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Developmental aspects of nonverbal communication

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DEVELOPMENTAL ASPECTS OF NONVERBAL COMMUNICATION

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Abstract

Developmental differences in encoding and decoding abilities were investigated in this study with subjects ranging from 5 years to 88 years of age. The 94 white, middle-class males and females were placed into five age groups. Subjects were asked to encode each of six emotional expressions, after which they were presented with three decoding tasks. The video tape mode required subjects to decode the same six common nonverbal expressions of emotion (i.e., anger, surprise, fear, happiness, sadness, disgust). A second decoding task consisted of four expressions (anger, fear, sadness, happiness) which were schematically depicted. Subjects' decoding of affect in a verbal context was assessed by means of an Emotional Situation Assignment List which presented emotional evoking situations for which the subject was asked to assign one of the six affect types. Subjects' encoding accuracy did not change after 9 years of age. Decoding accuracy of animate faces and situational cues portrayed in video tape mini scenes increased with age to adulthood, until in old age a decline in accuracy was observed. Subjects' identification of low, medium, and high intensity in expression increased in accuracy between the child groups not increasing significantly for adults. Schematic face decoding accuracy for the youngest children, in contrast to their

accuracy on the video tape labeling, was not different from adult accuracy. Young-, and mid-adult groups' decoding performances did not differ. Few sex differences were found. The aged subjects showed the most inaccuracies in both decoding tasks. These results suggest that the differences between the children and adults may have resulted from a deficit in cognitive skills. The age differences between the aged subjects' accuracy and the other adults' accuracy is believed due, in part, to a cognitive style preference for problem solving resulting from different life styles.

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List of Tables

Table of Contents

Chapter 1
Introduction

Human communication involves a process of multiple channel information exchange with both verbal and nonverbal components. The study of language in the communication process has produced an extensive body of literature on the cognitive skill underpining the communication process. Our knowledge of language development in a verbal mode extends from early childhood (e.g., Brown & Bellugi, 1964) to the adult years (e.g., Bontwinick, 1967), but more information in the area of nonverbal communication skills is necessary to understand human communication since nonverbal cues frequently parallel verbal communication. There is a need for developmental data on nonverbal communication to provide further insight into age related changes in the communication process. The bulk of previous studies has been on recognition of facial expression types using children or college age students. Middle-aged and older persons have been excluded.

Development of nonverbal expression.

Early attempts to investigate the role of certain nonverbal expressions of affect in infancy resulted in a series of studies focused on the commonly observed facial expressions (e.g., the smile). The results of this research on facial

expressions in a social context (e.g., Gates, 1923) indicated that 3 year old children were capable of recognizing the smiling or laughing face. Further, Washburn, as cited in Izard (1971) found evidence for an organization of social responses in stereotyped pattern within the first 16 weeks of life. This early appearance of social patterns seems to parallel the developmental sequence for the emergence of early cognitive structures reported by Kagan (1970). Using length of visual attention to a target stimulus as an indicator of perceptual development, Kagan has outlined specific developmental changes in this process. During the first few weeks the infant is predisposed to attend to events with changing physical characteristics. Areas in the visual field which vary in light-dark features (i.e., contrast) are most likely to attract a newborn's attention, but this preference for attention is contingent on stimulus intensity, duration, and visual area. As the infant encounters more visual events in his environment he is able to represent and preserve the spatial or temporal pattern which makes that event distinctive among other events (e.g., the face). Kagan assumes that development of their schema enables the infant to recognize and retrieve information. At 4 months of age the child not only attends to the sight of the mother's face events but he has also assimilated familiar face events which satisfy personal needs as expressed by a smile to the sight of this face. Kagan observes that 4 month old infants show longer visual

fixation to two regular faces than to an abstract achromatic figure, but altering the face extensively (i.e., discreet facial features of a portrait rearranged within the face area) extinguishes attention responses since the face no longer resembles the infant's schema. As the child develops this capability of recognizing familiar sights, he also develops the ability to interpret perceptions which deviate from existing schemas. By 1 year of age, the child attends for longer periods of time to stimuli which are discrepant with existing schemas. This period of increased attention denotes the child's emerging capacity to transform an unusual event into a familiar one, since the child is now capable of activating hypotheses to explain information discrepant from existing schemas.

The subsequent development of language enables the child to refer to many events common to the experience of others, and permits a gradual shift in behavioral reference from self to the environment. Saltz, Soller, and Sigel (1972) found that younger children demonstrated fragmented concepts which were tied to a specific context in a developmental study of the acquisition of natural language concepts of food, animals, transportation, clothes, toys, and furniture among 5, 8, and 11 year olds. Older children were able to control this contextual reference and could relate to more general attributes inherent in different representations for the same concept. Saltz et al also observed a marked qualitative change in the

basis for concept identification. These changes in orientation probably influence communication as well. With an increasing awareness of nonverbal expression, the source of information becomes more important to the child.

The results of several studies suggests that the young child is cognizant of certain behaviors and cues displayed by others in communication. This level of communicational development, however, is influenced by conceptual and percaptual limitations involving awareness and thought processes. Deutsch (1974) observed that female preschoolers as young as 3 years of age could describe and make accurate choices about the positive and negative tone of several acted video taped episodes. Wolman, Lewis and King (1971), using 5 to 7, 8 to 9, and 10 to 13 year old subjects, focused on the limitations of the child's perceptions in eight specific 'emotions': happiness, sadness, anger, fear, nervousness, hunger, thirst, and sleepiness. The most consistent differences in their study appeared between 5 to 7 and 10 to 13 year olds, suggesting that with maturity children can articulate their body percepts and self-awareness, thus freeing them from the influence of external cues. Intelligence, socioeconomic class, birth order, and school performance were not influential factors in this process.

A problem of definition

Communication ability, including language development, appears to be intricately bound to social development. But,

a prominent problem in the investigation of communication processes is the absence of a clear deliniation of the meaning of communication behavior. Specific to this investigation is the problem of defining nonverbal communication. Wiener, Devoe, Rubinow and Geller (1972) identify three major components of human communication which need to be considered in nonverbal communication. These components are the code, the encoder, and the decoder. Code refers to a system of signals and referents consensually taken as having specific meanings. This system is governed by rules for emission and organization in communication. The encoder is the individual who transmits some information via the code, and the decoder is the recipient who systematically responds to the code. In terms of language development, encoding is similar to production, whereas decoding implies interpretation. Encoding also can be viewed as denoting expressive language, while decoding is analogous to receptive language. The terms encoding and decoding are also used in describing information processing involved with memory. However, encoding in this context refers to transforming perceptual stimuli into storable units, whereas decoding refers to retrieval and accessing the stored information. These processes are involved in nonverbal communication, but the concern is with the sending and receiving of information rather than storage.

The most efficient kinds of nonverbal communication behavior are those which are frequently observed and informative.

Consequently, these behaviors should be the primary focus in a developmental investigation. Ekman (e.g., Ekman, 1965; Ekman & Friesen, 1967) has shown that the face is the most important area of the body for relating the kind of nonverbal information encoded. Interest in the face as a nonverbal communication instrument has ranged from eye engagement and attention during interaction (e.g., Exline, 1962; Kendon, 1967; Strongman & Champness, 1968) to emotionality in the face (e.g., Ekman & Friesen, 1967; Frijda, 1969; Izard, 1971), and the stereotyped expression (e.g., Darwin, 1905; Ekman, 1972; Izard, 1971).

The two most important areas of the face for communication are the eyes and the mouth (Ekman, Friesen & Tomkins, 1971). The results of studies on eye and mouth cues in facial nonverbal expression indicate that many expressions are recognized primarily from eye area cues, whereas cues in the mouth area become more important when other facial cues are subtle, or when eye cues are similar for two different expressions. Ekman, Friesen and Ellsworth (1972) and others report that subjects who have viewed photographs of face expressions frequently confuse certain of these expressions. For example, pictures of expressions portraying fear cues were frequently mistaken for cues to surprise. Conversely, certain cue differences between expressions become more salient as the cue increases in distinctiveness from one expression to another (e.g., happiness and sadness). The salience

of facial cues is further supported in a study by Pick, Hales, Christy, Frankel and Glick (1972) who found that preschoolers attending to particular mouth area orientations in schematized representations of faces (i.e., downward curving lines of the 'sad' face) tended to attribute face characteristics to the same lines not in a face context. Hess and Pick (1974) also observed that preschoolers could discriminate differences in pairs of faces more accurately when eye variations occured than when mouth variations occured. Further, children and adults apparently attribute pleasantness-unpleasantness, and maleness-femaleness on the basis of variations in eye and mouth areas, specifically mouth curvature and intra-eye width (Bradshaw & McKenzie, 1971).

Encoding and decoding in nonverbal communication

Since the meaning of a message is determined by the code, the encoder or sender, and the decoder's perception of the cues, one needs to be concerned with encoding and decoding ability. Odom and Lemond (1972) showed that a developmental lag exists in the ability to transmit (i.e., encode) facial affect as compared to perceiving and identifying (i.e., decoding) the same expression of affect. In their study, kindergarten and fifth grade children were asked to identify and match photographs of facial expressions denoting fear, anger, joy, distress, surprise, shame, disgust, and interest. Fifth grade children made more accurate identifications and matches than kindergarten subjects.

The child also was asked to produce each of the eight expressions by showing an expression he would use in a situation which was described for him, or by imitating one of the expressions in a photograph. Decoding and encoding improved with age, but encoding showed less improvement than decoding ability. In studies of encoding ability with adult subjects, Ekman (1972) and Izard (1971) found substantial intercultural agreement on the meaning of several facial expressions of emotion such as anger, fear, surprise, happiness, sadness, and disgust. Encoding and decoding abilities for facial and vocal expression of six common emotional expressions have been recently assessed by Zukerman, Lipets, Koivumaki and Rosenthal (1975) using college subjects. They reported that the ability to detect and display facial and vocal cues to expressions was correlated, but few significant relationships appeared between encoding and decoding for a specific expression. Zaidel and Mahrabian (1969), who investigated the relationship between encoding and the observer's attribution about the favorableness of the target's communication in a vocal and a facial mode found that the facial channel was generally more effective in communicating attitudes than the vocal channel. Negative attitudes were more accurately encoded than positive attitudes, and females were found to be more accurate encoders than males in demonstrating negative cues to feelings.

It is quite apparent from the encoding-decoding studies that developmental comparisons in nonverbal communication have

been limited to children, as a result, much important developmental information is absent. For example, no data have been reported specific to child and adult encoding and decoding of nonverbal facial expressions, and the nonverbal communication process among the aged has not been described. Also, there is no comparative information of recognition accuracy of face expression intensity.

Cognitive factors associated with encoding and decoding

Other investigations (e.g., Sokoloff & Ford, 1975) have examined various cognitive factors associated with encoding and decoding, such as cognitive decentering, since the encoder is required to make a face as if he were in a given situation. The results for egocentric and decentered 9 year old children did not support their prediction that decentering subjects would be more successful encoders of facial expressions than subjects measured as more egocentric. However, Buck (1975) found that successful encoders in his preschool sample were rated by knowledgable observers as demonstrating many egocentric behaviors (e.g., impulsiveness, aggressiveness, bossiness, and being extraverted). In addition, females were slightly better encoders than males.

Bontwick (1967), in a comprehensive investigation of changing cognitive abilities in aging, reports that many verbal abilities may increase beyond the last years of formal education, and there appears to be no appreciable decline into the middle adult years. However, the aging individual experiences some decline in memory (i.e., learning and recall), reasoning,

speed, and spatial abilities, but cognitive skills in problem solving seem more susceptible to extraneous influences. In some problem solving situations, elderly people tend to retain familiar but unproductive problem solving schemas. Looft (1972) contends that because of social influences and biological certainties in aging, the individual experiences a separation from society. The physical and cognitive decrement experienced in aging paired with a changing life style (i.e., from active to passive roles) may precipitate a shift in the individual's perceptual perspective toward an egocentric position in life patterns as a reaction to the decline.

Developmental data on changes in cognitive ability across age has been reported in several studies. Papalia (1972) administered a battery of standard Piagetian measures assessing conservation of number, substance, weight, and volume to individuals ranging in age from 6 years to over 65 years. He found that age differences in task performance and competence on these tasks followed the order of complexity for the concept. Number conservation appeared first in children, followed by conservation of substance, weight, and volume. The order of performance deficits in those persons beyond childhood was the reverse of that reported for acquisition. Subjects over 65 years of age showed the greatest decline in performance of conservation of substance, weight, and volume and the least decline in number conservation. Further support for Papalia's findings appeared in a study by Rubin, Attewell, Tierney and

Tumulo (1973) who used five problems of the Goldschmid and Bentler Concept Assessment Kit and a spatial egocentricism measure. The subjects consisted of males and females ranging in age from 7 years through old age, with a mean age of 76.3 years for the oldest group. Aged subjects' performance on the spatial egocentricism and conservation tasks was inferior to the two other adult groups. In a subsequent study, with subjects ranging in age from 7.6 to 11.5 years, and 21 to 76 years of age, Rubin (1974) assessed age differences in ability to communicate with peers in a non-egocentric manner. The aged subjects performed less effectively than the college age subjects on this task which required one of two persons, not in view of the other, to describe several novel, 'low-encodable' graphic designs so that the decoder or listener could select the figure described from a collection of cards.

Further, Schultz and Hoyer (1976) reported an association between spatial egocentricism and fluid intelligence (active problem solving behavior) in a sample of aged men and women who maintained their own homes. In their study, males and females were assigned to one of three conditions in a spatial-perspective egocentricism task (control, practice, or verbal and visual perspective feedback). The control subjects received the test for spatial egocentricism, and the I. Q. measures (the Ravens Progressive Matrices test and Logical operations and the Primary Mental Abilities test). The practice group was given five presentations of each problem on

on the spatial perspective task and the I. Q. measures, and the feedback condition group received perspective training on seven problems and verbal feedback for correctness on these problems as a pre-test condition, followed by the I. Q. measures. Subjects in the feedback condition made fewer wrong or egocentric responses than practice or control subjects. Intercorrelations for the posttest measures indicated that objective scores on the spatial egocentricism measure were significantly related to measures of fluid intelligence and age, and negatively correlated with wrong and egocentric responses.

The overall decline among the aged noted by Bontwinick (1967), the cognitive deficits isolated by Papalia (1972) and Schultz and Hoyer (1976) may have a sex linked characteristic for nonverbal performance. Elias and Kinsbourne (1974) observed a greater decrement in nonverbal processing performance by aged females than aged males when compared to younger adults performing a nonverbal matching task. The aged sample (66-73 years), selected for optimum intellectual advantages, good health, and social activity, was matched with a group of young adults (23-33 years of age) on a nonverbal task which required the subjects to match the orientation of angular lines by certain rules, and emphasized short term memory and attention processes. The elderly female subjects used more time matching abstract lines than the elderly males or the younger males and females.

The results of the previous studies show distinct aging

differences for nonverbal cognitive processing, and present evidence of declining communication processes. Emotional recognition and acquisition of nonverbal communication skills parallel verbal acquisition and cognitive development for young children (e.g., Deutsch, 1974; Odom & Lemond, 1972; Saltz, Soller & Sigel, 1972). Therefore, it seems reasonable to assume that changes in cognitive abilities among the aged would influence nonverbal communication skills.

The previous discussion suggests several hypotheses about developmental aspects of nonverbal communication which need to be evaluated. 1. Expressing an experience in the nonverbal channel using the face to show happiness, anger, surprise, fear, sadness, and disgust is more accurately performed by adults ranging in age from 18-40 years than 5-11 year old children or aged adults (i.e., at least 65 years). Nonaged adult females encode these six expressions more accurately than other females, and more accurately than nonaged males.

2. Accuracy in recognition of happiness, anger, surprise, fear, sadness, disgust increases with age to adulthood except for the eldest group (i.e., 65-88 years). Adult females under 65 years identify intensities of enacted expressions more accurately than children and aged persons.

3. Since the stereotyped expression in schematic form offers the simplest image of an expression, young children (i.e., 5-6 years) are more accurate in discriminating the stereotyped

expressions and schematic face intensity in expression for 'anger,' 'fear,' 'sad,' 'happy' than similar expressions presented in a situational context. Aged adults are less accurate identifying stereotyped expressions than the younger adults, but they are not less accurate on this task than children.

4. Since the first recognizable expression in the development of social communication is the smile and the smile is associated with a pleasurable experience, the expression of happiness is accurately recognized by all age groups.

5. Verbal understanding of feelings evoking the facial cues underlying the six expressions increases with age to adulthood, and does not change in old age.

A research methodology

The meaning assigned to the nonverbal message is determined by encoded content, the cues which are stressed, and the decoder's understanding of the situation. Both encoder and decoder are continually acting on and being acted on by their environment. For this reason, active stimuli approximating life situations should offer clear, unambiguous cues to the decoder. These contingencies suggest that the most reasonable and accurate method for presenting active encoding should be through a prepared color video tape. In this medium the encoder in his environment can be active in a temporal sequence climaxing in the display of face cues to familiar expressions.

The face cues in photographed expressions present a fixed face pose or stereotyped representation of a meaningful ex-

pression which may be clearly represented by a simplified or schematized representation of the expression. Pick et al (1972) and Hess and Pick (1974) have found that children accurately detect fine variations in both eye and mouth areas of schematic faces. Bradshaw and McKenzie (1971) have reported that the only facial components which move voluntarily in displaying cues are the eye and mouth areas. These reports suggest that most individuals, especially children, should attribute real face expressions (i.e., basic, elemental) to stylized impressions of posed real face expressions whose characteristics are best depicted by strong eye and mouth area cue representations. Thus, a further check on recognition of facial expression and intensity of each expression can be provided through the use of schematic representations of faces where eye and mouth changes can be systematically manipulated.

Chapter 2

Method

Subjects

The subjects for this study consisted of 45 males and 49 females from white, middle class backgrounds, whose ages ranged from 5.1 years to 87.6 years and whose minimum level of verbal fluency was at least an I. Q. of 98, based on their score on the Peabody Picture Vocabulary Test (PPVT). Five groups were established consisting of the following age ranges:

young children (5.1-6.8 years; M=5.56 years; n=10 males and 9 females), older children (9.1-11.1 years; M=9.7 years; n= 9 males and 10 females), young adults (18.2-20.8 years; M= 19.3 years; n=10 males and 10 females), mid-adults (31-40.3 years; M=35.12 years; n= 10 males and 10 females), and aged adults (65-87.6 years; M=76.78 years; n=6 males and 10 females). The children were randomly selected from a suburban elementary school. The young-, and mid-adult subjects were volunteer students from several undergraduate psychology classes who participated in the experimental tasks for extra credit. Aged subjects were healthy, active, non-institutionalized adults selected at random from two senior citizen residental apartment complexes, and a community center.

Apparatus and Materials

A prerecorded color video tape was used, consisting of enacted mini scenes depicting the six selected nonverbal facial expressions and three levels of face expressive intensity. These scenes and expressive intensities were sequenced in three different orders for each of the six selected categories. A color video tape cassette recorder and a 24 inch color monitor were used to present the video taped stimuli. The mini scenes which ranged in length from 10-17 seconds showed a male actor (in his 20's who was active in college theater) portraying facial expressions during an event occuring to him in each of the six scenes denoting anger (the target chides a small group), fear (the target reacts to his sudden encounter with a spider), sadness (the target is seen in a wake scene with a

closed casket), happiness (the target opens a gift package), surprise (the target examines and operates a mechanical box which suddenly opens), and disgust (the target in a laboratory setting reacts to the odor of the contents of one of the test tubes).

The expressions selected for investigation were the six common facial expressions: anger, fear, sadness, happiness, surprise, and disgust used in previous investigations (e.g., Ekman, 1972; Izard, 1971; Zukerman et al, 1972) and illustrated in Izard (1971). Izard's illustrations provide the conceptual criteria for the production of the facial expressions. This criteria provided the basic component for each of the expressions portrayed by the actor. Several hours of rehearsal time were used by the actor and the experimenter to practice each of the facial expressions which were recorded on video tape and played back for criticism and subsequent change. The tape showing the final version of each expression was rated by 14 graduate students to evaluate agreement on the representativeness of the expressions. The percentage of agreement among the judges was happiness 93, fear 86, sadness, anger, and disgust each 79, and surprise 50.

In the final taping, the recorded facial expressive intensities representing low, medium, and high levels, were selected from a series of practiced variations of expression by the actor. This was done in order to portray a distinct increase in message strength without altering the basic type of expression shown for a particular category. Each 10-12

second facial expression started without perceptible affect (i.e., a neutral facial expression) which lasted for about 2-3 seconds, then changing to the particular expressive intensity which was maintained for the remaining 7-10 seconds. These expressive intensities were recorded using a split screen technique. Each of the three expressive intensities was paired with the other two expressive intensities. The onset of each expression in each pair did not deviate by more than $\frac{1}{2}$ second. These pairings were randomly ordered and followed the mini scene for that expressive category after a 15 second interval. An interval of three seconds was inserted between the onset of one expressive intensity pair and the end of the last pair of expressive intensities and the next mini scene was five seconds.

The concept of expressive intensity was suggested by Osgood (1966) and Frijda (1969) who pointed out that any expression may vary within as well as across categories, and modification in the movement of face features could follow 'n-dimensions,' suggesting several levels of expressive energy possible for a class of expression which would be controlled by the particular situation as perceived by the encoder.

A color video tape cassette recorder and a 24 inch color monitor were used to present the video taped stimuli. The subject's encoding responses were recorded on a black and white vidco tape recorder. All the schematic face stimuli representations depicting 'happy,' 'sad,' 'anger,' and 'fear' were illustrated by black india ink lines on a white paper

surface. Each face representation consisted of a four inch circle with eye and mouth area features. The eyes were elliptical and showed pupils. The elliptical centers were separated by 1 inch and located approximately 1¼ inches from the top center of the head. The mouth was a paired series of engineering curves and free-hand stylizations centered on the midline of the face with the center of the mouth located 1¼ inches from the bottom of the circular face. The representations and their pairs of expressions, representing low, medium, and high expression intensity, paralleling the video tape pairs, were derived by stylizing the real face expressions of the actor and photoreproducing these stereotypings on 8½ by 11 inch white bond paper which were then mounted on a firm cardboard surface (see Appendix #1).

Two Emotional Situation Assignment Lists (ESAL)--a child form and an adult form--were constructed using 10 items from the Odom and Lemond (1972) situation descriptions and 20 new situation descriptions. The resulting 30 item ESAL consisted of five situation descriptions for each of the six facial expressive categories (see Appendix #2). The adult form of the ESAL closely paralleled the child form, the only changes were those necessary to fit the adult experience. The two situation lists were scored by 14 adult judges to establish reliability. The resulting Kuder-Richardson formula 20 coefficients were .99 ($\underline{M}$=4.55, S.D. .65) for the adult list, and .99 ($\underline{M}$= 4.48, S.D. .18) for the child list.

Procedure

The children were administered the encoding-decoding tasks and the PPVT in two 25 minute sessions with a 1 day interval. The tasks were individually administered to the child in a mobile research trailer located at the child's school. The adult subjects completed all tasks within the period of 1 hour, were administered the tasks in one of three locations--an experimental room at the University; the mobile research trailer; or a meeting room at their residential complex.

For the video tape presentation of the facial expressions each subject was asked to read the instructions on their response sheet before the task, whereas the experimenter read the instructions to the children. The experimenter instructed each subject: "When the video tape begins you will see a man in a scene reacting in a brief situation, please specify (write or say aloud) what you think the man is feeling from his expression at the end of the scene. Notice the expression which the camera zooms in on and the reaction the man shows to the event occuring. Please identify the single, most clear expression in the man's reaction, if you believe you see more than one expression. Each scene is simple and brief. I will give you a hypothetical example of what you could see to clarify what you are to do. If a scene showed a man jogging (running) along a rocky and rough footpath in a natural setting (i.e., a woods or a park) and you see him suddenly trip and fall then get up, then looking in your direction he shows an

expression like this (the experimenter shows a grimace) while rubbing his leg would you be able to identify that expression?" All subjects said the expression probably indicated pain, which was correct. The subject then was shown one of three different orders of the six sets of nonverbal expressions, consisting of anger, fear, sadness, happiness, surprise, and disgust, and the expressive intensity pairs for each expression. Each subject was asked to label the expressions, after which the subject's attention was redirected to the color monitor for the intensity comparisons. When the first pair of expressive intensities was shown by the actor, the experimenter asked for subject to select the face--on the left or right of the split-screen--that corresponded to the number 1 and 2 on the response sheet, which showed the most expression of the pair. When the second and third pairs were viewed the experimenter requested the same "greater than" decision from the subject. The inter-stimulus interval on the cassette tape sequence did not limit the number of times an individual could view any scene or expressive pair if desired, and each subject was instructed that they could review any segment they were currently working on before viewing the next event on the tape.

The schematic face stereotyped expression task was administered in the same manner as the video tape stimuli. The subject first labeled the expression, and then selected the face showing the greater intensity for each of the pairs of

schematic expressions. Three different orders of presentations were used for the four facial expressions--'happy,' 'sad,' 'anger,' 'fear.' The subject was not restricted in viewing time for the expression or the pairs of expressions, which were shown individually. The order of the video tape and the schematic face decoding tasks was counterbalanced.

Scoring for labeling and intensity recognition--video tape and schematic modes.

Subjects' labeling responses to each facial expression for the video tape mode and the schematic faces were scored 1 for a correct response and 0 for an incorrect response. The standard for judging correctness of labeling was the correct label or an acceptable synonym, according to the current Roget's Thesaurus. This 1-0 score provided the response measure for each category of facial expression. A 1-0 scoring system was also used for the subjects' response to each pair of the facial expressive intensities. The response measure consisted of the summed score for the three intensity pairs.

The ESAL was administered to adults last since the expression labels for this task were listed on the response sheet to avoid biasing. The children were administered this task with the PPVT at the first session.

The sum of the subject's responses (1 for a correct response, 0 for an incorrect response) to the five items for each of the six categories of expression provided the response measures for the ESAL.

For the encoding task each subject was asked to "show how you would show" (the expression) for each of the six expressive categories--sadness, anger, surprise, fear, disgust and happiness. The subject's facial expression for each of the categories was video taped. Written permission to record the subject's expressions was obtained before the experiment began. The encoding task preceded the decoding tasks so that the actor's expressions could not influence the subject's production.

The subject's facial expression received a score of 1 for a correct encoding response or 0 for an incorrect encoding response on each of the six categories as determined by the two judges. The response measures for this task consisted of the 1-0 score for each facial category.

Chapter 3

Results

Accuracy of Nonverbal Facial Expressions

To assess the prediction that the smiling face is the most recognizable expression of the six nonverbal categories (anger, surprise, fear, happiness, sadness, and disgust), the proportion of correct responses for each video taped situation across age groups was computed. The most accurately recognized expression in an appropiate situation was fear 90%, followed by sadness 82%, happiness 78%, anger 66%, surprise 60%, and disgust 52%.

Labeling. The frequency of correct response for each facial expression by age group appears in Table 1. A Kruskal-Wallis analysis of variance performed on the proportions of correct labeling indicated differences among the age groups for the six situations, $H(4)=8.00$, $p<.05$. A standardized proportions test (Hodges, Krech & Krutchfield, 1975) was used to make age and sex comparisons between groups for the six expressive categories. The situation depicting nonverbal facial cues for happiness was correctly labeled by more older children ($z=-1.78$, $p<.04$) and mid-adults ($z=-1.84$, $p<.04$) than young children, and by more mid-adults than young adults ($z=-1.77$, $p<.04$). But the youngest children were more accurate in labeling the happiness situation than the aged adults ($z=1.80$, $p<.04$). All younger age groups labeled happiness more accurately than the aged group (z's from 1.80 to 3.33, $p<.05$ for all comparisons). The older children also were more accurate in labeling the situation depicting nonverbal facial cues for anger than the young adults ($z=1.71$, $p<.05$), the mid-adults ($z=2.57$, $p<.006$), and the aged ($z=4.90$, $p<.001$). The aged subjects were less accurate labeling anger than the young children ($z=3.92$, $p<.001$), the young adults ($z=3.73$, $p<.001$) and the mid-adults ($z=2.19$, $p<.003$). The situation depicting nonverbal facial cues for disgust was more accurately labeled by older children ($z=-2.32$, $p<.02$), young- and mid-adults (z's=3.07, p's$<.001$) than the youngest children, and the disgust situation was labeled correctly by more young-, and mid-adults than the aged (z's-1.95, p's$<.03$). The situation

TABLE 1

Frequency of Correct Response on the Video Tape Labeling Task [a]

	Young Child		Older Child		Young Adult		Mid-Adult		Aged Adult	
	M(10)	F(9)	M(9)	F(10)	M(10)	F(10)	M(10)	F(10)	M(6)	F(10)
Anger	8	7	9	9	7	8	6	6	2	0
Surprise	5	3	8	7	4	8	7	4	4	6
Fear	7	8	7	8	10	10	10	10	5	10
Happiness	7	7	9	9	6	9	9	10	2	4
Sadness	8	5	9	8	9	10	9	8	5	7
Disgust	2	2	7	4	6	8	7	7	3	3

[a] Numbers in parentheses indicate the number of subjects in each age-sex group.

with the nonverbal facial cues for surprise was labeled correctly by more older children than younger children (z=-2.32, p<.02). The young adults and the mid-adults were more accurate than both child groups in labeling the situation for fear (z's=-2.17, p's<.02) and the situation sadness was labeled more accurately by the young adults than the young children (z=-2.16, p<.02), or the aged group (z=1.72, p<.04). The prediction that the young and mid-adult groups would be more accurate for this decoding task than the children was not supported. However, distinct age differences in decoding ability between the oldest and the youngest subjects (i.e., mean ages 76.8 and 5.6 years) and the younger adults were present. The youngest and the oldest subjects were significantly less accurate in labeling four of the six video taped situations (anger, happiness, sadness, disgust--by the aged; fear, disgust, happiness, sadness--by the youngest) than the young or mid-adults (p's<.05 for all comparisons).

Expressive intensity. Age differences in recognition of the video taped intensities for the facial expression task were assessed by a Kruskal-Wallis analysis of variance and found to be significant, $H(4)$=13.05, p<.005). Table 2 shows the proportion of subjects in each age group who made correct intensity identifications in the six categories. Subsequent comparisons using the proportions test revealed that the accuracy differences between age groups on this task were attributed to the older children. This age group was

TABLE 2

Proportion of Correct Responses on the

Video Tape Intensity of Expression Task [a]

	Young Child		Older Child		Young Adult		Mid-Adult		Aged Adult	
	M(10)	F(9)	M(9)	F(10)	M(10)	F(10)	M(10)	F(10)	M(6)	F(10)
Anger	.83	.67	1.00	1.00	.57	.87	.73	.83	.72	.83
Surprise	.77	.74	.85	.93	.70	.87	.80	.87	.78	.77
Fear	.66	.74	1.00	.93	.70	.70	.73	.73	.56	.70
Happiness	.80	.84	1.00	1.00	.93	.93	.93	.90	.94	.90
Sadness	.66	.74	.85	.90	.87	.80	.83	.93	.61	.90
Disgust	.77	.70	1.00	.90	.80	.80	.67	.87	.61	.77

[a] Numbers in parentheses indicate the number of subjects in each age-sex group.

more accurate in their identification of intensity cues for happiness ($z=-1.82$, $p<.04$) and disgust ($z=-1.78$, $p<.04$) than the young children, and in identifying disgust cues than the aged ($z=1.91$, $p<.03$). The older children also were more accurate in identifying anger (z's from +2.09 to 2.37, p's $<.02$) and fear intensities (z's from +2.00 to 2.46, p's $<.03$). Comparisons for the young children showed no differences between the youngest and any adult group on this task, and the other age comparisons for the six expressive intensities were not significant. The data do not support the prediction that adults under 65 years are more accurate than children in recognizing expressive intensity differences.

Sex differences. An examination of accuracy within each age group for this labeling task revealed few sex differences. No sex differences appeared for the young children and the mid-adults. Males in the older child group were more accurate than their female peers in decoding disgust ($z=1.68$, $p<.05$), and the young adult females were more accurate in decoding the face cues for surprise than their male peers ($z=1.83$, $p<.04$). Aged males were more accurate identifying anger than aged females ($z=1.70$, $p<.05$). Nonaged females did not decode more accurately than males. There were no within age group, sex, differences for the intensity task.

Schematic Faces

Labeling. A Kruskal-Wallis analysis of variance of the proportion of correct labeling by age was not significant,

TABLE 3

Frequency of Correct Response on the Schematic Face Labeling Task [a]

	Young Child		Older Child		Young Adult		Mid-Adult		Aged Adult	
	M(10)	F(9)	M(9)	F(10)	M(10)	F(10)	M(10)	F(10)	M(6)	F(10)
Anger	9	8	9	10	10	10	6	8	3	3
Fear	4	1	3	4	5	3	3	2	3	3
Sad	5	6	6	7	4	5	9	6	0	2
Happy	9	9	9	10	10	10	10	10	6	10

[a] Numbers in parentheses indicate the number of subjects in each age-sex group.

$H(4)=1.43$, $p>.05$. The frequency of correct labeling for each age group on the four facial representations ('anger,' 'fear,' 'sadness,' 'happiness') appears in Table 3. The proportions test revealed fewer age differences in schematic face task than found in the video taped task. The prediction that the youngest children would have greater success in identifying schematized representations of the four facial expressions than the video tape stimuli was not supported since the combined accuracy totals on the schematic face labeling task are less than the accuracy for the comparable expressions in the video tape labeling task. However, on the schematic face task no other age group labeled these representations more accurately than the youngest children ($p>.05$ for all comparisons). Contrary to prediction, the aged subjects were not as accurate as the children on this task. The young children ($z=3.23$, $p<.001$), older children ($z=4.08$, $p<.001$), young adults ($z=4.02$, $p<.001$) and mid-adults ($z=1.94$, $p<.03$) were more accurate labeling 'anger' than the aged, and all younger groups were more accurate labeling 'sad' than the aged (z's from 2.14 to 3.73, $p<.01$ for all comparisons). The older children and the young adults were more accurate labeling 'anger' ($z=2.62$, 2.66, p's$<.005$) than the mid-adults, and the mid-adults were more accurate in labeling 'sad' than the young adult group ($z=11.94$, $p<.03$).

Expressive intensity. Table 4 shows the proportion of subjects in each age group making correct intensity identifica-

TABLE 4

Proportion of Correct Responses on the Schematic Face Intensity of Expression Task [a]

	Young Child		Older Child		Young Adult		Mid-Adult		Aged Adult	
	M(10)	F(9)	M(9)	F(10)	M(10)	F(10)	M(10)	F(10)	M(6)	F(10)
Anger	.73	.93	1.00	.93	.80	.93	.77	.93	.61	.60
Fear	.83	.74	1.00	.90	.77	.93	.77	.80	.61	.43
Sad	.73	.81	.96	.90	.73	.83	.83	.90	.56	.53
Happy	.93	.85	1.00	.93	.83	1.00	.90	.93	.50	.80

[a] Numbers in parentheses indicate the number of subjects in each age-sex group.

tions for the four schematic expressions. A Kruskal-Wallis analysis of variance indicated age differences on this task, $H(4)=15.44$, $p<.001$. The differences, as shown by the proportions test, were between aged adults and the younger age groups, which does not support the prediction that aged individuals would identify schematized intensities as well as the child groups. No differences existed among the nonaged groups. Age differences appeared for 'fear' intensities which were more accurately identified by the young children ($z=1.81$, $p<.04$), older children ($z=3.02$, $p<.001$), young adult ($z=2.27$, $p<.02$) and mid-adult ($z-1.78$, $p<.05$) groups than the aged. Intensity of 'anger' was more correctly identified by older children ($z=2.16$, $p<.02$), young adults ($z=1.86$, $p<.04$) and mid-adults ($z=1.70$, $p<.05$) than the aged. The older children, young-, and mid-adults also were more accurate in their identification of 'happy' expressive intensities than the aged (z's from 1.77 to 2.22, p's $<.05$ for all comparisons), and the category 'sad' was identified by more older children ($z=2.65$, $p<.005$) and mid-adults ($z=2.16$, $p<.03$) than the aged subjects.

Sex differences. No sex differences in accuracy of labeling or identification of expressive intensity were present, and the females were not more accurate than males on this task (p's $>.05$).

Encoding

Each subject's accuracy in the nonverbal expression production task for the categories anger, surprise, fear, happiness,

TABLE 5

Frequency of Correct Encoding Responses [a]

	Young Child		Older Child		Young Adult		Mid-Adult		Aged Adult	
	M(10)	F(9)	M(9)	F(10)	M(10)	F(10)	M(10)	F(10)	M(6)	F(10)
Anger	2	2	5	3	2	5	2	3	1	5
Surprise	1	3	7	4	6	8	7	8	6	4
Fear	4	1	2	2	3	2	1	4	2	8
Happiness	7	8	9	9	10	10	10	9	4	10
Sadness	2	0	3	4	5	2	2	5	1	3
Disgust	0	0	3	6	5	9	4	6	2	5

[a] Numbers in parentheses indicate the number of subjects in an age-sex group.

sadness, and disgust was evaluated by two female raters. Inter-rater agreement by category was: happiness 96%, fear 79%, disgust 78%, anger 77%, surprise 74%, and sadness 62%. Frequency of successful encoding performance by age group appears in Table 5. A Kruskal-Wallis analysis of variance showed no significant differences across categories, $H(4)=6.06$, $p>.05$. However, analyses using the proportions test were performed to identify specific age and sex differences. All older groups were more successful in encoding surprise and disgust than the young children (z's from -2.32 to -3.37 and -3.22 to -4.55, p's $<.01$), and older children ($z=-1.91$, $p<.03$), young adults ($z=-1.75$, $p<.05$), and mid-adults ($z=-1.81$, $p<.04$) performed cues to sadness more effectively than young children. Young adults performed happiness cues more accurately than the young children ($z=-2.17$, $p<.02$), and the aged group ($z=2.23$, $p<.01$), while the aged adults performed fear cues more accurately than each younger group (z's from -2.15 to -2.49, p's $<.02$). The data do not support the prediction that nonaged adults are more successful encoders of the six expressions than children. Also, there is no support for the prediction that aged persons are less accurate encoders than nonaged adults.

Sex differences. Within age groups the older child males were more accurate performing surprise facial cues than their female peers (z-1.68, $p<.05$). Young adult females were more accurate performing facial cues for disgust than male peers ($z=-1.95$, $p<.03$). Aged males were more accurate

than aged females displaying cues for surprise ($z=2.44$, $p<.008$), while aged females demonstrated more accuracy with cues of fear ($z=-1.88$, $p<.04$). The prediction that females younger than the aged group are more accurate encoders than males was not supported.

Encoding vs. Decoding

Comparisons between decoding and encoding of facial expressions for each age group appear in Table 6. Phi-coefficients for decoding responses on video tape labeling and encoding accuracy were computed for each age group. The relationship between encoding and decoding for happiness was significant for the older children ($Phi=.89$, $p<.001$) and the mid-adults ($Phi=.90$, $p<.001$). All other encoding-decoding relationships were nonsignificant (p's$>.10$).

Verbal Situations

Emotional situation assignment (ESAL). A 5x2x6 repeated measures analysis of variance with age and sex as between subjects factors and the situation assignment as a within subjects factor was performed on the subject's choice of emotional terms for the 30 situations. The mean scores by age and category appear in Table 7. The analysis revealed a significant effect for age, $F(4,84)=55.36$, $p<.001$. Using the Tukey HSD procedure, mean comparisons showed that each of the adult groups was significantly more accurate assigning the appropriate emotional term to the situation presented on the ESAL than young children ($p<.05$). There were no differences between the two child groups ($p>.05$) or among the adult groups (p's$>.05$).

TABLE 6

Encoding and Decoding Frequencies by Age and Facial Expression

Young Child (n=19)

	Decode	Encode	None	Decode & Encode	Phi
Anger	12	1	3	3	-.05
Surprise	6	2	9	2	-.08
Fear	11	1	3	4	-.02
Happiness	3	4	1	11	-.02
Sadness	11	0	6	2	.02
Disgust	6	0	13	0	.18

Older Child (n=19)

	Decode	Encode	None	Decode & Encode	Phi
Anger	11	1	0	7	-.10
Surprise	6	2	2	9	.10
Fear	12	1	3	3	-.04
Happiness	1	1	0	17	-.89*
Sadness	11	1	1	6	-.09
Disgust	7	4	3	5	-.15

Young Adult (n=20)

	Decode	Encode	None	Decode & Encode	Phi
Anger	10	2	3	5	-.06
Surprise	3	5	3	9	.13
Fear	15	0	0	5	-.26
Happiness	0	5	0	15	.26
Sadness	13	1	0	6	-.17
Disgust	5	5	1	9	-.19

Mid-Adult (n=20)

	Decode	Encode	None	Decode & Encode	Phi
Anger	8	1	7	4	.24
Surprise	3	7	2	8	-.06
Fear	15	0	0	5	-.26
Happiness	1	1	0	18	.90*
Sadness	12	2	1	5	-.28
Disgust	8	3	2	7	-.12

Aged Adults (n=16)

	Decode	Encode	None	Decode & Encode	Phi
Anger	2	6	8	0	-.10
Surprise	3	3	3	7	.20
Fear	5	0	1	10	.17
Happiness	0	7	2	7	.17
Sadness	9	1	3	3	-.13
Disgust	5	6	4	1	-.42

*p .001

TABLE 7

Mean Scores for Emotion Assignment List by Age and Category

	Anger	Surprise	Fear	Happiness	Sadness	Disgust	combined
Young Child	2.03	1.38	1.58	3.79	3.47	1.21	2.24
Older Child	3.84	3.63	4.02	4.64	3.02	2.15	3.55
Young Adult	4.20	4.20	4.70	4.85	2.75	4.10	4.13
Mid-Adult	4.00	4.35	4.60	4.95	3.50	4.55	4.33
Aged Adult	4.25	4.32	3.88	4.78	4.37	4.30	4.32
combined	3.66	3.57	3.76	4.60	3.42	3.26	

Category of emotion also emerged as a significant factor, $F(5,420)=21.81$, $p<.001$. Happiness situations were recognized correctly more often than disgust ($p<.05$), but there were no differences in recognition accuracy among the other categories (see Table 7). Age was an important factor also in selecting the appropriate emotional label as indicated by the interaction between age and category, $F(20,420)=8.80$, $p<.001$. Simple effects analysis indicated recognition differences for the young children, $F(1,5)=12.23$, $p<.015$, older children, $F(1,5)=7.40$, $p<.01$, young adults, $F(1,5)=5.46$, $p<.01$, and mid-adult groups, $F(1,5)=2.59$, $p<.05$, but not for the aged adults. Further analysis of category means with the Tukey procedure showed that age influenced recognition differences in the disgust category ($p<.05$) for both child groups as compared to all adult groups. Anger, surprise, and fear descriptions also were less accurately recognized by the youngest children than by older groups ($p<.05$), and the older children and young adults were less accurate than the aged adults in selecting sadness descriptions ($p<.05$). As predicted, verbal knowledge of selected affect labels increased with age and did not change significantly with advanced age.

Chapter 4

Discussion

The ESAL verbal measure was used to reflect the level of understanding each group had for these concepts. The youngest

age group (i.e., 5 years old) was less familiar with the six emotional concepts than the older groups because they did not understand any of the terms as well as the older age groups. These results parallel the findings of Saltz, Soller and Sigel (1972) whose 5 year olds did not select as many pictorial representations for the six concepts represented as the older children, thus demonstrating a fractionation of concepts. The performance of the 5 year olds on the verbal assignment task is also congruent with the Wolman, Lewis and King (1971) finding that the child's self-awareness matures during the years from five to nine, accompanied by language development which enables the child to experience those feelings necessary for the sympathetic understanding of another's experience.

In their attempts to place the six affect respomses into meaningful contexts for identification, the youngest subjects demonstrated less understanding of the face in the situation or the face cues alone in comparison with three of the four older groups. But the young child's recognition of stereotyped expression schematic form was highly accurate for the frequently observed expressions which were less likely to be confused outside of a situational context (e.g., 'happy') than the complex expressions which are commonly confused (i.e., fear mistaken for surprise). Because of eye and mouth cue similarity, the stereotyped characteristics require a lower level of recognition competence of nonverbal cues than for recognition of nonverbal communication. Recognition of both types of face expressiveness (i.e., expressive intensities for real and schematic faces)

also was less difficult for the young child than labeling the face in the situation, since expressive intensity cues vary with the mobility of the face feature pattern rather than with the feature manipulation within each pattern. Encoding performance by the young children also suggests an overall lack of knowledge of face cues to these expression categories.

Older children's encoding and decoding task performance was not essentially different from adult performance. The 9-11 year olds were not significantly different in their verbal assignment of five of six category labels in the ESAL, suggesting that this age group understood most of the situations as well as the adults, and were therefore capable of assigning the appropriate affect. It would appear that by the age of 9-10 years the child has experienced a variety of situations, similar to that of the adult, which contain familiar cues to particular feelings, thus facilitating the classification of situational cues which identify a pronounced affect tone. Further, the older children were as accurate as both groups (i.e., 18-40 year olds) in decoding situational and facial cues to the six categories of expression, and in labeling the stereotyped expressions. The 9-11 year olds also produced the most accurate responses of any age group in identifying the expressive intensities for the real and schematic face medium, and their encoding accuracy was equivalent to that of the adult groups.

When the encoding-decoding performance of the young child and the older child groups is compared, the older children

were more accurate encoders and decoders, but they showed more disparity encoding and decoding, thus supporting Odom and Lemond (1972) who found an age lag for encoding and decoding facial expression. It is important to note the differences between the young and the older children's verbal assignments on the ESAL. In the nonverbal decoding task the young children showed more accurate labeling for the categories of anger, surprise, and fear than on the verbal assignment. Perhaps the visual situation cues alone prompted a judgment of classification without qualitative evaluation of the total cue pattern. That is, young children seem to be more perceptually bound in decoding. By about 10 years of age children have developed the requisite cognitive skills which enable them to assess the life-like situations presented for these concepts in a manner similar to that of adults.

Winer and Kronberg (1974) found certain developing cognitive skills (i.e., conservation and class inclusion) emerging at different ages, with the class inclusion skills postdating conservation skills in their kindergarten through sixth grade sample. They reported that class inclusion proficiency improved with age, but at a slower rate than conservation skills. The 10-11 year olds were significantly more correct on both conservation and class inclusion tasks than children in kindergarten through second grade (i.e., ages 6-8 years). The nonverbal situations, like the verbal descriptions in the ESAL, required the subject to evaluate the category of expression rather than isolate cues in a situation, requiring

each to weight the nonverbal cues observed in some set of socially recognizable behaviors to derive the meaning. It is not that the older children had more life experiences, rather that with experience the older child has developed cognitive skills which permits one to form judgments about separate events representing a class of events in the environment. Their skill is a culmination of knowledge of the distinctive face cues and the probable combinations of face and environmental cues occuring in a temporal sequence. Without this knowledge, the young child has to rely on those isolated cues that can be related to some past experience.

In contrast to the young child, aged subjects were not less accurate than the other adults in assigning the appropriate label in the ESAL task, thus demonstrating their competence with the six concepts. But the aged were not as successful as other adults in identifying video tape scenes and schematic face expressions, particularly the stereotyped expressive intensities. The video tape stimuli provided real cues of an animate face reacting in a situation which were readily classifiable into general affect categories. This cue information may not have been utilized in the same manner by the aged and younger adults. To account for this response difference, factors other than conservation skill deficits or slowing of cognitive processing must be responsible for such a change. In addition to the possible effect of egocentric responses discussed by Papalia (1972), Rubin et al (1973), and Rubin (1974), there is some evidence of a shift of active

classification strategy from early and middle adulthood to old age. Denney (1974), investigating cognitive style in middle and aged community residents, found that middle-aged business and professional males and females used taxonomic kinds of criteria (i.e., grouping by characteristics in common with each item) in grouping pictorial items, but nonprofessional and nonbusiness middle-aged community females and community-aged persons grouped these same items by using more complementary, or thematic criteria (i.e., grouping by a characteristic of the stimuli which has some idiosyncratic relationship among the items). In a similar investigation with the aged, Overcast, Murphy, Smiley and Brown (1975) found aged adults (ages 62-85 years) recalled more information on a surprise recall test from prepared thematic lists of pictorial items than from prepared taxonomic lists. Subjects instructed to categorize or remember what they saw recalled more items on both lists than subjects merely asked to look at the two lists.

Corroborant information concerning aged performance in classification type tasks has been reported by Denney and Cornelius (1975) who compared highly educated (i.e., post high school education) community middle-aged males and females, community aged males and females, and institutionalized aged males and females with low education (a high school education or less) community middle-aged males and females, community aged males and females, and institutionalized aged males and females' performance on class inclusion and multiple classifi-

cation tasks. Middle-aged subjects (M=34.53 years) performed significantly more effectively than community aged (M=73.19 years), and institutionalized aged (M=76.22 years) subjects on both tasks. In their analysis, education level emerged as a significant factor, and a significant sex by educational level interaction was found. Well educated males performed more accurately than less educated males, but educational level had no effect for females. Denney and Cornelius argue that educational level per se was not responsible for the significance differences, rather another factor such as occupational experience affected scores, since the educational level of males is or has been important in determining occupational status, which in turn affects the kinds cognitive style one is familiar with. The aged group was less accurate on the schematic face task than the video tape task, although cue simplification was present. Only the most familiar expression (i.e., 'happy') was reported correctly. This may suggest that the processing of nonverbal cues of highly abstract features exceeds some minimum level of novel face stimuli which the aged can recognize.

The verbal assignment scores for each category indicated how familiar the age groups were with six kinds of situations. Happiness situations were most accurately selected on the ESAL, while the remaining five category assignments did not differ in accuracy. These results show the tendency for individuals to identify first the highly positive statements about the subject's own experience than less positive or negative ex-

perience. But, the situation most accurately labeled by non-verbal cues was not the one most accurately selected on the ESAL. The order of accuracy followed from two negative affect situations. The situation most accurately named was for fear and the second situation was for sadness. Attenuated face cues alone (e.g., the photograph) of fear expressions has been confused with other complex expressions (e.g., surprise) in previous research (e.g., Ekman et al, 1972; Frijda, 1969; Izard, 1971). Given the appropriate environmental setting with animate cues, the observer has a meaningful reference for his own experience in the class of situations that represent the expression of fear. Individuals are exposed early in life to many environmental elements which can evoke this response (e.g., avoidance of potentially harmful animals including snakes and spiders) and are able to best recognize this class of stimulus cues in an appropriate context.

While many fear evoking situations are sanctioned in our culture, show of fear in adulthood is considered a sign of weakness, and therefore should not be displayed. Frequent or extreme displays of sadness also are treated as showing weakness, but as Izard (1971) points out, sadness is a common feeling for most people, consequently it is acceptable in low and infrequent expression provided that sadness is displayed in the proper setting. Recently, others (e.g., Zukerman et al, 1975) have also adopted this view, crediting one's attention to a particular negative or 'forbidden' expression as a

function of socialization processes which condition the individual not to show certain expressions, and to be aware of such expressions by others. Happiness cues were the third most accurately identified. The cues in this category were expected to be the most accurately recognized, but it appears that portrayals of negative expressions had a greater impact than positive expressions. Perhaps the positive expressions are not a constant threat to the individual. The fourth most recognized expression in a situation represented the affect cues of anger. These cues may be less recognizable as age increases, perhaps resulting from socialization practices which emphasize that anger and aggression are socially undesirable behaviors. This may explain why the terms anger and disgust appear interchangeable for some adults in this study. That is, anger may be given another, less volatile label, which in turn may diminish the hostile feeling. Surprise and disgust cues were hardest to detect, although situational and animate facial cues were provided. Ekman et al (1972) found that the expression of surprise is usually brief, and a complex expression which suggests this expression may require more specific cues of an individual's experience to clarify the meaning. The cues to disgust may be comparatively uncommon in our well regulated society where noxious and repugnant stimuli are often eliminated from our surroundings.

Identification of intensity in expression isolated from the situation permits the individual to focus on movement characteristics of an expression while not being limited by

explicit context. Recognition of facial expressive intensity assumes two components: 1) recognition of a face pattern or type of face expression; 2) recognition of pattern variations. The likelihood of recognition of a particular expression is dependent upon the individual's familiarity with the type of pattern and its variations which is predicated on significant experience with such patterns, i.e., either in quantity and/or quality of the individual's experience. The class or type of pattern intensity variation most accurately detected was that for the smiling and laughing face. Few differences in detection of expressive intensities were present for anger, sadness, surprise, disgust, and fear.

If the happy expression is a very positive expression to communicate, and if positive expressions are socially more acceptable in communication than negative kinds of expression, then it is likely that positive expressions are displayed more frequently, and are more visible than other expressions. Thus certain positive expressions are more likely to be recognized. This interpretation is supported by Izard (1971) who found that the expression of joy-excitement was the most desirable and best understood emotional expression in his sample of several western industrialized cultures.

Order of category accuracy on encoding versus decoding provides a contrast. Both positive expressions--happiness and surprise--were encoded more frequently than any other expressions, but the two most accurately decoded expressions were fear and sadness, which were the least accurately encoded. The

discrepancy between encoding and decoding on nonverbal channels has been a recent issue in the literature (e.g., Davitz, 1964; Lanzetta & Kleck, 1970; Mehrabian & Ferris, 1967; Osgood, 1966; Zukerman et al, 1975), with most investigators reporting few relationships between an individual's encoding and decoding demonstrations in a laboratory setting. Zukerman, Lipets, Koivumaki and Rosenthal (1975) found fewer relationships for decoding a target's expression and the subject's encoding of that same expression, than for the subject's ability to encode and decode different expressions in the same channel (i.e., vocal and visual). The results of this investigation confirm previous findings of nonsignificant relationships between encoding-decoding measures of accuracy. In the present study a significant encoding-decoding relationship appeared only for the expression of happiness, and only in two age groups. If one groups the expressions, in the present study into the two broad categories of positive (i.e., happiness and surprise) and negative expressions, (i.e., fear, sadness, anger, disgust), low positive nonsignificant to high positive significant relationships exist for encoding-decoding most category of the positive expressions, whereas nonsignificant, low negative relationships appear for encoding-decoding negative expressions. Although the numbers in each group are too small to provide a significant trend, it appears that negative expressions are not demonstrated, but they can be successfully detected, whereas positive expressions are more readily

demonstrated and detected. These communicative differences may be the result of socialization experiences. One must be able to detect negative expressions in order to understand another, but socialization has conditioned us to inhibit casual expression of negative affect. However, positive affect is socially approved, and receiver reinforcement even in those situations lacking a particular context.

Some further comment needs to be made on the schematic task performance. The schematic face is a denuded representation of each expression concept presenting a fundamental image of the stereotyped expression. The results of the labeling accuracy indicate that certain of these representations were more easily classifiable than others. Stereotyped expressions of 'happy' and 'anger' were highly recognizable, while representations of 'fear' and 'sad' were less recognizable. The differences in recognition of these categories suggests two possible interpretations. The difficulty in recognition may be attributed to the stimulus material in that representations for 'sad' and 'fear' were difficult to illustrate. Conversely, the expressions for 'happy' and 'anger' may have been easier to depict. On the other hand, the 'fear' and 'sad' expressions may represent complex face expressions which need clarification and elaboration offered by the animate face or cues in the environment. Ekman et al (1972) reported that the label of surprise was frequently assigned to the photographic representation of fear. This confusion appeared to

be responsible for much inaccuracy in labeling 'fear' for the schematic face stimulus in the present study. If one re-labels the category--'surprise-fear'--accuracy then exceeds 72%. This reanalysis tends to support the explanation that some expressions are too complex to be communicated effectively by static poses.

Some consideration needs to be given to the question of external validity with respect to the video taped mini scenes and the resultant facial expressions. The theme portrayed in each scene was selected to represent a common experience in our society. Therefore, one can argue that the subjects had probably encountered this kind of experience in their life. One exception may be that of the casket scene associated with the expression of sadness. Many young children may not have experienced a funeral. In spite of this probability, their labeling scores were quite high for this category. While one can question the representativeness of a facial expression portrayed by an actor, this criticism seems to lack validity in that the judges agreed that the expressions were recognizable. Further, the use of a professional actor seems appropriate in that we commonly accept the theater as a legitimate medium for communicating affect in real life situations.

In conclusion, age differences were present in the decoding task, but certain groups were quite accurate in the labeling task where they responded freely to enacted expressions in video taped situations. Encoding performance showed

fewer age differences, which may have occurred because of the tendency to suppress encoding among the older groups in this experimental setting. Certain expressions seem to be less desirable than others to demonstrate, and the cues to these expressions are actively suppressed as a consequence (e.g., Izard, 1971). The relationship between encoding and decoding expressions approximates zero for most categories, with the exception of happiness, a positive, socially approved communication of affect.

Schematic representations of the face provided the decoder with simplified expressions, some of which were more recognizable by both nonaged adult groups and the children, but not aged persons. This difficulty may be attributable to the stimuli exceeding a hypothesized level of novelty which the schematized face represents for the aged. The level of novelty the aged individual experiences may be due to the present cognitive style used in problem solving situations for any unfamiliar event. Therefore the simplified, stereotyped expression may have appeared too discrepant from the familiar cue carrier (i.e., the face) to be taken as the representation of face expression.

The youngest age group seemed to lack the cognitive sophistication to recognize nonverbal expressions, whereas the aged showed a conceptual acquaintance with nonverbal expressions, but they did not appear to invoke a cue pattern recognition strategy similar to younger adults and older children. The reasons for the discrepant strategies used is

not apparent. It is assumed that the requisite operations and cognitive structures were present at some time for the aged, but it has not been determined whether the apparent regression in cognitive performance reflects a neurophysiological loss in ability, or if this deficit is entirely a result of the comparative environmental change from a demanding life-style to a less demanding life-style which may release the individual from maintaining little used forms of problem solving strategies.

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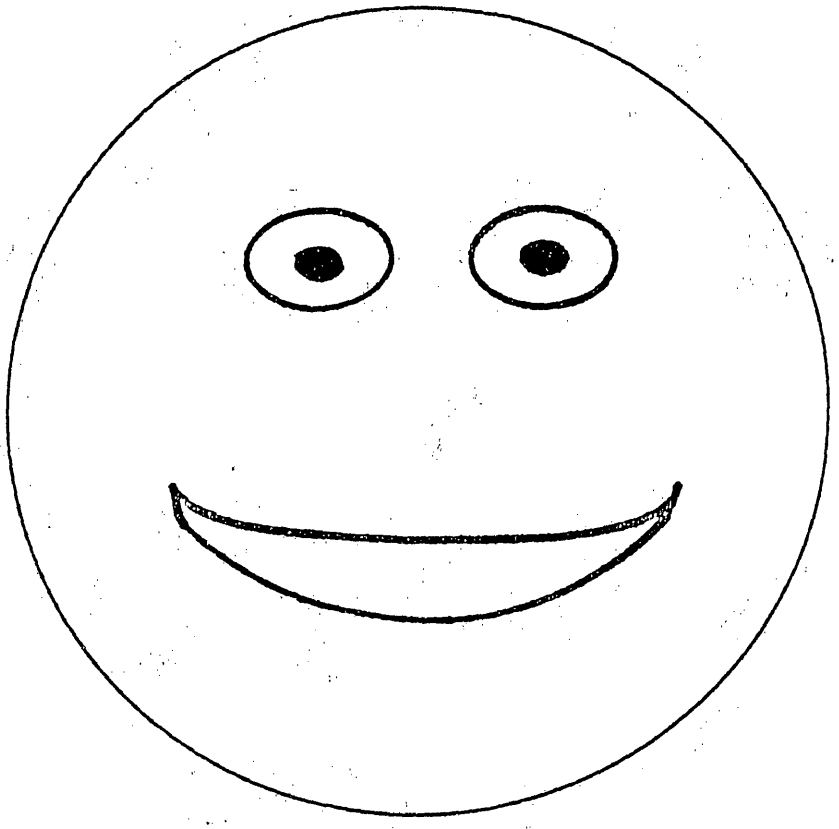
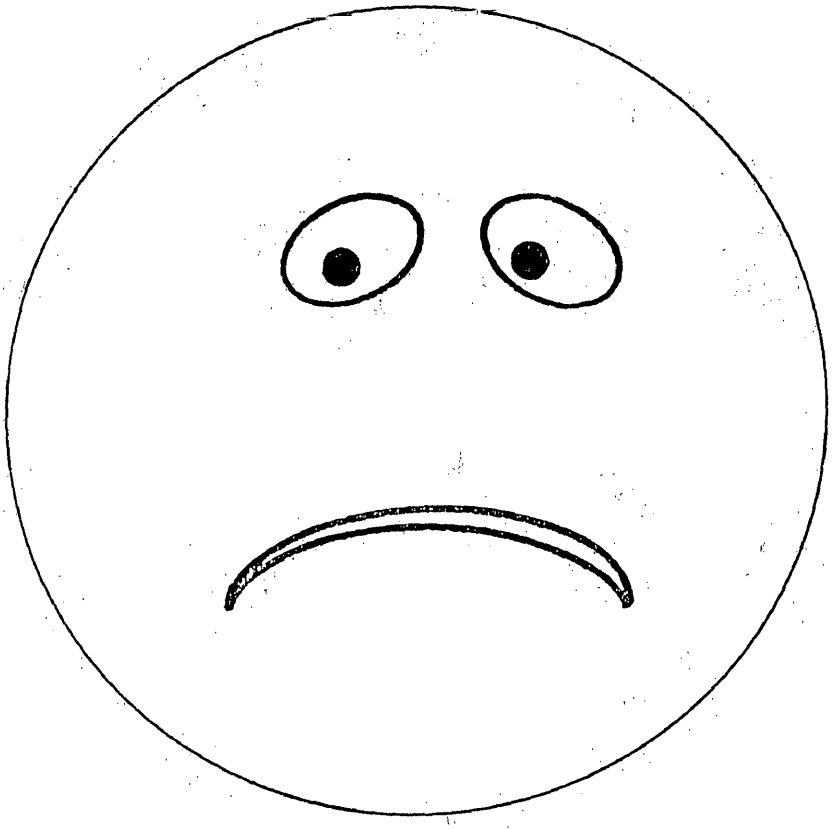
APPENDIX 1

Examples of the Schematic Face Expressions

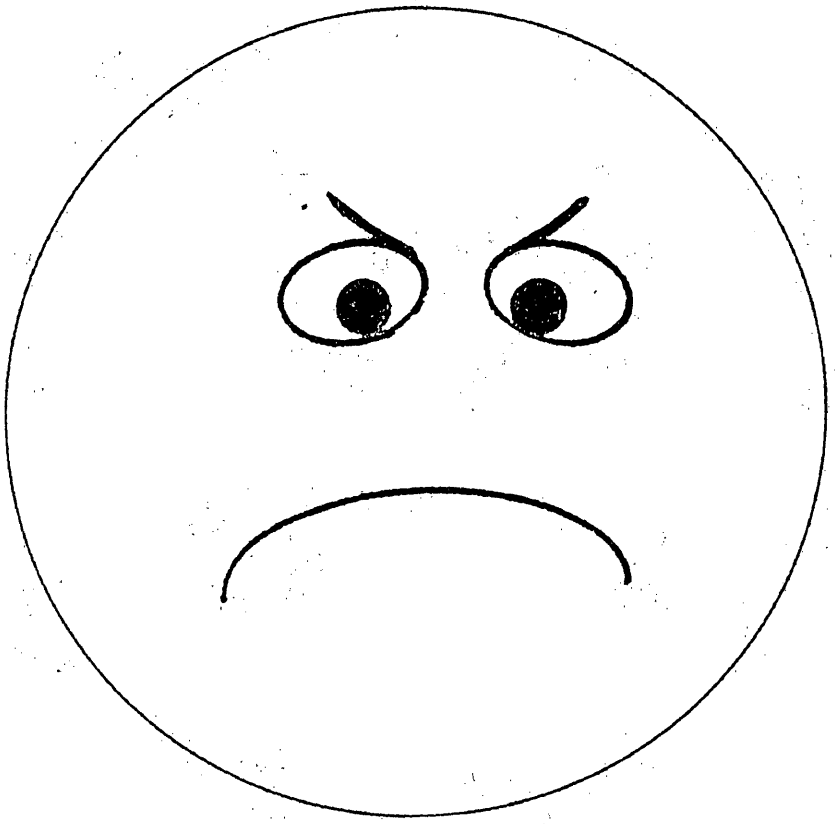
HAPPY



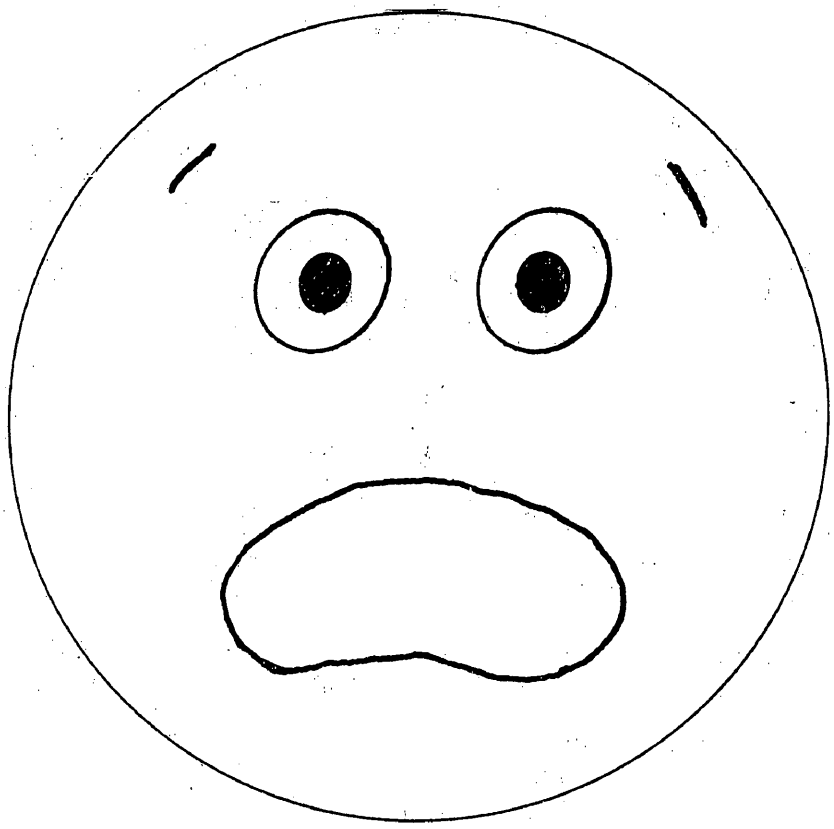
SAD



ANGER



FEAR



APPENDIX 2

Items appearing on child and adult Emotional Situation Assignment Lists

Child Emotional Situation Assignment List

* designates original items from Odom and Lemond (1972)

* Being chased by a mean dog
* Running away from a man with a gun
Losing your favorite toy
Winning a contest
Seeing someone jump over your house by himself
* Found a smashed bug in your milk
* Gotten a big bowl of ice cream
Seeing a dinosaur on your front lawn
If you had an eyé poked out because you were not careful
* Stepped in dog do
Telling someone not to do something but they do it anyway
Being chased by a snake
At your birthday party
If your mom or dad died
* Seeing a jack in the box pop out
Finding a stranger in your bed
* Getting ready to hit somebody
Smelling a dead fish
* Gotten a cute puppy for your birthday
Biting into a rotten egg
Dropping your ice cream cone
About to fall out of a tall tree
Getting yelled at for doing something you really didn't do
If the puppy you got for your birthday died
Seeing a ghost
* Heard a dog say hello instead of barking
Not being allowed to do something really fun because mom or dad won't let you
Getting smelly grease spilled on you
Going to Disneyland
* Seeing somebody take your favorite toy away

Adult Emotional Situation Assignment List

Being chased by a vicious dog
Having seen your team win the play-offs
Losing the check which represents your life savings
Seeing someone steal your new car (and not being able to stop him)
Arriving at a party to find it is being given for you
Finding an 'inch worm' in your sandwich after you have taken your first bite
Getting your favorite dessert after dinner
Finding a five pound tomato in your garden
Learning that you will have to have part of your leg amputated after an accident
Coming home from vacation to find young vandals destroying your furniture
Being chased by a snake
Running barefoot through the grass then suddenly stepping in dung
Having had your house and property destroyed by a natural disaster (i.e., a storm)
Going on vacation
Opening a box marked 'candy' to have a spring loaded doll pop out at you
Being a hostage for a group of bank robbers
Getting ready to hit somebody
Smelling dead (old) fish
Awaking one day in the middle of a usually warm summer to find three inches of snow on the ground
Getting the gift you especially wanted for your birthday
Faced with the death of your mother or father
At a sister's or brother's wedding
Swallowing rancid butter
Biting into a rotten egg
Seeing your team lose a big game
About to fall into an abandoned mine shaft
Being falsely accused of a serious crime
Having the worst nightmare of your life
Having heard a horse speak
After your house had been robbed