are 2 practice segments and 16 experimental segments. Each segment will be shown to you twice. The segments are very brief and go very quickly. Please be sure to watch the entire segment. After the first time the segment is shown, there will be 10 seconds of a blank screen, during which you will look over the adjective ratings and multiple choice phrases in the Segment Questionnaire packet that was just given to you. Then the segment will appear for the second time. You are to keep your attention focused on the screen during this second viewing of the segment. After the segment is shown for the second time, you will have 25 seconds to rate the person in the DVD using the adjective scales and the phrase you believe the person in the DVD said, judging by their hand movement. As you will see, the phrases are not complete sentences, but only contain the words that the person said while doing the hand movement. You will also see the various phrases more than once throughout the questionnaire, but remember to select the phrase that you think the person said judging by their hand movements. Please do not focus on anything except the person's hand movement. When the 25 seconds are up, the next clip will appear.

5. (Segment Questionnaire): Please read along as I read the Segment Questionnaire instructions aloud.

This questionnaire will contribute to research on hand movements. In this study, we are only interested in what the person in the video clip is doing with their hands. Please disregard other movements involving the face, eyes, legs, or body. We are interested in your ideas and impressions regarding the hand actions you see in each video segment, *so please focus only on the person's hand movement.*

Are there any questions before we begin the practice segments?

(Answer any student questions, then proceed.)

6. (Beginning of Experiment): We will now begin the experiment, starting with the practice segments. We will pause the DVD after the first practice segment is shown to answer any questions you may have. Once the second practice segment is over, we will again pause the video to answer any more questions you may have. We ask that you please refrain from speaking and focus only on the experiment. Once we have finished the practice segments and answering questions, the experimental segments will begin. The DVD will then not be stopped at any time until the last segment has been shown twice. It is important to note that if you leave at any time, it will not be possible for you to return and finish the experiment.

After you have filled out the questions for segment 16, please place your pen down. Remember to focus only on hand movements.

We will now begin the DVD.

(MAKE SURE THE DVD IS MUTED. The 2nd researcher should now start the DVD and pause it after the first practice segment is shown the second time.)

Are there any questions?

(After the 1st researcher answers any questions, ***the 2nd researcher should press play to continue the DVD, and then pause the DVD after the second practice segment is shown the second time.)***

Are there any questions? **(Answer questions.)**

The experimental segments will now begin and the DVD will not be stopped at any time until segment 16 is over.

(The 2nd researcher should now play the DVD again. Do not stop the DVD at any time until 25 seconds after segment 16 is shown for the second time.)

(Wait 25 seconds after segment 16 has been shown for a second time, then proceed.)

7. (Personality Measures): You may now place your Segment Questionnaire packet to the side and refer back to the packet that you filled out your demographic information in. You will now fill out a series of 4 personality measures. Read the directions closely. Please do not spend too much time on any one question and do not leave any question unanswered. Once you have completed the personality measures, you may turn both of your packets in to us. Please tell us your name when you do so, and if you would like us to sign your copy of the consent form just let us know. Thank you for your participation, you may now begin the personality measures.

(When each participant turns in their packets, both/either researcher should look over the packets before letting the participant leave to make sure that all pages have been completed. If questions have not been answered, please ask the participant to do so now.

ALSO, researchers should write the number of the participant - according to the Sign-in Sheet – on both of their packets and their consent form which was collected during the beginning of the experiment. Please write their number in the upper right portion of the first page of each packet.)

APPENDIX C.

Segment Questionnaire

This questionnaire will contribute to research on **hand movements**. In this study we are only interested in what the person in the video is doing with their hands. Please disregard other movements involving the face, eyes, legs, or body. We are interested in your ideas and impressions regarding the hand actions you see in each video segment.

Practice Segments

PRACTICE SEGMENT 1

Now: Please **circle** the phrase that you think best matches what the person in the video is saying.

a) ...and that made me almost to cry...
b) ...his actions were alarming...
c) ...and there was this kid...
d) none of the above

Now, please use the nine point scale to rate the person in the clip. **Circle** the number that best represents how you see the person in the video using each *italicized* adjective scale.

How *calm* was the person in the video?

0	1	2	3	4	5	6	7	8
	Not at all							Very

How *thoughtful* was the person in the video?

0	1	2	3	4	5	6	7	8
	Not at all							Very

How much was the person *expressive* in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *happy* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *attentive* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

PRACTICE SEGMENT 2

Now: Please **circle** the phrase that you think best matches what the person in the video is saying.

a) ...and that made me almost to cry...
b) ...his actions were alarming...
c) ...and there was this kid...
d) none of the above

Now, please use the nine point scale to rate the person in the clip. **Circle** the number that best represents how you see the person in the video using each *italicized* adjective scale.

How *calm* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *thoughtful* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How much was the person *expressive* in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *happy* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *attentive* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

BEGIN EXPERIMENTAL SEGMENTS

SEGMENT 1

Now: Please **circle** the phrase that you think best matches what the person in the video is saying.

a) …I felt kind of nervous…
b) …it was a huge cake…
c) …carries you through the…
d) none of the above

Now, please use the nine point scale to rate the person in the clip. **Circle** the number that best represents how you see the person in the video using each *italicized* adjective scale.

How *calm* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *thoughtful* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How much was the person *expressive* in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *happy* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

How *attentive* was the person in the video?

0 1 2 3 4 5 6 7 8
Not at all Very

TABLES

TABLE 1

Test of Significant Proportions for Verbal Content Accuracy

Segment #	Valid N (out of 107)	N correct	% Correct	Z Statistic	*p* value
9. G	107	99	A 92.5	16.125	.001
1. G	107	65	C 60.7	8.528	.001
7. G	107	61	B 57.0	7.644	.001
14. G	106	55	C 51.9	6.396	.001
5. G	107	48	C 44.9	4.754	.001
2. ST	107	41	A 38.3	3.177	.001
16. G	107	35	B 32.7	1.839	.033
3. G	107	34	C 31.8	1.624	.053
12. G	107	33	C 30.8	1.385	.084
8. ST	107	31	C 29.0	.955	.171
13. ST	107	26	A 24.3	-0.167	.567
10. ST	107	19	A 17.8	-1.7199	.957
6. ST	106	17	B 16.0	-2.1399	.984
15. ST	107	9	C 8.4	-3.965	.999
11. ST	107	5	B 4.7	-4.849	.999
4. ST	106	1	B .9	-5.730	.999

Note. Letters indicate the "correct" verbal phrase selection out of 4 multiple choices.

G = Gesture Segments. ST = Self-touching Segments

TABLE 2

Intercorrelations among Adjective Rating Scales

	Calm	Thoughtful	Expressive	Happy	Attentive
Calm		.46**	.18	.26*	.45**
Thoughtful			.54**	.56**	.41**
Expressive				.50**	.28*
Happy					.29*
Attentive					

Note: * $p < .01$. ** $p < .001$

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