THE EVALUATION OF AFFECT: THE EFFECT OF MENTAL RETARDATION ON SPEED AND ACCURACY OF SOCIAL COGNITION

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TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I

INTRODUCTION

During the past decade few issues have received more attention in the field of mental retardation than that of adaptive behavior. Prior to recent years educators and researchers had viewed mental retardation exclusively with regard to intelligence quotients (IQs) and placed the emphasis on academic training as the primary remedial measure. More recently professionals in the area of mental retardation, scientists, physicians, educators, and others have focused on issues such as differential causes, prevention, and treatment methods to allow for achievement of maximum potential in all areas of development, including general adaptive behavior. Conventional diagnostic techniques utilizing only IQ scores are now considered unsatisfactory and against state and federal regulations (PL 94-142) when used as the sole determinent of educational or intellectual classification. The American Association on Mental Deficiency (AAMD) defines mental retardation as, "significantly subaverage general intellectual functioning resulting in or associated with impairments in adaptive behavior and manifested during the

developmental period" (Grossman, 1983, p.11). Therefore, an individual must have an IQ well below average in addition to concurrent significant deficits in adaptive behavior to be classified as mentally retarded. The AAMD defines adaptive behavior as "the effectiveness or degree with which the individual meets the standards of personal independence and social responsibility expected of his age and cultural group" (Grossman, 1983, p. 157). The three factors of this behavior: 1) maturation, 2) learning, and/or 3) social adjustment, are of differential importance at different age levels as qualifiers of mental retardation. The present research is focused primarily on the aspect of social adjustment. Social cognition through the interpretation of affective facial expressions is only a small part of the repertoire of behaviors necessary for satisfactory social adjustment but is certainly a very integral and necessary component for adequate social fluency.

Differences in the retarded individual's social skills have been attributed to lowered intellectual functioning by one group of researchers (Lewin, 1935; Ellis, 1963; Luria, 1963; Spitz, 1963). Zigler (1961) holds an opposing view. This theorist views the retarded individual's social difficulties as stemming from environmental factors including the way they are treated by others due to their lowered intellectual abilities. Often over-protected, isolated from peers of average

intelligence, neglected, and provided with little stimulation, the retarded may lack the opportunities to experience and develop normally in social situations. It is generally felt by all concerned, however, that the retarded individual has a below average degree of social compentency regardless of etiology.

As will be demonstrated in the review of literature, facial expressions, at least with the basic emotions such as happiness and unhappiness, have been found to be crosscultural. The evaluation of affect, therefore, is an adaptive social skill necessary for adequate social fluency regardless of cultural factors or individual differences (except, of course, blindness).

The present study examines the skills of latency and accuracy in the evaluation of affect in two groups of mentally retarded adults and compares them to the findings of studies by Stanners and Hernon (1977) and Stanners, Byrd, and Gabriel (1985) in order to develop information for possible future utilization of in the evaluation of the retarded individual's adaptive skills.

CHAPTER II

REVIEW OF LITERATURE

Cross-cultural Aspects of Social Cognition

Assessing adaptive behavior is a very difficult task in general, but the complexity and difficulty is compounded when the individuals being evaluated are in their teens or older. There are few tests that are appropriate for this group which would enable the examiner to compare retarded adults with appropriate age norms, much less their own unique group. Most tests of adaptive behavior were developed with a greater emphasis on childhood or early development. Although the Vineland Social Maturity Scale (Doll, 1965) can be used with adults up to thirty years of age, it was developed with no handicapped individuals nor minorities in the standardization sample. Thus, it gives us a measure of a handicapped individual's adaptive behavior as compared to an average nonhandicapped Caucasian population.

One task or measure of social aptitude that does not appear to be affected by racial or cultural factors has been the recognition and classification of emotions. Facial expressions and their interpretations, at least with

the basic emotions such as happiness and sadness, appear to be cross-cultural (Ekman, Friesen & Ellsworth, 1972). Darwin (1872) was the first known individual to hypothesize that emotions are innate and universal. He proposed that each emotion has a universal corresponding set of facial behaviors associated with it. Klineberg (1940) expressed the opinion that certain types of expressive behaviors (probably the manifestations of happiness, fear, and sadness) are common to all societies of human beings. However, controversy over this issue continued for years with little quantitative research being done by either side of the argument. One of the first experiments comparing judgments of the same set of facial expressions across subjects of different racial groups was performed by Dickey and Knower (1941). They compared the judgments of a group of Mexican children and a group of American (Caucasian) children on the same set of posed photographs of facial expressions. The children chose among different emotion categories the one that best described a particular picture. The photographs were made in America for use with American subjects, yet the Mexican subjects were higher in agreement in chosing among the categories of emotion than were the children from the United States. In both cultures the same preselected expressions were judged as portraying the same emotion. The authors concluded the higher agreement among Mexican subjects could have been due to a greater use of gesturing and nonverbal communication in the

Mexican culture, thus sensitizing these children to this type of task in everyday interactions. Nonetheless, the results offered support for the theory of cross-cultural commonality of interpretation of basic facial expressions.

Some of the most impressive studies concerning the issue of cross-cultural commonality of facial behavior and interpretation were conducted by Ekman, Sorenson & Friesen (1969), Ekman & Friesen (1971), and Izard (1971, Chap. 10 & 11). The studies by Ekman et al. (1969 & 1971) involved subjects who were members of preliterate cultures in Borneo and New Guinea. The studies by Izard involved young adults from nine different nationalities. Izard (1971, Chap. 10) found no significant intercultural differences in emotion recognition responses for the five categories of emotion: interest, surprise, shame, distress, and enjoyment. The few minor intercultural differences found were explained by the author as possibly being the result of the fact that the photographs used and the specific emotion category definitions were of Western Caucasian origin. All cultural samples exceeded chance in recognizing the emotions represented in the thirty-two photographs while the average agreement of the subjects in categorizing the photos across all cultural groups was 78%. These studies (Ekman, et al. 1969 & 1971, and Izard, 1971, Chap. 10 & 11) all offered strong support for the innateness and universality of the expression and recognition of the fundamental emotions of happiness and sadness as well as others. If research with

primates may be considered as evidence for innateness, further support can be gained by the results of the works of Miller, Murphy and Mirsky (1959) who reported that rhesus monkeys could distinguish between fearful and calm monkey faces in photographs.

Developmental Aspects of Social Cognition

There are many different titles given to the social skills involved in the recognition and classification of emotions. Some of the titles found in the literature are: social perception, social inference, and social cognition. Social cognition will be used here as it seems to best characterize the skills under investigation.

The roots of social cognition appear early in infancy and focus primarily on the face and the infant's reaction to it. The first, and possibly the most important, interactions with the caretaker are felt by some to be the infant's foundation upon which all future social-emotional relationships and interactions are based. Izard (1971) suggested that the frown and the smile are the first means of communication. Spitz and Wolff (1946) demonstrated the effectiveness and ease in eliciting a social smile in infants by using visual stimuli consisting of two eyes and a mouth. Mutual gazing and eye-to-eye contact in the en face position (mother's face is aligned with the infants so that their eyes meet in the same vertical plane) play a critical role in establishing maternal-infant bonding and

attachment (Klaus & Kendell, 1976). Fantz (1963) has shown that four to five day old infants fixate on facelike patterns longer than on other oval patterns on which the facial elements are randomly arranged. Infants four months of age have been found to spend considerably more time focusing visually on a picture of a human face than another graphic design without facial content yet of even greater contrast (Haaf & Bell, 1967). According to the findings of Spitz & Wolff (1946), a human face does not produce a smile response in an infant up to two months of age. From approximately the second to the sixth months any human face in full frontal presentation will elicit a smiling response regardless of the expression on the face. After six months the infant becomes more discriminating and smiles only at familiar faces.

Developmentally, the advancement of social cognition appears to coincide with chronological age and cognitive development in the normal child. The child initially reacts only to the surface appearance of the face. As the child advances with age and cognitive development and begins to differentiate self from other(s) there is generally a progressive increase in the child's ability to understand that other people have feelings, thoughts, and percepts that are different and separate from his/her own. By preschool normal children show evidence of emerging understanding of how another person is feeling.

In a study by Borke (1971), involving the task of selecting a picture of a face to match what a person in a story was feeling, it was determined that three year olds were highly reliable in identifying happy situations. Identification of the feeling states involving fear, sadness, and anger was found to become increasingly well established between the ages of four and seven. Borke (1973) presented supporting cross-cultural evidence in a replication of her 1971 study with a group of Chinese and American subjects from various social classes. From the results of these studies Borke (1971;1973) hypothesized that empathy appears in very young children as a conscious awareness that others' feelings are different from their own. She further speculated that the development of empathy proceeds through a developmental hierarchy culminating at adolescence with the ability to "decenter" one's self and see the world through another person's eyes.

From Gates' (1923) study we find evidence that supports the notion that the ability to recognize and classify emotions from facial affect increases with age and also becomes more refined. A replication of Gates (1923) study by Kellogg and Eagleston (1931) resulted in strikingly similar results. The only difference in the latter study was that Black rather than Caucasian subjects were used. The photographs used in both studies were of a Caucasian woman. Both studies found the percentage of correct responses tended to increase with age from three to

fourteen years regardless of the emotional expression being judged. Also both studies demonstrated that the recognition of different emotions becomes possible at different ages. In the Kellogg and Eagleston (1931) study 75% of the subjects correctly identified laughter at four whereas a comparable percentage (74%) of correct responses was not achieved in the judgment of fear until age fourteen. Gates (1923) found laughter being correctly identified by a majority (>50%) of the children three years of age with the recognition of pain, anger, fear/horror, and surprise emerging sequentially at approximately two year intervals. In Gates' (1925) study, significant correlations were found between the emotion labeling scores and indices of mental age and social adjustment.

Relationship of Piagetian Stages of Cognitive Development and Social Cognition

In addition to chronological age and mental age, the progression of the development of skills involved in the evaluation of affect can be examined using a stage developmental model. This model purports that the individual develops in a stair-step fashion (as opposed to a linear fashion). Stage functioning is therefore related to age but there is not a one to one correlation. Changes in development are qualitative not quantitative. If the

behavior can be observed, the individual is assumed to be functioning in that stage. Furthermore, later development is dependent upon earlier development (epigenesis).

Piaget's theory of cognitive development is a stage developmental model. Piaget believed in a hierarchical structure of learning in which maturation, environment, social experience and equilibrium all contribute to development. He hypothesized that the affective and social aspects of development are structured in parallel progression to that of cognitive development. In fact, he initially believed, that cognitive development resulted primarily from the process of socialization involving taking another's point of view with a decline in egocentricism. Later, however, he theorized that children's inability to imagine perspectives other than their own results from their lack of advanced logical operations (Achenback, 1978). Clear-cut changes in perspective taking were found with increasing age. In both play and communication the child was found to progress from a singular and self-centered point of view to one which includes others and takes the others' needs into account, resulting in an interactive and responsive social exchange. During the years of Preoperational reasoning (generally 2-7 years) the child was found to be characteristically egocentric, lacking in flexibility of thought, the ability to comprehend reversibility, and the awareness of their own cognitive strategies or thought processes. In Concrete

Operations (generally 7-11 years), children become able to understand relations and sequences, to follow rules that are shared by adults, and to demonstrate an understanding that others have feelings, thoughts, opinions, and views other than their own. With some forms of perspective taking, the child at this stage is still unable to perceive the world through another's eyes.

To study perspective taking, Piaget and Inhelder (1948/1967) used a model of three mountains and asked children to become familiar with it. They then asked the children to choose from several pictures the one that represented the scene viewed by a doll located opposite the child. From this study the researchers concluded that advanced operational development was necessary for even rudimentary role-playing based upon their results that children prior to the age of nine had little success at this task.

Other studies have cast doubt on the significance of perspective-taking in relation to other cognitive skills. Kurdek (1977) found little correlation among three different types of perspective-taking including: assuming another person's perceptual perspective, assessing another's emotional state (affective perspective or social cognition) and judging another's knowledge (cognitive perspective).

If we assume that role-playing skills or the ability to "decenter" one's self is necessary to recognize and

classify emotions, then we could also assume that Borke's (1971;1973) and Gates' (1923) three and four year old subjects were capable of these advanced operations. Chandler and Greenspan (1972) indicated that, according to their findings, six year olds had extreme difficulty in adopting a point of view different from their own. They did feel, however, that younger children can accurately interpret certain facial expressions of emotion but can do this only in an egocentric way in that they make no distinction between their own view of the situation and possible alternative views. Therefore, according to Chandler and Greenspan (1972), the child below six years of age generally may understand that another person can hold a different perspective, but is unable to specify that perspective or merely assumes it to be similar to his own thoughts, feelings, or intentions. Cowan (1978) discussed this issue in terms of Piagetian cognitive stages rather than age. He explained that children in the early Intuitive substage of Preoperations (generally 4-5 years) become sensitive to special characteristics of others but are not able to interpret the world through another's eyes. They know about other points of view but are not yet able to take the role of another.

Perhaps what is at issue here is whether or not true empathy is involved in the recognition and classification of emotion. In a simple two-choice task such as a judgment of an expression as pleasant or unpleasant (happy or

unhappy), the subject, in order to respond correctly, must be able to assess the pattern of muscular configurations on the face in question and make the association between this affective state and the related feeling or emotion from social experience. The subject, however, would not necessarily need to be experiencing the same feeling or true empathy in order to infer the other's portrayed emotional state. This statement is valid if it is assumed that true empathy is operationally defined as requiring an affective response on the part of the observer or, in other words, a shared emotional experience mediated by understanding.

Feshbach and Roe (1968) investigated the relationship between understanding how another feels and actually experiencing the same feeling. After showing a series of slides depicting an emotional experience with an accompanying story, children ages six and seven years were asked, "How do you feel?". Half of the subjects were again presented the slides/stories and then asked how the child in the story was feeling. More children responded with the depicted emotion to the second question than to the first. The authors concluded that social understanding or cognitive empathy may occur independently of an affective experience or affective empathy. They also concluded that although cognitive empathy may be a necessary component or prerequisite for affective empathy, the reverse was not necessarily indicated.

This would explain why Borke's (1971;1973) and Gates' (1923) three and four year old subjects, who were presumably operating at or near the Preoperational level, were successful in identifying happy situations. Following this early level of social cognition comes a more sophisticated ability to recognize affectual expressions which are more complex and to which the individual has had less exposure culminating at adolescence with the ability for true empathy in the nonretarded individual. This progression parallels an individual's decline from egocentricity much the same as the ability to communicate and play cooperatively. Although these are approximate ages for the attainment of cognitive stages in the nonretarded individual, they are offered only as general guidelines and are not intended to imply a direct relationship.

Because viewing an individual with regard to the stage of cognitive reasoning is possible regardless of chronological or mental age by observing behavior, evaluating the ability of retarded individuals through this method may be preferable. Conventional evaluation methods generally involve a linear progression of abilities to which one is compared. In contrast, the theoretical framework set forth by Piaget presents cognitive development in a hierarchy of stages wherein behavior is observed and the results offer the evaluator assessment of not only existing skills but the knowledge of preexisting

skills from which the individual must have graduated in the epigenesis of cognitive development.

Inhelder (1943/1968) studied the development of Piagetian concept formation in retarded individuals and found the stages observed in the operational development of the nonretarded were also found with impressive regularity in the retarded population. She did, however, find that whereas a nonretarded child goes through successive stages readily moving easily from level to level, the retarded individual proceeds at a much slower rate. In addition, she found that even when the retarded individual attains a superior stage of cognitive reasoning his thoughts may continue to be colored by the stage or level of reasoning from which he has just advanced. Thus, the nonretarded child was found to move from stage to stage more quickly, more smoothly, and more completely. With the retarded individual there appears to be a gradual slowing down or, at times, a fixation at a particular level with no appreciable further advancement. Zigler (1969) also held this position but stated that this only applied to retarded individuals who were not organically impaired.

Milgram (1973) argues, however, that there are structural differences in the cognitive stages of retarded individuals as compared to nonretarded individuals. Not only does Milgram (1973) feel that there are traces of more primitive stages in the retarded individual's reasoning but that they are apt to give way to regression to those

earlier stages and, thus, employ less advanced reasoning than a nonretarded individual of the same mental age as measured on a standard intelligence test.

In a review of studies employing Piagetian conceptual measures, Weisz and Yeates (1981) distinguished between studies utilizing retarded subjects who were nonorganically impaired and those who were not screened for organicity. They found when only nonorganically impaired retarded individuals were used as subjects and matched with nonretarded subjects on mental age, the stage of Piagetian conceptual development or reasoning did not differ significantly. When retarded subjects were not screened for organicity, the retarded groups were significantly inferior to the nonretarded groups matched for mental age.

Social Cognition in Populations of Mentally Retarded Individuals

Although a number of studies have been conducted on recognition and classification of emotions with nonretarded adults and children, relatively few have been conducted with retarded subjects. Levy, Orr, and Rosenzweig (1960) investigated judgments of emotion from photographs by mental hospital patients and mentally retarded subjects. They compared these results to those obtained from a similar study with a group of college students conducted by Engen, Levy, and Schlosberg (1958). In the Levy, et al.

(1960) study, 66 retarded male subjects ranging in age from 15 to 31 years and in IQ from 50 to 79 with a mean of 62 were used as subjects. All were asked to make a judgment of expressions from photographs by rating each one on a one to nine point scale from pleasant to unpleasant. The terms "happy" and "unhappy" were used to replace the terms "pleasant" and "unpleasant" that were used in the Engen, et al. (1958) study to avoid possible semantic difficulties with the retarded subjects. A large thermometer-like symbol graduated from one to nine and anchored at the extremes with photographs representing "happy" and "unhappy" was used. Subjects were tested individually and were instructed to look at 48 pictures [the same as those used in the Engen, et al. (1958) study] one at a time and assign a number along the continuum which best represented their opinion of how the girl in the picture was feeling. Subjects' responses were silently recorded by the experimenter and no time restrictions were imposed. The results of the Levy, et al. (1960) study indicated essentially complete agreement among the three groups of subjects in their judgments. Product-moment correlations between the 48 median ratings by each group ranged between 0.97 and 0.99 suggesting apparent insensitivity of perception of emotions on the happiness-unhappiness dimension to intellectual and emotional factors, according to the authors. The greater range of judgments of the two clinical groups relative to the college group suggested

that pathology may act so as to accentuate individual differences in social perception. The college students, however, were tested in groups and were not provided with a graphic representation of the rating scale. They viewed the same photographs projected on a screen and wrote down their ratings of one to nine representing the continuum from "pleasant" to "unpleasant".

A later study by Iscoe and McCann (1965) compared perception of emotion along a continuum by older and younger institutionalized retarded subjects. Subjects were matched on mental age but differed by an average of twenty years in length of institutionalization. These subjects were asked to arrange nine moon-faced drawings portraying affect from very happy to very unhappy. A subject's response was scored in two manners. First, the response was classified as: a) no errors, b) one face misplaced, or c) two or more faces misplaced. Secondly, the amount of displacement involved in each error was scored yielding a measure of deviation. The results utilizing both scoring methods indicated the performance of the younger subjects was significantly superior to that of the older subjects. The results of scoring methods one and two were $\chi^2=28.7$ ($df=2$, $p<.001$), and $t=6.58$, ($p<.001$), respectively. The authors concluded that extensive time in an institutional setting may extinguish the need for or the ability to discriminate human emotional reactions, particularly human facial expressions. These results would tend to support

Zigler's (1961) theory regarding the adverse effects of institutionalization on adaptive functioning in social skills.

One group of researchers (Edmonson, deJung, Leland & Leach, 1974) have concentrated on social competence in the mentally retarded. This group of investigators developed the Test of Social Inference (TSI) which discriminates quite well between retarded and nonretarded samples. The TSI involves a series of pictorial representations of social events similar in format to the Thematic Apperception Test. The subject is presented with a card which depicts a common social situation and is then asked to explain what is happening in the picture. A score is gathered following several standard probes. Fifteen year-old educably mentally retarded (EMR) public school students with a mean IQ of 68 were found to score approximately one standard deviation lower on the TSI than lower-class nonretarded age peers. This EMR group was found to score approximately one standard deviation above a group of institutionalized EMR subjects with a mean IQ of 60 (Edmonson et al., 1974).

An unpublished study by Simpson and Izard (1971) revealed a very low correlation (r=.12) between retarded subjects' scores on the Peabody Picture Vocabulary Test (PPVT) and their scores on an emotion recognition task. In this study institutionalized retarded subjects ranging in age from ten to forty years were given the PPVT in order to

obtain a mental age for each. The PPVT results indicated the subjects ranged in mental age from four years, five months to nine years, eight months. Subjects then performed an emotion recognition task in which they were asked to choose one of three photographs which represented a given emotion. The experimenter requested that the subject, "Show me the one who is..." followed by the key emotion term in one of nine categories (e.g., "happy", "sad", "afraid", "mad", etc.) (Simpson and Izard, 1971, p. 2). What constituted a correct response was predetermined by adult norms. A subject's score was the number of correct responses.

In the same study the retarded subjects' scores on the emotion recognition task were also compared with those of a nonretarded group matched on mental age. A t-test for matched groups indicated that the nonretarded group performed significantly better than the retarded group (t =3.4, df=32, $p < .01$). The authors did not discuss the nonretarded subjects. It is doubtful that they too were institutionalized and, if not, the effects of institutionalization were not controlled. This may have accounted in part for the significantly better performance of the nonretarded subjects. In fact, the same emotion recognition task used in this study was administered to a cross-cultural population in an earlier study by Izard (1971) and revealed that scores on this task were lower among culturally deprived children.

Further support for the detrimental effects of institutionalization on the evaluation of affect is found in a paper presented at the Gatlinberg Conference on Research in Mental Retardation in March of 1976 by Iacobbo and Brooks. The results of their study indicated that, when asked to choose the appropriate facial expression for a blank-faced character depicted in an emotion arousing situation, non-institutionalized retarded subjects performed significantly better than institutionalized retarded subjects. Nonretarded subjects performed better than either group.

A dissertation by Maria Iacobbo (1977) examined the relationship of age, institutionalization, and intelligence (IQ) with the development of the recognition of emotions with and without situational clues. Two tasks were used in this study. The first task required the subject to choose from three photographs of facial expressions the one that portrayed the same emotion as a single photograph of a facial expression presented separately but simultaneously. The experimenter then said, "Which one of these (pointing to the triad of photos) feels the same as this person (pointing to the single photo)?" (Iacobbo, 1977, p. 13). The subject responded by pointing to his/her choice of photos. The second task involved contextual clues. This task required the subject to choose a facial expression (from a triad of photos) that would be most appropriate for a blank-faced character in a drawing portraying an emotion

arousing situation (e.g., a person with a lion chasing her/him). The instructions given by the experimenter for this task were, "Which one of these (pointing to the triad of photos) feels the same as this person (pointing to the blank-faced person in the drawing)?" (Iacobbo, 1977, p. 13). Response behavior was the same as in the first task. Subjects' mean number of correct responses (agreement with nonretarded adult raters) was analyzed. Results indicated that retarded subjects were, in general, less accurate than nonretarded subjects in identifying the appropriate facial expressions with or without contextual clues. Furthermore, the retarded subjects' ability to recognize from facial expressions that two people feel the same does not appear to improve with advancement of chronological age, while the ability to recognize the appropriate facial expression within situational context does improve with age advancement during childhood but drops off in adulthood. The nonretarded subjects showed this age effect on both tasks with or without contextual clues. The author stated that the retarded subjects were not only poorer discriminators but were also slower. This was not actually measured but was based on the observational report of the testers that the retarded subjects took longer to complete the tasks.

Harris (1977) examined the ability to recognize facial expressions and to match photographs of facial expressions to story vignettes in mildly retarded adults

and adults of normal intelligence who were enrolled in a vocational rehabilitation program. Results indicated that the retarded adults were significantly less accurate in recognizing facial expressions than chronological-age matched nonretarded subjects. Follow-up data collected on social-vocational adjustment, however, indicated that the ability to recognize emotions was not significantly related to job success.

The Relationship of Intellectual Functioning and Social Cognition

According to a review by Tagiuri (1969) there is abundant evidence that the ability to judge emotions by facial expressions in still photographs is correlated with intelligence. Gates (1923), Kellogg and Eagleston (1931), and Weisgerber (1956) were cited as finding moderate correlations. None of these studies included retarded individuals. The correlations found were between the results in intelligence test/ratings and task performance. As outlined in the research reviewed earlier in this paper, Simpson & Izard (1971), Iacobbo (1977), and Harris (1977) found that when retarded subjects' performance was compared to that of nonretarded individuals on a variety of tasks involving the evaluation of affect, the latter group was consistantly found to be superior in the accuracy of their judgments. The only exception was the Levy et al. (1960) study which indicated correlations between median ratings

of the three groups ranging between 0.97 and 0.99, indicating no significant differences. They did find a greater range of judgments were made by the mental hospital patients and the mentally retarded subjects.

Studies Involving Latency in Social Cognition

Although the literature on accuracy of social cognition in which retarded subjects were utilized is scarce, the literature appears to be barren of studies of speed of evaluation of affect involving retarded individuals. In fact, the only studies investigating speed of recognition of emotions that were found were an unpublished study by Stanners and Hernon (1977) and a study by Stanners, Byrd and Gabriel (1985).

College students were used in the Stanners and Hernon (1977) study which assessed the amount of time required to classify colored slides of posed faces as either pleasant or unpleasant. Their data were analyzed according to both the sex of face in the slide and the sex of the subject evaluating the facial expressions. Average decision times were well under three quarters of a second with a statistically significant tendency to evaluate female faces faster than male faces for pleasant expressions. It was also found that male subjects had significantly shorter response latencies when evaluating female faces than male faces, whereas, female subjects responded equally fast to

faces of either sex. In an analysis of variance on the error data two significant main effects were found. Subjects made a significantly greater number of errors in the evaluation of male faces than on female faces. When the data were combined over sex of subject and sex of face, it was found that subjects were significantly more accurate in the evaluation of unpleasant expressions than on pleasant expressions. When asked to make the decision as quickly as possible, accuracy levels were close to those achieved when allowed several seconds to make the decision. In order to compare subjects' speed of evaluations the authors compared latency on a decision task in which subjects were asked to classify circles and squares into their appropriate categories to the latency on the evaluation of facial expressions. Results indicated it took the subjects only 300 milliseconds longer on the average to categorize a facial expression as compared to a circle or square. A slightly shorter time was found in evaluating facial expressions than that required in making a word-nonword decision. These results indicate that in the nonretarded young adult, the evaluation of facial expression is a very quick and surprisingly accurate phenomenon. No trade off of accuracy for speed was evidenced suggesting that in everyday situations we are effortlessly making numerous evaluations of those with whom we interact as quickly as their expressions appear.

In the Stanners, et al. (1985) study subjects were asked to classify slides of posed facial expressions into the categories of pleasant or unpleasant in virtually the same manner as in the Stanners and Hernon (1977) study with both latency and accuracy of response under investigation. Sex of subject and sex of face in the slides were variables examined in the analysis of this study in addition to age (early or late adolescence) and mode of expression. The subjects in this study were 40 seventh graders and 40 college freshmen. Latency and accuracy data were gathered also on a circle/square classification task which were used as a covariate to control for age related differences in perceptual-motor skills. Results indicated no age effect when latencies were adjusted for differences in perceptual-motor skills between the two groups. A significant effect in response latency was found, however, between the two age groups on the circle/square covariate task, suggesting that differences in speed of latency between the two groups is attributable to general perceptual-motor factors rather than the actual process of evaluating affectual information. As in the Stanners and Hernon (1977) study, the results indicated that subjects evaluated female faces with pleasant expressions more quickly than any other combination of type of expression and sex of face. The group mean latency for female subjects for the evaluation of female faces was found to be faster than any other combination of sex of subject and sex

of face. Since the procedure for the evaluation of the faces was basically the same as that for the circle/square task, the authors compared the mean latencies for the two tasks and found a difference of only 243 msec. The means for the circle/square task and for the facial expression task were 536 msec. and 779 msec., respectively. This difference of only approximately one quarter of a second was offered as an estimate of the time required for the actual process of evaluating affect in the pleasant/unpleasant mode. The subjects were also quite accurate in the evaluation of affect with the average error rate of only 0.078. With regard to the accuracy data, subjects were found to make significantly fewer errors in evaluating female faces than male faces and in evaluating unpleasant expressions than pleasant expressions.

Reaction Time: The Relationship Between Intelligence and Latency

Because of the absence of any known literature on the speed of evaluation of affect involving mentally retarded subjects [other than the observation made by testers in the Iacobbo (1977) study], reaction times, in general, were considered. According to a review article on reaction time and mental retardation by Baumeister and Kellas (1968), speed and intelligence have been found to be positively related at least within a certain range of ability in virtually every study comparing nonretarded and retarded

individuals on reaction time finding the latter markedly slower. In addition, an impoverished preparatory set, more resistance to change, and greater variability of response were indicated with retarded subjects when compared to nonretarded subjects. Mental ability and speed appear related even within the retarded population (Berkson, 1960; Ellis & Sloan, 1957; Pascal, 1953). Sensory-motor deficits, however have been found to confound the results of reaction time studies involving retarded subjects.

Hypotheses Based on the Review of Literature

What effect does the degree of mental retardation have on the speed and accuracy of the evaluation of affect? Does this skill improve with advancement of Piagetian stage of cognitive reasoning?

On the basis of the literature reviewed, retarded subjects have been found to be less accurate in recognizing or classifying facial expressions than the nonretarded. Additionally, the retarded have slower, more variable reaction times in general as compared to nonretarded subjects. Thus, it was hypothesized that the greater the degree of retardation, the less accurate and slower their social cognition skills would be. However, this difference, if found, could be solely due to perceptual-motor deficits. With regard to Piagetian stage of cognitive reasoning, the lower the concept stage, the

slower and less accurate the retarded subject should be on the task of evaluation of affect. Differential effects on speed and accuracy were predicted.

The effects of sex of subject, sex of face in the photograph as well as emotion portrayed in the photograph were hypothesized to remain the same as those found in the Stanners and Hernon (1977) and the Stanners, et al. (1985) studies.

CHAPTER III

METHOD

Subjects. The subjects were 64 Caucasian individuals from three sheltered workshops for mentally retarded individuals in southern Louisiana. There were 32 males and 32 females between the ages of 16 and 45. These individuals had been evaluated by means of at least one standardized intelligence test and a measure of adaptive behavior.

On the basis on these test results the subjects had been classified as functioning in either the mild level of mental retardation or the moderate level of mental retardation (32 mild and 32 moderate) at the judgment of the private practictioner performing the evaluation. (A review of these evaluations revealed that classification of mental retardation was analagous to classification by IQ in virtually every case.) Of the 64 subjects 18 (or 28%) were found to be left handed while the remaining 46 were right handed. Subjects were from middle to upper class income homes, thus the factor of cultural retardation was considered improbable. Although most were of adult age, parent/guardian permission was obtained for the subject's participation in the study. Potential

subjects with previous histories of institutionalization or identified physical handicaps which would interfere with vision, hearing, or gross motor skills (e.g., cerebral palsy, legal blindness, deafness, etc.) were excluded. In exchange for participation in the study each subject received a soft drink or the equivalent amount of money.

Materials. A set of 104 35 mm color slides developed by Stanners and Hernon (1977) and judged by a group of Oklahoma State University undergraduate students as pleasant or unpleasant were employed in this study. In addition to judging the slides of faces as pleasant or unpleasant the college students rated each expression on a scale from one to five as representing the portrayed expression. This set of slides included 52 different faces utilizing both the pleasant and unpleasant poses for each face. These pairs of slides were chosen from an original set of 180 slides as having the highest level of judge agreement with pose instructions and as having a relatively similar average rating (one to five) across categories. Of the 52 different faces in the 104 slides chosen, 26 were of female faces and 26 were of male faces. A set of 20 practice slides were developed with correct response being that expression (pleasant or unpleasant) that the person in the slide was asked to portray.

A set of 38 geometric figures (19 squares and 19 circles) on black and white 35 mm slides were employed.

Of these eight were utilized as practice slides while the remaining 20 were utilized in obtaining latency and accuracy scores to serve as covariate measures.

In the final portion of the experiment a set of ten pictures of cats and dogs (five dogs, five cats) in full frontal view were utilized. Also, a set of 25 drawings of dogs cut out of posterboard were developed for use by means of a reduction method of copying the drawing by even increments producing drawings that were consistent in form but graduated in size (2"x 2" to 6"x 6") to represent five size categories. The drawings were also graduated in color shading from white to black with three shades of gray to represent five shade categories. In other words, there were five sizes of each shade category. A matrix partitioned into 25 equal parts (7"x 7" each) was drawn on posterboard.

Procedure - Collection of Latency and Error Data.

The data collected in the first portion of the present study was organized by subject pairs with each of the pair tested individually. Each of the pair was presented the slides of 52 individuals with 13 slides in each of the four categories (male face pleasant, males face unpleasant, female face pleasant, female face unpleasant). No subject viewed an individual face more than once. In other words, if a particular unpleasant facial expression was presented to the first subject of the pair, the corresponding pleasant facial expression of the same face

was presented to the second subject of the pair. Pairs were composed of subjects with the same intellectual classification and of the same sex. This pair arrangement was employed in order to avoid two potential confounds. The first was having completely different faces associated with different expressions. In the present design, the same faces were involved in the comparison of data for pleasant vs. unpleasant faces. The second potential confound of having a subject encounter the same face twice during the course of the latency trials was controlled for in that no subject viewed a particular face more than once.

The subject was seated at a small table approximately 42 inches from a Plexiglass screen to conform with Hall's (1974) "personal but not close" interpersonal distance. By means of a solenoid operated shutter-projector the faces were back-projected onto the screen to an image height of approximately ten inches. Two button-type switches were located within arm length on the table top. Each subject was made familiar with the procedure for responding through a demonstration wherein the experimenter explained that when a "happy" (pleasant) face was seen the button on the side with the moon-face drawing of a happy  face should be pushed and when a "unhappy" (unpleasant) face was seen the button on the side with the drawing of an unhappy  face should be pushed. The terms "happy" and "unhappy" were used in place of

"pleasant" or "unpleasant" in order to insure the subjects' fullest understanding of the terms and direction of response. The drawings were placed beside the corresponding buttons prior to the subject's entrance to the room. The direction of response was held constant for each individual subject but balanced between subjects. The instructions were recorded and indicated that the subject should attend closely to the screen and keep her/his hands on the buttons in order to be ready to respond. The experimenter than activated a solenoid operated shutter by a thumb switch. A face was presented on the screen one second later. A digital millisecond clock started with the presentation of the face and stopped with the subject's response at which time the latency was automatically printed. Both latency and accuracy of response were recorded by the experimenter. The subject was given 76 trials (including 24 practice trials) with the slides of faces. Another set of tape-recorded instructions was then presented in which the subject was informed that the next set of slides would involve making a decision between circles and squares. The signs next to the button switches were changed to  and  to indicate the correct response categories. The direction of response was again balanced over subjects within the mildly-retarded and moderately-retarded groups. Following a demonstration, each subject then received four circles and four squares presented randomly as practice

trials followed by fifteen more circles and fifteen more squares randomly ordered. Latency and accuracy of response were recorded in the same manner as the slides of faces.

Procedure - Piagetian Classification Tasks. The final portion of the experimental session consisted of three tasks in which the subject was asked to categorize and seriate pictures of cats and dogs. In Task I the subject was instructed to sort ten pictures of cats and dogs into two piles representing their respective categories. A subject passing this task (i.e., classifying all pictures into categories of cats and dogs) was considered to be at least at the Preconceptual stage of cognitive reasoning. In Task II the subject was asked what the cats and dogs were separately (correct response "cats" and "dogs") and collectively (correct response "animals" or "pets"). If the subject responded correctly the experimenter then asked if there were more cats than animals/pets (using the subject's own term for the collective state). A subject passing this task (responding that there were fewer cats than animals/pets) was considered to be at least at the Early Intuitive stage of cognitive reasoning. In Task III the subject was presented with 25 drawings of dogs cut out of posterboard. The drawings were of five sizes (numbered I-V below) and five shades (numbered 1-5 below). In demonstration the experimenter then arranged the first column of the five

darkest dogs in order on the matrix from the smallest to the largest and the first row of the smallest dogs from the darkest to the lightest (see below) while the subject was watching. The subject was then asked to complete the matrix involving the different sizes and shades of dogs as presented in Figure 1.

FIGURE 1

Dark to Light

Small, Dark	I1	I2	I3	I4	I5	Small, Light
	II1	.	.	.	.	
	III1	.	.	.	.	
	IV1	.	.	.	.	
Large, Dark	V1	.	.	.	.	Large, Light

On this task subjects in the Early Intuitive stage focused either on the size or shade of the dogs and failed to correctly complete the series in either dimension. Subjects in the Late Intuitive stage arranged the pictures correctly by size or by shading but not by both. The subject who produced a matrix of five columns increasing in size and five rows increasing in color shade intensity were considered to be at least at the Concrete Operations stage. Subjects were then classified into the three categories of Preconceptual, Intuitive and Concrete based on their highest level of correct response. (These Piagetian tasks were modeled after tasks developed by Inhelder and Piaget, 1959, as presented in Cowan, 1978). Latency and accuracy (error data) on the evaluation of affect task were

then analyzed in terms of the subject's Piagetian stage of cognitive reasoning.

CHAPTER IV

RESULTS

Design I - Latency Data

The latency data were first analyzed by way of a 2x2x2x2 analysis of variance, then by analysis of covariance. Gender of subject and classification of mental retardation (class) were the between subjects factors, whereas, sex of sender and type of expression were within factors. Based on previous studies which have found speed and intelligence positively related (Baumeister and Kellas, 1968), mildly retarded subjects were predicted to have significantly shorter latencies in the evaluation of affect than moderately retarded subjects. Because perceptual-motor functioning differences influencing general reaction time were suspected between the two classification groups, the covariate circle/square task was employed to factor out these differences between the groups in the analysis of covariance for latency. Only correct responses were used to calculate the means for these analyses.

As was predicted the results indicated a main effect for class with the mildly retarded group having significantly shorter latencies both before,

$F(1, 60) = 11.91$, $p < .001$, and after $F(1, 59) = 4.14$, $p < .05$, the introduction of the covariate. In this analysis of covariance for latency, the main effect of sex of sender was also found to be significant, $F(1, 60) = 7.27$, $p < .01$ with subjects responding significantly faster to female faces than to male faces. In addition, a significant four way interaction for class, gender of subject, type of expression, and sex of sender was found, $F(1, 119) = 4.50$, $p < .05$. The analysis of variance summary table for latency data with the covariate for between subject factors is presented in Table 1 - Appendix B.

The presence of the four way interaction indicated that the main effects were not general over all combinations of variables. Therefore, mean comparisons were made by class and by sex of sender with Dunn's multiple comparison procedure (Kirk, 1968) in order to find out for which combinations of variables the main effects were significant. A breakdown of the mean latencies and the results of the Dunn's multiple comparisons procedure by class and by sex of sender are presented in Tables 2 and 3 - Appendix B.

In the case of class only two pairs of means compared were significantly different, $d = 1.71$, $p < .05$. Mildly and moderately retarded female subjects ($M = 1.701$, $M = 0.431$, sec. respectively) were found to differ significantly in the evaluation of male pleasant

expressions. Mildly and moderately retarded male subjects ($\underline{M}$ = 1.755, $\underline{M}$ = 3.503, sec. respectively) were found to differ significantly in the evaluation of male unpleasant faces. Mildly retarded subjects had significantly shorter latencies in both cases.

In the case of sex of sender only one pair of means compared differed significantly, $\underline{d}$ = .764, $\underline{p} < .01$. Moderately retarded females had significantly shorter latencies in the evaluation of female pleasant faces ($\underline{M}$ = 2.585 sec.) than in the evaluation of male pleasant faces ($\underline{M}$ = 3.431 sec.).

Therefore, the effects of class and sex of sender may be more realistically described as "marginal effects" as defined by Cramer and Appelbaum (1980). These authors explain that this effect is the average effect of the experimental treatment (or state of nature) averaged over all occurrences of that treatment rather than an effect which is common and consistent irrespective of what other treatment or states of nature with which it may be combined. According to these authors, when an interaction is present there is no consistent effect of the treatment or main effect.

Based on the results of the Stanners and Hernon (1977) and Stanners, et al. (1985) studies a significant interaction of sex of sender and type of expression was expected. This was not found to hold true for the present investigation.

An analysis of variance on subjects' latency responses to the circle-square task (presented in Appendix A) did reveal a significant main effect for class, $F(1, 60) = 7.61$, $p < .01$ with mildly retarded subjects having significantly shorter latencies. The analysis of variance summary table is presented in Table 4 - Appendix B.

Design II - Accuracy Data

Error scores for each subject were calculated by summing over errors within each of the four categories of slides. These means are presented in Appendix A. A 2x2x2x2 analysis of variance was performed with gender of subject and classification of mental retardation (class) as between subject factors and sex of sender and type of expression as within subject factors. Three of the four possible main effects were predicted to be significant. The analysis of variance summary table is presented in Table 5 - Appendix B. An analysis of covariance, utilizing subjects' error count data to the circle/square task as the covariate, was performed for the accuracy data. None of the main effects for between subjects factors were found to be significant.

Although there was no study found comparing the accuracy of the evaluation of affect between groups of mentally retarded individuals who differed in level or classification of mental retardation, Simpson and Izard (1971) found a low correlation ($r = .12$) between retarded

subjects' scores on the Peabody Picture Vocabulary Test and their scores on an emotion recognition task. However, several studies comparing retarded subjects with nonretarded subjects indicated that the more intelligent subjects tend to be more accurate (Harris, 1977; Iacobbo, 1977; Simpson & Izard, 1977). Several studies also found the ability to judge emotions in facial expressions to be correlated with intelligence among nonretarded subjects (Gates, 1923; Kellogg & Eagleston, 1931; Weisgerber, 1956). On the basis of these findings, mildly retarded subjects were predicted to be significantly more accurate (fewer errors) than moderately retarded subjects in the evaluation of affect. This did not hold true for subjects in the present investigation. Although the mean number of errors for mildly retarded subjects was less than that for moderately retarded subjects the difference was not significant supporting the Simpson and Izard (1971) results.

The subjects' overall accuracy was predicted to be significantly higher (lower error rate) for unpleasant expressions than for pleasant expressions and for female faces than for male faces as found both in the Stanners and Hernon (1977) study and the Stanners, et al. (1985) study. Both of these main effects were found to be significant as predicted. For type of expression a significant result of $F(1, 60) = 17.95$, $p < .001$ was found with error rate for pleasant expressions greater than for

unpleasant expressions. For sex of sender a significant result of $F(1, 60) = 4.29$, $p < .05$ was found with error rate for for male faces greater than for female faces.

A significant interaction of sex of sender and type of expression was also found, again qualifying the main effects. Using Dunn's multiple comparisons procedure (Kirk, 1968), the mean differences within the interaction were investigated. With mean error counts as follows: male pleasant ($M = 3.55$), female pleasant ($M = 2.45$), male unpleasant ($M = 1.31$), and female unpleasant ($M = 1.58$), all mean differences were significant, $d = .837$, $p < .05$ or $d = 1.02$, $p < .01$ as presented in Table 6 - Appendix B, except that for male unpleasant and female unpleasant expressions. Thus, the error rate between male and female pleasant faces differed significantly, whereas, the error rate for male and female unpleasant faces differed minimumly.

Thus, the main effect for type of expression holds true while the main effect for sex of sender would again be more adequately be described as a "marginal effect" as defined by Cramer and Appelbaum (1980) for the subjects in the present investigation. This interaction was found neither in the Stanners and Hernon (1977) study nor in the Stanners (1985) study with nonretarded subjects.

An analysis of variance on the error data for the circle/square task was planned but not performed due to the fact that of the total of 1920 possible responses to

this task, subjects made a total of only 21 errors or had an error rate of 1.07 %. Correspondingly, on the face error data, out of the 3328 possible correct responses, subjects made 697 errors or had an error rate of 20.9%. In the Stanners (1985) study nonretarded subjects had an error rate of 1.7 % on the circle/square task and an error rate of 7.75 % on the face task.

Designs III & IV - Face Latency & Accuracy by Piagetian Stage

The highest level of performance on a series of Piagetian classification and seriation tasks was the basis for placement of subjects into one of the three stage categories. Of the 64 subjects nine were found to be in the Preconceptual stage, 46 were found to be in the Intuitive stage, and nine were found to be in the Concrete stage.

Dunn's multiple comparison procedure (Kirk, 1968) was performed to examine mean differences in latency responses in the evaluation of affect. These results, as well as a breakdown for mean latencies by Piagetian stage group, are presented in Table 7 - Appendix B. Only correct responses were analyzed. Means for the Preconceptual, Intuitive, and Concrete stage groups were 4.015, 2.113, and 1.551, sec. respectively. Results indicated that mean difference between the Concrete and Preconceptual stage groups was significant, $\underline{d} = 1.77$, $\underline{p} < .01$. The mean difference

between for the Intuitive and the Preconceptual stage groups was also significant, $\underline{d}$ = 2.289, $\underline{p} < .01$. Subjects in the Preconceptual stage had significantly longer latencies than those in either the Concrete or Intuitive stage.

Dunn's multiple comparison procedure (Kirk, 1968) was also performed to examine mean differences in accuracy (error count) in the evaluation of affect. These results, as well as a breakdown for mean error count by Piagetian stage group, are presented in Table 8 - Appendix B. Means for error count for the Preconceptual, Intuitive, and Concrete stage groups were 16.889, 10.326, and 7.778, respectively. Results indicated that the mean difference between the Concrete and Preconceptual stage groups was significant, $\underline{d}$ = 6.484, $\underline{p} < .01$. The difference between the means for the Intuitive and the Preconceptual groups was also significant $\underline{d}$ = 5.013, $\underline{p} < .01$. Subjects in the Preconceptual stage made significantly more errors than those in either the Concrete or Intuitive stage. These significant differences are consistent with those found for latency. Only the Concrete and Intuitive stage groups were not found to differ significantly on either measure.

Dunn's multiple comparison procedure (Kirk, 1968) for the circle/square data revealed no significant differences for latency or accuracy between the Piagetian stage groups.

CHAPTER V

DISCUSSION

In the analysis of variance for the latency data on the circle/square task classification of mental retardation (class) was found to be significant. These results indicated that on this simple measure, utilized as a covariate to represent as much as possible pure perceptual-motor effects, mildly retarded subjects had significantly shorter latencies than moderately retarded subjects.

The results of the analysis of variance for the face latency data with or without the covariate indicated that mildly retarded subjects had significantly shorter latencies than moderately retarded subjects. Therefore, mildly retarded subjects were faster both in general perceptual-motor performance and in the evaluation of affect than moderately retarded subjects.

The results of the analysis of variance for the face latency data also indicated a main effect for the sex of sender with latencies in response to female faces being significantly shorter than in response to male faces.

A four-way interaction for class, gender of subject, type of expression, and sex of sender was found. Dunn's

multiple comparison procedure (Kirk, 1968) was performed in order to investigate the mean differences of class and sex of sender for different combinations of the other variables.

The results of the Dunn's multiple comparison procedure by class revealed only two pairs of means to be significantly different. Mildly and moderately retarded female subjects were found to differ significantly in the evaluation of male pleasant expressions. Mildly and moderately retarded male subjects were found to differ significantly in the evaluation of male unpleasant faces. Mildly retarded subjects had significantly shorter latencies in both cases.

The results of the Dunn's multiple comparison procedure by sex of sender revealed that only one pair of means compared differed significantly. Moderately retarded females were found to have significantly shorter latencies in the evaluation of female pleasant faces than male pleasant faces.

Because the mean differences for all pairs of means examined did not differ significantly for results as analyzed by class or by sex of face, these main effects may be more adequately described as "marginal effects" as defined by Cramer and Appelbaum (1980). This effect, according to the authors, is due to an averaging rather than consistent significant differences between mean pairs.

These results offer the following possible explanations:

The class effect is two-fold. First, there is a general perceptual-motor effect of class on the latencies to the circle/square task. Secondly, in regard to the mean pairs that were found to differ signficantly, there is a social information processing effect of class in the evaluation of affect even when the circle/square latencies were used as a covariate with the face latency data. For these two pairs of means that differed significantly, even when differences in general perceptual-motor skills are accounted for mildly retarded subjects were found to evaluate affect significantly faster than the moderately retarded subjects. These results may suggest some type of difference in the social experiences of the subjects due to sex and/or level of retardation. For example, moderately retarded females may have less opportunity to interact in a postive way with males than mildly retarded females and, consequently, take longer to evaluate the unfamiliar male pleasant expressions. The results regarding mild vs. moderate male subjects in response to male unpleasant faces are somewhat puzzling. It may be that mildly retarded males have had more exposure to male unpleasant faces than moderately retarded males. One possible explanation for this could be that moderately retarded males could be more passive and perhaps do not

demonstrate acting-out behavior calling for unpleasant expressions on the part of other males as frequently as do mildly retarded males.

It is interesting that the main effect of class did not hold statistically true in regard to all pairs of latency means for the face data considering that speed of response has been correlated in general with intelligence. In an investigation involving retarded subjects Brabad and Deary (1982) found a negative correlation between IQ and inspection time (defined by Nettelbeck (1985) as the minimum exposure duration at which discrimination in an easy task is virtually error free). These authors have proposed that individuals capable of taking in information more rapidly have a greater inherent potential to take advantage of opportunities encountered. Also, with greater degrees of retardation subjects may have more pronounced attentional deficits and, as a result, would be expected to take longer to attend, focus and make a decision on both evaluation of shapes and evaluation of affect. Although this was the case with the evaluation of the circle/square data it did not hold true throughout the latency data for the evaluation of affect. Although the latency means for the moderately retarded subjects were consistently longer than those of the mildly retarded subjects, this difference was not found to be statistically significant except in the two mean pairs

discussed previously. The evaluation of affect, therefore, must be a skill that is not as greatly influenced by level of intellectual functioning as other skills involving inspection time. Perhaps the studies of inspection time did not account for general perceptual-motor differences if responses on the part of the subject involved a motor element (e.g., pressing a button, pointing, etc.).

The sex of sender effect was found to hold true only for only one pair of means examined. Moderately retarded females were found to have significantly shorter latencies in the evaluation of female pleasant faces than male pleasant faces. These results suggest that moderately retarded females may have more exposure to female pleasant faces than male pleasant faces. This could possibly be the result of parental protectiveness of their moderately retarded daughters by limiting their pleasant interactions with males. Since moderately retarded females were also found to have significantly longer latencies than mildly retarded females in the evaluation of male pleasant faces, these results suggest that moderately retarded females lack a familiarity or exposure to pleasant male faces or, perhaps, demonstrated some type of blocking on these responses. This combination of findings would further substantiate some type of social learning phenomenon with the moderately retarded females such as the possible fear of or

protection from postive overtures from males as proposed earlier.

The Stanners and Hernon (1977) and Stanners, et al. (1985) studies found a significant interaction for sex of sender and type of expression on the face latency data in which the female pleasant combination was evaluated more quickly than any other combination. This interaction was not found with the retarded subjects in the present study even though the same set of slides was utilized in virtually the same manner. Stanners, et al. (1985) suggested that there might be differential exposure to female pleasant expressions due to the predominanace of female caretakers. For the subjects in the present investigation, of the four combinations of sex of sender and type of expression, the mean latency for female pleasant faces was less (faster) than any other combination but not significantly so. Possibly, retarded children do not receive the same degree of exposure to female pleasant expressions as their nonretarded counterparts.

Mean latencies for subjects in the present study were considerably longer in duration than those found in the Stanners and Hernon (1977) and Stanners, et al. (1985) studies. The mean latencies for the evaluation of affect for the Stanners, et al. (1985) subjects and the subjects in the present study were 2.348 and 0.779, sec. respectively or approximately three times longer for the

mentally retarded subjects. For the circle/square task, the same difference is noted with mean latencies for the Stanners, et al. (1985) subjects and the subjects in the present study, 1.326 and 0.536, sec. respectively or more than twice as long for the mentally retarded subjects. Differences between the mean for face latency and the mean for circle/square latency were 0.243 sec. for the Stanners, et al. (1985) group and 1.022 sec. for the subjects in the present investigation.

Thus, the mentally retarded subjects appear to be slower at both tasks and to have a much greater mean difference for latencies between the two tasks. These differences are supportive of literature on inspection time, wherein mildly retarded subjects have demonstrated a marked deficiency when compared to nonretarded subjects (Nettelbeck, 1985). The processes indicated by inspection time, Nettelbeck (1985) explains, have not been clearly identified but have been demonstrated to involve aspects of attention. Because facial expressions in everyday life are very brief and fleeting, this would leave the nonretarded at a distinct advantage over the retarded in that the nonretarded may be able to make the evaluation more often prior to a change in expression more often than the retarded subject and, thus, be more interpersonally fluent with regard to evaluation of affect.

The analysis of variance on the number of errors or disagreements with judged facial expressions revealed no between subjects main effects. The fact that an effect was found wherein mildly retarded subjects had shorter latencies (significantly shorter in two of the pairs of means compared) but were not found to be significantly more accurate than moderately retarded subjects suggests that if given enough time moderately retarded subjects may be essentially as proficient in the evaluation of affect as mildly retarded subjects. In everyday life, however, the freezing or holding of facial expressions as in the still photographs employed in this study is not realistic. Thus, the moderately retarded are left at a distinct disadvantage.

When the accuracy of responses were examined for the face data, main effects were found for expression and sex of face in the same directions as in the Stanners and Hernon (1977) study and the Stanners, et al. (1985) studies. Subjects were significantly more accurate (lower error rate) in the evaluation of unpleasant expressions than pleasant and of female faces than male faces.

There was, however, a significant interaction effect of sex of sender and type of expression not found in either the Stanners and Hernon (1977) study or the Stanners, et al. (1985) study which indicated the number of subjects' errors differed significantly for sex of

sender for pleasant expressions but not for unpleasant expressions. Because of this significant interaction effect mean comparisons were made by Dunn's (Kirk, 1968) multiple comparison procedure. Of the four pairs of means compared, all pairs except one differed significantly. Subjects made significantly more errors in response to male pleasant faces than to female pleasant faces ($p < .01$). They also made significantly more errors on male pleasant faces than on male unpleasant faces ($p < .01$) and on female pleasant faces than on female unpleasant faces ($p < .05$). The only mean difference that was not significant was that for male unpleasant and female unpleasant faces. Thus, the difference in sex of sender (male vs. female) is highly significant for pleasant expressions but not significant for unpleasant expressions and is, therefore, more adequately described as a "marginal effect" (Cramer & Appelbaum, 1980). The main effect of type of expression did hold true regardless of sex of sender.

These results may indicate that retarded individuals receive less exposure to pleasant faces, particularly male pleasant face, than unpleasant faces. One might interpret this to be attributed to the negative social stigma produced by mental retardation resulting in more exposure to unpleasant expressions than pleasant in interactions with others but the fact that the Stanners and Hernon (1977) and Stanners, et al. (1985) studies

found the same main effect tends to negate that interpretation. They did not find the same interaction effect, however, which may indicate that the subjects in the present study may have had less exposure to male pleasant faces than the subjects in the Stanners, et al. (1985) study as the result of a social discrimination factor or may have developed a sensitivity to male unpleasant faces.

Mentally retarded individuals are often sheltered and treated more childlike throughout their life (Sternlicht and Deutsch, 1972) with the maternal figure figuring predominately in their social world. As Stanners, et al. (1985) noted, even with nonretarded individuals, specialized learning experiences may occur in the individuals's interactions with the primary caretaker who is generally female with more exposure to female faces-both pleasant and unpleasant, than to male faces. Perhaps, with the retarded population, because of this specialized learning combined with a sensitivity to unpleasant expressions in general, the evaluation of male pleasant faces may be the only combination of sex of sender and type of expression with which the person has not either had a good deal of exposure or developed a particular sensitivity to.

Another line of thought on this matter is the possibility that, as noted by Stanners, et al. (1985), female senders may produce more easily interpreted facial

expressions. It has been found that female senders express emotions in a more vivid or exaggerated fashion than male senders (Schartz, Ahern & Brown, 1979; Schartz, Brown & Ahern, 1980). It is likely that the more vivid or exaggerated the facial expression is, the easier it would be to evaluate with fewer errors.

Considering the error rates for subjects from the present study as compared to the nonretarded subjects from the Stanners, et al. (1985) study, it is interesting to note that the retarded subjects and the nonretarded subjects had essentially the same error rate on the circle/square task (1.09% and 1.47%, respectively). The retarded subjects actually performed with slightly greater accuracy. On the face data, however, the retarded subjects had many more errors with an error rate of 20.9% as compared to the nonretarded subjects' from the Stanners, et al. (1985) study of 7.75%. Since in this investigation subjects were allowed the amount of time needed to make these decisions, these results suggest a specific deficiency in the processing of information involved in the evaluation of affect on the part of retarded individuals, irrespective of the amount of time needed to process the information, as compared to nonretarded individuals.

In regard to the latency and accuracy (error count) on the face data by Piagetian stage group, Dunn's mean comparison procedure (Kirk, 1968) results for both sets

of data revealed that the Preconceptual group performed significantly more poorly (more errors and longer mean latencies) than either the Concrete stage group or the Intutitive stage group. In neither analysis did the Intuitive stage group and the Concrete stage group differ significantly from each other. Dunn's multiple comparison procedure for the circle-square data revealed no significant differences between the Piagetian stage groups.

Since Piagetian theory is a stage model developed on the basis of epigenesis, we can assume that those subjects in the Preconceptual stage group had not developed or refined the ability to evaluate affect to the degree attained by those in the later stages of Intuitive or Concrete operations. Individuals in the Preconceptual stage are truly egocentric with regard to ability to decenter completely in perspective taking as in the Piaget and Inhelder (1948) three-mountains task. They are also limited in terms of advanced classification skills. They are able to perform the simple classification of circles and squares but may need more refined skills in the evaluation of affect.

Borke's (1971 and 1973) nonretarded three year old subjects, presumably in the Preconceptual stage, were able to match appropriate facial expression to situations which produce happiness or sadness at a rate considerably greater than chance by selecting one of four stylized

faces depicting the emotions of happy, afraid, sad, or angry. Since photographs (such as those used in the current investigation) are likely to contain much more complex information than stylized drawings, this may account for the difference in results. Gates (1923), however, employed photographs of a Caucasian woman and found laughter being identified by a majority of the three year old nonretarded subjects. Perhaps since the affect portrayed was laughter vs. a more modulated pleasant or happy expression, the affect was more exaggerated or distinguishable in the Gates (1923) study.

In the literature reviewed the only other interpersonal compentency skill found that involved mentally retarded subjects viewed in terms of Piagetian theorectical concepts was that of role-taking skills. Affleck (1975) found a significant relationship between role-taking ability and the success with which mildly retarded young adults resolved a number of everyday social conflicts presented in structured role-playing situations. This investigation involved Feffer's (1959) Role-Taking Task which is a specially designed projective-type instrument in which the subject is asked a number of questions from the perspective of characters portrayed in pictures. Affleck (1975) found that role-taking ability is highly correlated with the tendency to recognize the other's feelings and intents during social encounters with the mildly retarded

subjects. Feffer and Gourevitch (1960) found various stages of role-taking development, culminating with the appearance of social decentration at about the age of nine years (corresponding roughly with the emergence of Late Concrete operations) in nonretarded children. From these studies one could deduce that as the retarded subjects approached Concrete operations their skills at role-taking and, consequently, their ability to recognize others' feelings improved. Also, Feffer (1970) reported that role-taking development was associated with increasing mental age rather than chronological age in a sample of mentally retarded children. The current results on accuracy do not support Feffer's (1970) findings with regard to significantly greater ability (fewer errors) of the higher functioning group (mild) as compared to the lower functioning group (moderate).

The current results do support Borke's (1973) hypothesis that the ability to recognize emotions in others emerges prior to the ability to decenter and take another's perspective to the degree involved in the three-mountains task (Piaget & Inhelder, 1948). By the time an individual reaches the Intuitive stage a sense of self has emerged (Cowan, 1978). Although still egocentric in terms of perspective taking, they have developed an awareness that others have percepts and feelings separate from their own. Based on current findings, this separation of self/other in the Intuitive

stage, with regard to self experiencing and other experiencing, may be related to the ability to recognize facial expressions of emotions in a more refined manner than individuals in the Preconceptual stage of cognitive development and prior to the ability to decenter which does not emerge until mid- or late-Concrete operations. Whatever cognitive operational ability is required in the evaluation of affect, the current results demonstrate that it is present by the Intuitive stage and continues in the Concrete stage as expected in a stage developmental model.

The results of this study suggest that in the evaluation of affect retarded individuals are both considerably slower and less accurate than nonretarded individuals. Within the mentally retarded population there are differential effects of class/gender of receiver (or subject) and sex of sender/type of expression variable combinations when responses are viewed by classification of mental retardation and sex of subject. The skills involved in latency of evaluation of affect are more influenced by classification of mental retardation than the skills involved in accuracy of evaluation of affect. When viewed by Piagetian stage of cognitive reasoning the skills of accuracy and latency of evaluation of affect are clearly demarkated with both showing significant advancements beginning in the Intuitive stage.

Thus, in terms of utilization of these findings for screening or assessment of adaptive behavior social skills, this task could be instrumental in differentiating retarded from nonretarded social functioning. It could also be utilized within the retarded population if subjects were viewed in terms of Piagetian stage functioning. Suggestions for future research include evaluation of the effect of social skill training in the evaluation of affect for retarded individuals and examination of the possible social learning phenomenona related to the sex of sender and sex of receiver in the moderately retarded group.

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APPENDIX A

BREAKDOWN - MEAN ERROR COUNT

BREAKDOWN - MEAN ERROR COUNT

(S) CLASS	(S) GENDER	EXPRESSION	SEX OF SENDER	MEAN
Mild	Female	Pleasant	Female	2.375
Mild	Female	Pleasant	Male	3.750
Mild	Female	Unpleasant	Female	.875
Mild	Female	Unpleasant	Male	.687
Mild	Male	Pleasant	Female	2.187
Mild	Male	Pleasant	Male	3.312
Mild	Male	Unpleasant	Female	1.688
Mild	Male	Unpleasant	Male	1.188
Moderate	Female	Pleasant	Female	2.063
Moderate	Female	Pleasant	Male	3.688
Moderate	Female	Unpleasant	Female	2.000
Moderate	Female	Unpleasant	Male	1.750
Moderate	Male	Pleasant	Female	3.188
Moderate	Male	Pleasant	Male	3.438
Moderate	Male	Unpleasant	Female	1.750
Moderate	Male	Unpleasant	Male	1.625

APPENDIX B

SUMMARY TABLES

Table 1

Analysis of Variance - Latency Data - With Covariate

Source	SS	DF	MS	F	
Constant	84.137	1	84.137	14.940	
Regression	249.413	1	249.413	44.288	
G	1.289	1	1.289	0.229	
C	23.336	1	23.336	4.144	**
GC	8.589	1	8.589	1.525	
G (e)	332.267	59	5.632		
E	0.045	1	0.045	0.047	
GE	2.054	1	2.054	2.163	
CE	0.017	1	0.017	0.018	
GCE	1.007	1	1.007	1.060	
E (e)	56.982	60	0.950		
S	3.033	1	3.033	7.275	*
GS	0.654	1	0.654	1.569	
CS	0.589	1	0.589	1.414	
GCS	0.346	1	0.346	0.829	
S (e)	25.018	60	0.417		
ES	0.837	1	0.837	1.926	
GES	0.680	1	0.680	1.566	
CES	0.077	1	0.077	0.177	
GCES	1.957	1	1.957	4.501	**
ES (e)	26.081	60	0.435		
TOTAL	734.271	255			

Note: G = Gender of Subject, C = Classification of Mental Retardation, E = Expression, S = Sex of Sender

* $p < .01$ ** $p < .05$

Table 2

Dunn's Multiple Comparison Procedure

Mean Differences - Latency - Four Way Interaction (Class, Gender of Subject, Type of Expression, Sex of Sender) by Class

	M1	M2	M3	M4	M5	M6	M7	M8
M 9	1.111							
M10		1.73 **						
M11			1.748 **					
M12				1.166				
M13					1.485			
M14						1.109		
M15							1.285	
M16								1.108

** $\underline{d}$ = 1.709, $\underline{p} < .05$

	Class:	Senders' Sex	Expression	(S)s' Gender	Mean
M1	= Mild	Male	Pleasant	Male	1.879
M2	= Mild	Male	Pleasant	Female	1.701
M3	= Mild	Male	Unpleasant	Male	1.755
M4	= Mild	Male	Unpleasant	Female	1.613
M5	= Mild	Female	Pleasant	Male	1.564
M6	= Mild	Female	Pleasant	Female	1.475
M7	= Mild	Female	Unpleasant	Male	1.881
M8	= Mild	Female	Unpleasant	Female	1.541
M9	= Moderate	Male	Pleasant	Male	2.990
M10	= Moderate	Male	Pleasant	Female	3.431
M11	= Moderate	Male	Unpleasant	Male	3.503
M12	= Moderate	Male	Unpleasant	Female	2.779
M13	= Moderate	Female	Pleasant	Male	3.049
M14	= Moderate	Female	Pleasant	Female	2.584
M15	= Moderate	Female	Unpleasant	Male	3.166
M16	= Moderate	Female	Unpleasant	Female	2.649

Table 3

Dunn's Multiple Comparison Procedure

Mean Differences - Latency - Four Way Interaction (Class, Gender of Subject, Type of Expression, Sex of Sender) by Sex of Face

	M1	M2	M3	M4	M5	M6	M7	M8
M 9	0.315							
M10		0.126						
M11			0.226					
M12				0.072				
M13					0.059			
M14						0.337		
M15							0.846 *	
M16								0.130

* $\underline{d}$ = .764, $\underline{p} < .01$

	Senders' Sex:	Class	(S)s' Gender	Expression	Mean
M1	Male	Mild	Male	Pleasant	1.879
M2	Male	Mild	Male	Unpleasant	1.755
M3	Male	Mild	Female	Pleasant	1.701
M4	Male	Mild	Female	Unpleasant	1.613
M5	Male	Moderate	Male	Pleasant	2.990
M6	Male	Moderate	Male	Unpleasant	3.503
M7	Male	Moderate	Female	Pleasant	3.431
M8	Male	Moderate	Female	Unpleasant	2.779
M9	Female	Mild	Male	Pleasant	1.564
M10	Female	Mild	Male	Unpleasant	1.881
M11	Female	Mild	Female	Pleasant	1.475
M12	Female	Mild	Female	Unpleasant	1.541
M13	Female	Moderate	Male	Pleasant	3.049
M14	Female	Moderate	Male	Unpleasant	3.166
M15	Female	Moderate	Female	Pleasant	2.585
M16	Female	Moderate	Female	Unpleasant	2.649

Table 4

Analysis of Variance - Latency - Circle/Square Task Data

Source	SS	df	MS	F
Sex	2.361	1	2.361	2.427
Class	7.404	1	7.404	7.612 *
Sex by Class	2.894	1	2.894	2.975
Within	58.364	60	0.973	
Total	70.923	63		

* $p < .01$

Table 5

Analysis of Variance - Accuracy Data (Error Count)

Source	SS	DF	MS	F	
Constant	1264.691	1	1264.691	189.091	
G	1.410	1	1.410	0.211	
C	11.816	1	11.816	1.767	
GC	0.035	1	0.035	0.005	
G (e)	401.297	60	6.688		
E	154.691	1	154.691	17.947	*
GE	0.473	1	0.473	0.055	
CE	3.754	1	3.754	0.435	
GCE	10.160	1	10.160	1.179	
E (e)	517.172	60	8.619		
S	10.973	1	10.973	4.291	**
GS	3.285	1	3.285	1.285	
CS	0.098	1	0.098	0.038	
GCS	0.473	1	0.473	0.185	
S (e)	153.422	60	2.557		
ES	29.566	1	29.566	9.322	*
GES	2.066	1	2.066	0.651	
CES	0.879	1	0.879	0.277	
GCES	2.441	1	2.441	0.770	
ES (e)	190.297	60	3.172		
TOTAL	1494.309	255			

Note: G = Gender of Subject, C = Classification of Mental Retardation, E = Expression, S = Sex of Sender

* $p < .01$, ** $p < .05$

Table 6

Dunn's Mean Comparison Procedure

Mean Differences - Accuracy - Two Way Interaction
(Sex of Sender, Type of Expression)

	M1	M2	M3	M4
M1	-	1.094*	2.235*	1.969*
M2		-	1.141*	0.875**
M3			-	0.266
M4				-

* $\underline{d} = 1.020$, $\underline{p} < .01$
** $\underline{\bar{d}} = 0.837$, $\underline{\bar{p}} < .05$

M1 = Male Pleasant = 3.547
M2 = Female Pleasant = 2.453
M3 = Male Unpleasant = 1.312
M4 = Female Unpleasant = 1.578

Table 7

Dunn's Multiple Comparison Procedure

Mean Differences - Latency - By Piagetian Stage Group

	M1	M2	M3
M1	-	1.902 *	2.464 **
M2		-	.562
M3			-

* $\underline{d}$ = 1.798, $\underline{p} < .01$
** $\underline{d}$ = 2.289, $\underline{p} < .01$

M1 = Preconceptual = 4.015 sec. n = 9
M2 = Intuitive = 2.113 sec. n = 46
M3 = Concrete = 1.551 sec. n = 9

Table 8

Dunn's Multiple Comparison Procedure

Mean Differences - Accuracy (Error Count)
By Piagetian Stage Group

	M1	M2	M3
M1	-	6.56 *	9.11 **
M2		-	2.55
M3			-

* $\underline{d} = 5.013$, $\underline{p} < .01$
** $\underline{\bar{d}} = 6.484$, $\underline{\bar{p}} < .01$

M1 = Preconceptual = 16.889 n = 9
M2 = Intuitive = 10.326 n = 46
M3 = Concrete = 7.778 n = 9

VITA

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