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## Age Trends in Children's Responses to Inconsistent Messages and Their Relationship to Intellectual Level and Social Competence

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210  
AGE TRENDS IN CHILDREN'S RESPONSES TO  
INCONSISTENT MESSAGES AND THEIR RELATIONSHIP  
TO INTELLECTUAL LEVEL AND SOCIAL COMPETENCE

by  
Frank Lani

A Thesis Submitted to the Faculty of the Graduate School  
of Loyola University of Chicago in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Arts

October

1977

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## VITA

The author, Frank Lani, was born December 27, 1949 in New York City. He is the son of Frank B. Lani and Frances (Grimaldi) Lani.

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# TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS . . . . .	ii
VITA . . . . .	iii
LIST OF TABLES . . . . .	vi
LIST OF FIGURES . . . . .	ix
REVIEW OF LITERATURE AND HYPOTHESES . . . . .	1
Social Sensitivity in Children . . . . .	1
Two-Channel Communication . . . . .	4
Inconsistent Messages and the Double-Bind Theory . . . . .	5
The Child's Response to Inconsistent Messages . . . . .	9
Hypotheses . . . . .	12
METHOD . . . . .	15
Subjects . . . . .	15
Measures . . . . .	15
Development of the measuring instrument . . . . .	15
Scaling the test stimuli . . . . .	17
Scoring systems . . . . .	18
Other measures . . . . .	25
Procedure . . . . .	26
RESULTS . . . . .	29
Preliminary Analyses . . . . .	29
Tests of Hypotheses . . . . .	33
Hypothesis A . . . . .	33
Hypothesis B . . . . .	44
Hypothesis C . . . . .	45
Hypothesis D . . . . .	46
Hypothesis E . . . . .	49
Hypothesis F . . . . .	51
Hypothesis G . . . . .	55
Hypothesis H . . . . .	57
Hypothesis I . . . . .	60
Hypothesis J . . . . .	70
Hypothesis K . . . . .	70
Hypothesis L . . . . .	75
DISCUSSION . . . . .	78

	Page
Development of Emotional Perception . . . . .	78
Inconsistent Messages and the Double-Bind Theory. . . . .	79
One-Channel Messages . . . . .	82
Methodological Considerations . . . . .	82
Shift from Concrete to Formal Operations. . . . .	84
Degree of Channel Discrepancy . . . . .	89
The Process of Discounting . . . . .	90
Joking and Sarcastic Messages . . . . .	92
Sex Differences . . . . .	93
Relationships Between the Abilities to Decode the Four Types of Messages . . . . .	94
Accuracy and Intelligence . . . . .	95
Accuracy and Social Competence . . . . .	97
Accuracy and Peer Nominations . . . . .	99
Suggestions for Future Research . . . . .	100
SUMMARY . . . . .	102
REFERENCES . . . . .	104
APPENDIX A: Mean Ratings and Variances of the Test Stimuli by Grade . . . . .	108
Facial Stimuli . . . . .	109
Verbal Stimuli . . . . .	110
Consistent and Inconsistent Stimuli. . . . .	111
APPENDIX B: Mean Response Latencies for the Test Stimuli by Grade . . . . .	112
Facial Stimuli . . . . .	113
Verbal Stimuli . . . . .	114
Consistent and Inconsistent Stimuli. . . . .	115
APPENDIX C: Fels Child Behavior Scales . . . . .	116

# LIST OF TABLES

Table	Page
1. Scaled Scores, Variances, and Descriptions of the Verbal Stimuli . . . . .	19
2. Scaled Scores, Variances, and Descriptions of the Facial Stimuli . . . . .	20
3. Scaled Scores, Variances, and Degree of Channel Discrepancy of the Two-Channel Stimuli . . . . .	21
4. Mean Verbal IQ Scores (Peabody Picture Vocabulary Test) by Grade and Sex . . . . .	30
5. Mean Nonverbal Intelligence Scaled Scores (Picture Arrangement Test) by Grade and Sex . . . . .	31
6. Mean Intelligence Test Scores by Examiner . . . . .	34
7. Mean Deviation Scores According to Grade, Sex, and Type of Message . . . . .	35
8. Summary of the Repeated Measures Analysis of Variance of Mean Deviation Scores, with Sex, Grade, and Message (2x4x4) as Variables . . . . .	36
9. Mean Response Latencies According to Grade, Sex, and Type of Message . . . . .	40
10. Summary of the Repeated Measures Analysis of Variance of Mean Response Latencies, with Sex, Grade, and Message (2x4x4) as Variables . . . . .	41
11. <u>t</u> Test Values for the Differences Between Mean Deviation Scores of the Different Age Groups . . . . .	43

Table	Page
12. Correlated Groups $t$ Test Values for the Comparison of Mean Deviation Scores of Inconsistent Messages with Facial, Verbal, and Consistent Messages . . . . .	47
13. Correlated Groups $t$ Test Values for the Comparison of Mean Response Latencies of Inconsistent Messages with Facial, Verbal, and Consistent Messages . . . . .	48
14. Mean Weights (Percentage Contribution of Facial Channel) According to Grade and Sex . . . . .	50
15. Summary of the Analysis of Variance of Weights with Sex and Grade (2x4) as Variables . . . . .	52
16. Number of Subjects Who Relied More Heavily on One Channel to Decode Two-Channel Inconsistent Messages . . . . .	54
17. Number of Joking and Sarcastic Messages Rated More Positively or Negatively by Second, Fifth, and Eighth Graders Than by Adults . . . . .	56
18. Total Instances in Which the Facial or Verbal Components of an Inconsistent Message was Discounted According to Grade . . . . .	58
19. Number of Instances of Discounting as a Function of Grade and High and Low Degrees of Inconsistency . . . . .	59
20. Mean Deviation Scores According to Grade and Degree of Discrepancy . . . . .	61
21. Summary of the Repeated Measures Analysis of Variance of Deviation Scores with Grade and Degree of Discrepancy (4x4) as Variables . . . . .	62



Table	Page
22. Correlated Groups $t$ Test Values for the Comparison of Mean Deviation Scores at Various Degrees of Discrepancy .	63
23. Mean Response Latencies According to Grade and Degree of Discrepancy . . . . .	66
24. Summary of the Repeated Measures Analysis of Variance of Response Latencies with Grade and Degree of Discrepancy (3x4) as Variables . . . . .	68
25. Correlated Groups $t$ Test Values for the Comparison of Mean Deviation Scores at Various Degrees of Discrepancy .	69
26. Intercorrelations of Deviation Scores for the Four Types of Messages . . . . .	71
27. Correlation Matrix of Accuracy Scores and Weights with Verbal and Nonverbal Intelligence . . . . .	73
28. Correlation Matrix of Accuracy Scores and Weights with Peer Nominations and Teacher Ratings of Social Performance . . . . .	74
29. Correlation Matrix of Intelligence with Peer Nominations and Teacher Ratings of Social Performance . . . . .	76

# LIST OF FIGURES

Figure		Page
1.	Mean Deviation Scores According to Grade and Type of Message . . . . .	37
2.	Age Trends in Deviation Scores . . . . .	38
3.	Mean Response Latency (in Seconds) According to Grade and Type of Message . . . . .	41
4.	Weights of Facial and Verbal Components of Inconsistent Messages as a Function of Grade Level . . . . .	53
5.	Mean Deviation Scores According to Grade and Degree of Channel Discrepancy . . . . .	62
6.	Mean Response Latencies According to Grade and Degree of Channel Discrepancy . . . . .	67

## REVIEW OF LITERATURE AND HYPOTHESES

Since the publication of Darwin's The Expression of the Emotions in Man and Animals in 1872, a number of investigators have been interested in the transmission and reception of emotional messages. Although the earliest workers in this area found little agreement between the emotions transmitted and those perceived (Feleky, 1914), more recent studies have demonstrated that very reliable judgments concerning the feelings and attitudes of another can indeed be made for both verbal and nonverbal channels of communication (Davitz, 1964).

### Social Sensitivity in Children

Although the adult subject has been studied extensively, investigations dealing with the development of social sensitivity in childhood have been limited in number. In one of these investigations, undertaken in Germany by Ahrens (1959), it was found that by the fifth month of life most infants have begun to develop perceptual discriminations of distinct features of facial expressions. It was further discovered that by the eighth month of life, the development of stranger anxiety and the child's playful reactions to various expressions seems to indicate that at about this age the infant is truly aware of the expressions of others and is capable of reacting to them in appropriate ways (Izard, 1971).

Despite this very early development of social sensitivity, Piaget

has maintained that the child remains essentially egocentric and uninterested in the emotions of others until about the seventh year. However, using a task which was easier and clearer than those used by previous investigators, Savitsky and Izard (1970) have shown that by the fifth year, children prefer the emotional expressions of others to their purely ornamental characteristics (i.e., hats). They found, further, that this preference develops independently of competence at recognizing emotions and may, therefore, be regarded as a genuine interest in emotional stimuli. Similarly, Borke (1971) demonstrated that children were able to recognize the emotions portrayed in tape recorded stories by as early as the fourth year, and that happiness was recognized by the age of three.

Carrying her investigation beyond the facial and verbal (content) transmission of emotion, Dimitrovsky (1964) employed messages carried purely in the vocal channel (e.g., tone of voice, inflection, and other variations in pitch and stress which are independent of content alone). She presented a standard paragraph with variations of the vocal component and found that children are able to recognize these "paralinguistic" cues to emotion at an early age (about five years).

The studies cited above, as well as others (e.g., Izard, Young, Cuceloglu, Khatri, & Tanaka, 1971), have challenged Piaget's view that the young child is primarily egocentric and they indicate that very early in life children are interested in and familiar with the emotional messages that are being generated around them. It should not be inferred, however, that since the very young child can recognize the overt feelings of others he is also able to meaningfully comprehend

the cause and effect relationships of the reasons for social actions. The young child may be sensitive to social stimuli, but he generally lacks the ability to recognize and interpret the motives prominent in social interactions. This phase in development is referred to by Selman (1973) as Stage 0.

Another line of investigation into the child's social sensitivity is exemplified by Rothenberg (1970). She correlated sensitivity scores, obtained in response to four tape-recorded stories, with measures of interpersonal competence, intrapersonal comfort, and intellectual level. Rothenberg found that social sensitivity was positively related to IQ, ratings of leadership and friendliness, and level of school adjustment. It was not at all related to self-concept, sex, ordinal position in the family, size of family, or father's occupation.

In general, studies such as those by Rothenberg and the other investigators cited above have demonstrated: (a) that sensitivity to emotional cues begins at an early age and develops fairly steadily until leveling off by early adolescence; (b) that this sensitivity is correlated with IQ (about .50); and (c) that certain emotions, such as happiness and sadness, are more basic and more easily recognized than such emotions as surprise and contempt. However, this field of study still contains many issues that are as yet unclear or unresolved: (a) various investigators have found widely differing orders of difficulty for the different emotions; (b) there has been conflicting evidence regarding whether or not girls are more socially sensitive than boys; (c) the influence of social status and other environmental

factors has not been adequately established; and (d) whether social sensitivity is instrumental in the development of effective social performance has not yet been conclusively demonstrated.

### Two-Channel Communication

Levitt (1964) has shown that adults are able to communicate emotional meanings more effectively through facial than through vocal cues. Little research has investigated whether the same relationship applies to children or whether children are differentially sensitive to emotional messages conveyed through the verbal (content), vocal (tone of voice), or facial channel.

The earliest such investigation was conducted by Gates (1927). She presented children with both facial and vocal messages and, though her original data have been lost, she found evidence that facial cues proved easier for children to identify than did vocal cues. Peterson, Danner, and Flavell (1972) studied children's responses to verbal and nonverbal feedback concerning their failure to accurately describe nonsense figures. They found that facial expressions were largely ineffective with both 4- and 7-year-olds, but that verbal feedback was correctly interpreted. The authors could offer no explanation as to the failure of their subjects to respond to the facial cues, and observed that these cues were simply discounted as if they were irrelevant. Although this study seems to indicate that children are more sensitive to verbal than to facial components of communication, this finding is not conclusive since the design of the Peterson et al. study confounded comprehension of the messages with the child's performance of appropriate responses. On the basis of these two studies,

however, one might tentatively hypothesize that young children are initially most sensitive to verbal, then facial, then vocal channels of communication.

### Inconsistent Messages and the Double-Bind Theory

The study of communication in two channels was expanded with the investigation of a new variable--inconsistency between the meanings conveyed in each of the channels. Some of the earliest studies of how inconsistent messages are decoded have been reported by Frijda (1969). In a preliminary experiment Frijda presented to adult subjects a number of photographs of emotional expressions in conjunction with a short description of the context in which these expressions might have occurred. Half of the pairings of the expressive cues with the contextual cues were consistent and half were inconsistent. Frijda determined cue dominance by using a measure of the relative shift of the two-channel ratings away from the preratings of either the expressive or contextual cues. It was found that when expression and content were inconsistent, expression was the dominant factor in determining the meaning attributed to the total message. In fact, the relative shift away from the preratings of the contextual cues was nearly three times as large as that away from the expression preratings.

This study was further refined with the work of Warries (1963) and Jaanus (1966). In the Warries experiment it was found that the expressive cues shifted the final rating 86% of the distance between both preratings away from the preratings of the contextual cues. Similarly, Jaanus found the relative shift measure to be 78% in favor of the expressive cues. Thus, these three studies have shown that in

those situations where expressive and contextual cues are not in agreement, adults find expressive cues to be clearly dominant over the context in the determination of the meaning of the overall situation. That is, for example, "if someone behaves happily or sadly when circumstances make us expect otherwise, we believe his behavior rather than our expectations" (Frijda, 1969, p. 197).

Studies of the process whereby inconsistent messages are decoded were also conducted by Mehrabian and Wiener (1967) and Mehrabian and Ferris (1967). These studies were designed to provide a test of the validity of the double-bind theory of schizophrenia. The double-bind was proposed by Bateson, Jackson, Haley, and Weakland (1956) as a mechanism which might play an important role in the etiology of schizophrenia. According to this theory, a double bind may be defined in part as the simultaneous communication of inconsistent messages in two or more channels. Such a situation might occur when a parent asks a child for a kiss while nonverbally conveying an attitude of uninterest or rejection. Such messages are presumed to be very difficult to decipher. It is hypothesized that when double-bind messages are employed habitually, they tend to foster a kind of "damned if you do, damned if you don't" apprehension which may be conducive to the development of a disordered pattern of thought and communication (i.e., schizophrenia).

Mehrabian and Wiener (1967) undertook to determine whether emotional messages which are inconsistent in two channels are indeed difficult to decipher. Their college age subjects evaluated the degree of positive or negative affect expressed in purely verbal, purely vocal,



and combined verbal-vocal messages. The combined messages were at times consistent and at times inconsistent across the two channels. It was found that when the verbal and vocal channels were inconsistent the effect of the vocal component was five times greater than the effect of the verbal component. That is, if a communication was judged to be positive in verbal affect and negative in vocal affect, when the two channels were combined the overall message would be judged to be negative in affect (with the verbal component tending to move the combined judgment only slightly toward the positive pole). The authors concluded that such a result runs contrary to the view that inconsistent messages are difficult to decipher. Due to the disproportionate weight attributed to the vocal rather than the verbal component, a person faced with an inconsistent message across these two channels should be able to easily assess its overall meaning by simply discounting the verbal message and basing his evaluation purely on the message conveyed in the vocal channel.

Mehrabian and Ferris (1967) replicated the above study using facial and vocal channels of communication. In this case it was found that the facial component received approximately one-and-one-half times the weight attributed to the vocal component. Combining the results of these two studies, Mehrabian derived the following regression equation:  $\text{Attitude} = .07 \text{ Verbal Attitude} + .38 \text{ Vocal Attitude} + .55 \text{ Facial Attitude}$ . Again he concluded that this finding failed to support the double-bind theory, "people do quite readily understand the true meaning when the verbal and nonverbal parts of a message are inconsistent--they rely on the nonverbal part and make their judgment

accordingly" (Mehrabian, 1971, p. 54).

Argyle, Salter, Nicholson, Williams, and Burgess (1970) expanded upon the work of Mehrabian by presenting three-channel communications via videotape (a more naturalistic method) and by investigating the transmission of dominant-submissive attitudes rather than positive-negative affect. Argyle et al. found regression weights for the facial, vocal, and verbal channels which were very similar to those found by Mehrabian.

Taking another line in the investigation of the double-bind theory, some investigators (Bailey, 1972; Berger, 1965) have attempted to determine whether inconsistent messages are indeed prevalent in the family interactions of schizophrenics. These studies have been hampered by the retrospective nature of the investigations and have found only limited evidence that schizophrenics have received more inconsistent messages than normal or other disturbed subjects.

Beakel and Mehrabian (1969) rated segments of interactions between disturbed adolescents and their parents and found no significant differences in the inconsistency of communications from parents of the more or less disturbed groups. However, it was found that parents of the more disturbed adolescents exhibited significantly more negative attitudes toward their children, a finding which led to the conclusion that, "the study of overall quality of positive-negative attitude rather than the incongruity in attitude communication, may be a more helpful avenue for the investigation of the relationship between communication patterns and psychopathology" (p. 130).

The work of a number of investigators, and particularly that of

Mehrabian, has consistently failed to support the double-bind theory of schizophrenia. This can be attributed in part to, "confusion about its precise definition, the diversity of interactional phenomena to which it has been applied, and the complex methodological task of attempting to measure a subtle phenomenon occurring selectively in the interaction between at least two individuals communicating simultaneously on different levels" (Schuham, 1967, p. 409). However, Mehrabian has also failed to find support for the double-bind theory in part because he has failed to provide an adequate test for it. He has concluded that adults can very easily decipher the meaning of inconsistent messages, but the foundations of schizophrenia are presumably laid in childhood in the communications between parents and their children. An important area for study, then, would be the investigation of the child's ability to decipher inconsistent messages and how this ability changes over time. The present study, as well as those cited below, is concerned at least in part with answering these questions.

#### The Child's Response to Inconsistent Messages

Bugenthal, Kaswan, Love, and Fox (1970) endeavored to study age trends and child-parent differences in the decoding of various three-channel messages. They videotaped acted scenes in which systematic variation of positive, neutral, and negative affect was represented in visual (facial), vocal, and verbal channels. Each of the three channels was rated independently for degree of positive or negative affect and then the combined three-channel videotapes were presented to children of three age groups (5 to 8, 9 to 12, and 13 to 18) and to their parents.

Bugenthal et al. found that children, as well as adults, were able to perceive evaluative meaning in all three communication channels, whether they were consistent or inconsistent. In addition, children tended to place less weight, relative to the adults, upon facial cues than upon verbal and vocal cues. There was also a tendency for women actors to be rated more negatively than men.

The above study was replicated by Bugenthal, Kaswan, and Love (1970), except that the multichannel tapes were also evaluated qualitatively (type of affect expressed) as well as quantitatively (degree of affect). Again it was found that children placed less emphasis upon facial cues than did adults, and that women were seen to have expressed more negative affect than men. Because of the child's greater reliance on verbal than facial cues, they tended to see joking messages (negative in verbal channel and positive in facial) in a more unfriendly fashion than did adults. In addition, when vocal and verbal channels were inconsistent both adults and children tended to discount the positive channel and base their impression totally upon the negative message. Based upon these two latter findings the authors concluded that, "children, when confronted with a conflicting message, resolve the incongruity by assuming the worst" (p. 655). Thus, if it is indeed true that the parents of disturbed children make relatively frequent use of conflicting messages, the above study seems to indicate that this may provide these children with more opportunities to experience disapproval and negative attitudes.

It seems clear that the work of Bugenthal and his associates, while shedding a good deal of light upon the study of the resolution

of inconsistent messages, has also added complexity to the issue. Solomon and Yaeger (1969) simplified the investigation somewhat by studying two-channel rather than three-channel messages. In their study, fourth grade boys listened to tape recordings of evaluative statements which included all possible combinations of three levels of verbal affect (positive, neutral, and negative) and three levels of vocal affect. In addition, the personality variables of anxiety, need for achievement, locus of control, need for approval, and IQ were assessed in order to study their relationship to the perception of the two-channel messages. The major finding of this investigation was that for the fourth grade boys studied, the verbal component contributed more to the final evaluations than did the vocal component of the taped message. This result is clearly contrary to Mehrabian's finding that adults rely more heavily upon the vocal than verbal component. It would appear, then, that during the childhood years a cross-over occurs such that the verbal component goes from primary to secondary importance in the decoding of two-channel messages and the vocal component goes from secondary to primary importance. Another finding reported by Solomon and Yaeger was that the latency of the subjects' responses was greater for inconsistent than for consistent messages. The authors postulated that their subjects perceived the inconsistency, had difficulty reconciling it, and finally resolved it by discounting the vocal component of the message. With the exception of the anxiety measure, the personality variables were found to have no relation to the perception of the messages. Anxiety, however, was found to be positively related to sensitivity to the vocal component, which seems to be consistent

with the view that anxiety may tend to foster greater vigilance.

In order to undertake a developmental investigation of the hypothesized crossover during childhood of the importance of verbal and vocal channels of communication, Solomon and Ali (1972) replicated the above study on subjects in grades 2, 4, 6, 8, 10, and 12, as well as college sophomores. They found that boys tended to be more positive in the evaluations of the taped messages than girls, and that girls tended to be more sensitive to the vocal component of the message than boys. In addition to these sex differences, it was found that: (a) like Mehrabian, the vocal component was predominant for adults in the attribution of speaker attitude; and (b) like Bugenthal, the verbal component was predominant for children. Solomon and Ali found, also, that the effect of the verbal component increased until about the fourth grade, then declined thereafter, while the effect of the vocal component increased from about the eighth grade, so that the expected crossover occurred shortly after the twelfth grade.

Finally, in investigating the child's perception of morality, Bryan and Walbek (1970) have shown that inconsistency between what a model practiced and preached did not affect the evaluations of the models made by third and fourth grade subjects. These children also had a more difficult time recalling the inconsistent conditions than the consistent ones. The authors concluded, therefore, that "apparently, the conceptual processes required of the child to learn and/or remember those components necessary in defining inconsistency in this social situation are beyond him" (p. 352).

The present study was designed to fulfill three general objectives. The first was to develop a measure for evaluating the child's sensitivity to verbal and facial channels of communication, both alone and for consistent and inconsistent combinations. The second objective was to investigate the relationship between these four types of response accuracy (e.g., accuracy in decoding facial, verbal, two-channel consistent, and two-channel inconsistent messages) and the child's intellectual level and social competence. The third general objective was to plot over time the child's changing reliance on either verbal or facial cues for decoding inconsistent messages. This last objective was accomplished through a cross-sectional evaluation of children at different ages.

The specific hypotheses investigated were as follows:

A) Accuracy of response in decoding the four types of emotional messages studied (facial, verbal, consistent, and inconsistent) increases steadily throughout childhood.

B) Females decode facial, verbal, consistent, and inconsistent messages more accurately and easily than do males.

C) Young children (second and fifth graders) are more adept and accurate at decoding verbal messages than facial messages.

D) Messages which are inconsistent across two channels are more difficult to decode, especially for young children, than are one-channel messages and messages consistent across two channels.

E) Young children rely more heavily upon verbal than facial cues for decoding inconsistent messages, while adults rely more heavily upon facial cues. Therefore, an equal reliance on verbal and facial cues may be expected to occur at some time during early adolescence.

F) Children perceive joking messages more negatively than do adults and sarcastic messages more positively.

G) While adults tend to integrate inconsistent cues into a meaningful impression, children are more likely to discount inconsistent cues.

H) The tendency to discount one channel of an inconsistent message is greater for highly inconsistent messages than for messages with a lesser degree of inconsistency.

I) Highly inconsistent messages are more difficult to decode than are less inconsistent messages. However, high or low degrees of consistency do not affect the difficulty of decoding messages which are inconsistent across two channels.

J) The abilities to accurately decode facial, verbal, consistent, and inconsistent messages are intercorrelated (e.g., those people who exhibit a high degree of accuracy in decoding one type of message should also tend to be accurate in decoding the other three).

K) Accuracy in decoding the four types of emotional messages and the tendency to decode inconsistent messages by relying primarily upon the facial component are positively related to verbal and nonverbal intelligence, teacher ratings of social competence, and peer preference ratings.

L) Social adjustment, as measured by the teacher ratings and peer preferences, is more strongly related to accuracy in decoding inconsistent messages than to accuracy in decoding facial, verbal, and consistent messages.



## METHOD

### Subjects

A total of 103 subjects participated in the present study. They were 23 students from Loyola University of Chicago used to select the test stimuli, 20 Loyola students used to scale the stimuli, and 20 subjects each from the second, fifth, and eighth grades of a public, middle-class elementary school in Chicago. The school children were randomly selected for participation in the study from among those students who returned signed consent forms from their parents.

The age and sex distributions for the samples were as follows:

(a) Adults, seven males and 16 females between the ages of 17 and 21, who made the preliminary ratings of the test stimuli; (b) Adults, 10 males and 10 females from 18 to 22, average age = 19.2; (c) Second Graders, 10 males and 10 females from 7-4 to 8-8, average age = 8.0; (d) Fifth Graders, 10 males and 10 females from 10-5 to 11-6, average age = 11.1; (e) Eighth Graders, 10 males and 10 females from 13-5 to 16-0, average age = 14.1.

### Measures

Development of the measuring instrument. Two male and two female Loyola University drama students were photographed while portraying various degrees of positive and negative affect through their facial expressions. In addition, a number of verbal expressions were written with the intention of portraying a variety of emotional attitudes which

might be conveyed from one person to another. The expressions were limited to between five and seven syllables and were simple enough to be read and comprehended by the second grade subjects. From these initial pools of facial and verbal stimuli a total of 40 each were selected according to two criteria: realism and equal representation of various degrees and types of emotions. These were then presented to the preliminary group of 23 adult subjects who were divided into four groups so that the order of presentation was counterbalanced across the groups (e.g., verbal first, items 1-40; facial first, 1-40; verbal first, 40-1; facial first, 40-1). The following instructions were given verbally to these subjects:

The purpose of this study is to find out how well people can judge the feelings of others. You will be shown a number of sentences and photos of people's faces which you will be asked to rate. These will also be shown to second, fifth, and eighth graders in order to compare their ratings with those of adults.

Following these instructions the subjects were given the stimuli (either verbal or facial first) and the following directions:

Below are listed a number of sentences which might be spoken by one person, A, to another person, B. Using the scale below, indicate what you think A's attitude is toward B, by writing the appropriate rating immediately at the end of each sentence.

While the above directions were used for the verbal stimuli, they were easily modified for the facial stimuli as well. In order to make their ratings the subjects were provided with a 13-point scale with +6 (likes very much) and a -6 (dislikes very much) at its poles and zero (neutral) at its center.

After evaluating the attitude expressed by each of the 80 stimuli these preliminary subjects were then asked to return to each item and

select a one-word description of each message. The possible choices provided were: loving, happy, surprised, sad, distressed, fearful, angry, disgusted, and other (please specify).

In this way 16 verbal and 16 facial stimuli were chosen as the final test stimuli. These stimuli satisfied the criteria that they be clear and unambiguous (as indicated by a low variance of the ratings), that they span much of the range from +6 to -6, that a variety of different emotions be represented, that half of the stimuli be judged negative and half positive, and that each actor be represented in 4 of the 16 pictures.

Each of the 16 photographs was then combined with one of the verbal expressions such that 16 two-channel messages were generated. Eight of these were consistent (negative-negative or positive-positive) and eight inconsistent (positive-negative or negative-positive). In addition, four of the inconsistent messages represented a high degree of inconsistency (based on the magnitude of the discrepancy between the ratings of the two channels) and four a low degree of inconsistency. Likewise, four of the consistent messages represented a high degree of consistency and four a low degree of consistency.

Scaling the test stimuli. After this preliminary selection 20 adult subjects were presented all of the 16 verbal and 16 facial stimuli. They were again asked to rate their affective content, but in this case only quantitative ratings were obtained. The stimuli were administered to four groups of five subjects each. The same instructions and counterbalancing procedures were used as have been detailed above.

This group of subjects was tested again after a period of two weeks. They were again presented the same 32 stimuli, but in this case the stimuli were presented as the 16 two-channel messages. The subjects were given the following instructions:

You will be shown a number of photographs in which the person pictured, A, can be thought of as looking at another person, B, while speaking the accompanying sentence. Using the scale below, indicate what you think A's attitude is toward B by writing your rating in the appropriate space below.

Again the 13-point scale was provided for this purpose.

Other information obtained from these subjects was: sex, age, year in college, cumulative grade-point average, and CAR (which is a rating score devised by the university and based upon a student's high school rank and performance on the verbal portion of either the SAT or ACT exam).

The final test stimuli and their mean scaled ratings by the group of 20 adult subjects may be found in Tables 1, 2, and 3. The mean ratings by the second, fifth, and eighth graders may be found in Appendix A.

Scoring systems. For the purposes of the present study it was necessary to devise a measure of the accuracy with which the various types of emotional messages were decoded. All of the one- and two-channel stimuli were scaled, as was described earlier, by presenting them to the group of 20 adult subjects. The mean rating of each stimulus was calculated and these have been presented in Tables 1, 2, and 3. This mean rating was considered to be the criterion with which all other ratings by all of the subjects were compared to determine their accuracy. This decision was made on the basis that the average adult

Table 1

Scaled Scores\*, Variances, and Descriptions of the Verbal Stimuli

<u>Stimulus</u>	<u>Average Rating</u>	<u>Variance of Ratings</u>	<u>Most Frequent Description(s)</u>
1. Why don't you stay awhile?	+3.25	2.30	Happy/Loving/Anxious
2. I really can't believe you.	-1.00	2.53	Disgusted/Fearful
3. Wow, I can't believe it.	+1.80	3.12	Surprised
4. What are you going to do?	+1.65	5.40	Anxious/Fearful
5. I'm sick and tired of you.	-4.20	1.96	Disgusted
6. Let's go out and play.	+3.55	2.37	Happy
7. I'll give you half of mine.	+4.45	2.16	Loving
8. You're probably my best friend.	+5.30	0.85	Loving
9. I wish you wouldn't do that.	-0.90	4.46	Disgusted/Angry
10. I don't care what you think.	-3.10	3.46	Angry
11. Do you like my new coat?	+2.35	2.35	Anxious/Happy
12. You give me the creeps.	-4.50	1.53	Disgusted/Angry
13. You're so much fun to be with.	+4.75	2.09	Happy/Loving
14. Please don't waste my time.	-3.95	3.63	Angry/Disgusted
15. Can't you see I'm busy?	-3.30	1.59	Angry/Disgusted
16. You're not very good at that.	-1.85	1.61	Disgusted

\*Scaled scores are the mean ratings by the adult subjects of the degree of positive or negative affect expressed in each stimulus. The possible range of scaled scores is +6 to -6.

Table 2

## Scaled Scores, Variances, and Descriptions of the Facial Stimuli

<u>Stimulus</u>	<u>Average Rating</u>	<u>Variance of Ratings</u>	<u>Most Frequent Description(s)</u>
1.	+3.85	4.98	Happy
2.	-4.70	2.43	Angry
3.	-2.15	4.56	Surprised
4.	+3.60	2.04	Surprised
5.	+2.80	2.59	Happy
6.	-2.05	3.42	Sad
7.	+1.05	1.42	Happy
8.	-3.30	3.91	Disgusted
9.	+4.25	1.88	Happy
10.	-4.20	5.22	Angry
11.	+0.35	4.87	Loving
12.	+3.85	2.87	Happy
13.	-2.90	3.67	Disgusted/Angry
14.	-1.15	1.19	Disgusted
15.	+1.85	1.92	Happy/Loving
16.	-0.65	0.56	Fearful/Sad

Table 3  
Scaled Scores, Variances, and Degree of  
Channel Discrepancy of the Two-Channel Stimuli

<u>Stimulus*</u>	<u>Channel Discrepancy</u>	<u>Average Rating</u>	<u>Variance of Ratings</u>
1.	0.60	+3.90	4.31
10.	1.10	-4.80	3.64
11.	2.00	+0.95	7.73
16.	<u>1.20</u>	-2.05	1.84
	<u>M</u> 1.23		
2.	3.70	-2.85	3.92
4.	1.95	+2.95	7.00
7.	3.40	+2.25	3.46
14.	<u>2.80</u>	-3.45	2.79
	<u>M</u> 2.96		
3.	3.95	+0.45	8.37
6.	5.60	-1.00	7.79
9.	5.15	+2.75	5.99
15.	<u>5.15</u>	+0.25	3.78
	<u>M</u> 4.96		
5.	7.00	+0.95	6.05
8.	8.60	-1.65	9.19
12.	8.35	+1.30	6.70
13.	<u>7.65</u>	-2.45	6.68
	<u>M</u> 7.90		

\* Each two-channel stimulus is composed of the two one-channel stimuli of the same number.

ratings could be considered the most valid and precise estimates of the "actual" degree of positive or negative affect conveyed by each of the test stimuli. The assumption concerning the validity of the average adult rating as a criterion is borne out by the findings of numerous investigators (e.g., Rothenberg, 1970) that the degree of accuracy with which the feelings of others are perceived increases with age. The assumption concerning the precision of the adult ratings was substantiated by the finding that the adult ratings were found to have smaller variances than the ratings of the other three groups. Thus, it should be kept in mind that what is called accuracy in this study can also be considered consensus, since it is not possible to derive an absolute criterion against which to compare each subject's ratings.

For the purpose of determining response accuracy, then, the children's ratings were always compared to the average adult rating. The deviations between the adult's and children's ratings were computed. The final deviation score for each subject is the sum across the stimuli of the absolute value deviations from the adult means. For example, the computation of a subject's deviation score for the verbal stimuli may be illustrated as follows. If the subject rated the first verbal message +1, while the adult mean for this stimulus was +3.25, then a deviation of  $(+3.25) - (+1)$  or 2.25 would have been recorded. If the same subject rated the second verbal message -5, while the adult mean was -1, then a deviation of 4 would have been recorded. The subject's total verbal deviation score would then be the sum of 16 such deviations, one for each of the 16 verbal stimuli.

For each subject four deviation scores were computed. The verbal



deviation score is the sum across the 16 verbal stimuli of the absolute value deviations from the adult means for these stimuli. The facial score is the sum of the absolute value deviations across the 16 facial stimuli. The consistent and inconsistent deviation scores are respectively the sums across the eight consistent and eight inconsistent stimuli. Since the two-channel deviation scores were based on 8 rather than 16 stimuli, the final two-channel deviation scores were doubled in order to correspond in magnitude with the one-channel scores.

Due to the fact that the deviation scores are based on the magnitude of the discrepancy between the criterion ratings and the actual ratings of each of the test stimuli, it should be clear that accuracy of perception is inversely related to the magnitude of the deviation scores. That is, high deviation scores denote a low degree of accuracy and vice versa.

It was also necessary to devise a measure to represent the relative contributions of the facial and verbal components in decoding inconsistent messages. The present study, like that of Frijda (1969), employed ratings from all of the subjects for both the independent stimuli (one-channel) and the combined stimuli (two-channel). This method permits a determination of the relative weights proportioned by each person to the facial and verbal channels in decoding the inconsistent messages. Let us designate the ratings of the independent facial and verbal stimuli as F and V respectively, and the ratings of the two-channel inconsistent stimuli as I. Then for each subject's response to each inconsistent stimulus a measure of the relative weights proportioned to each component of the message can be computed as follows:

Weight =  $|V-I|/|F|+|V|$ . This method yields a number between 0.00 and 1.00, where 0.00 represents the situation in which the information carried in the facial channel is disregarded and 1.00 the situation in which the information carried in the verbal channel is disregarded. Similarly, 0.50 represents an equal reliance upon facial and verbal cues for decoding inconsistent messages. Values larger than 0.50 denote a greater weight given to the facial channel and values smaller than 0.50 indicate greater weight on the verbal channel.

A useful way to think of the measure designated here as the relative weight would be as the coefficient of the facial component in a regression equation. Where, for example, a weight of .75 was computed, one can visualize the facial component being weighted .75 and the verbal component being weighted  $1.00 - .75$  or .25. Or, where a weight of .30 was computed, the result would be .30 facial + .70 verbal. Thus, while the measure designated as weight is not actually a regression coefficient, it may be helpful to conceptualize it in this way.

The above measure enables one to determine each subject's implicit method for weighting the facial and verbal components of an inconsistent message. It is thereby possible to correlate these implicit weights with other relevant variables. Since this method yields weights for each subject based on only eight inconsistent stimuli, it may be argued that such weights are not very reliable. This may be true to some degree and can be improved in future research. However, it does provide an estimate of what may be occurring in the implicit decoding process for each subject. In addition, the weights for each age group as a whole were based on responses to approximately 160 inconsistent

messages (20 subjects times 8 messages) and hence are likely to represent a highly reliable estimate.

Note that the number of weights calculated at each age according to the above method was not specified exactly. This is due to the fact that while all of the inconsistent stimuli were prerated as being inconsistent, this provided no assurance that all subjects perceived the facial and verbal components to be inconsistent. In the case where a subject independently rated the facial and verbal components of an inconsistent message as both positive or both negative in expressed affect, then it could be said that this subject did not perceive the two-channel message as being inconsistent. It was not possible to calculate a meaningful weight in such a case. As a result, the number of weights calculated for each age group on the basis of perceived inconsistency was slightly less than 160.

Other Measures. Two measures of intellectual level were administered to each child. The Peabody Picture Vocabulary Test (PPVT) Form A was used as a measure of verbal intelligence. The Picture Arrangement (PA) subtest of the Wechsler Intelligence Scale for Children (WISC) was intended as a measure of nonverbal intelligence, as well as a rough estimate of social intelligence.

The two measures of interpersonal competence employed were teacher ratings and peer performance. The scales used for obtaining the teacher ratings can be found in Appendix C. These scales for measuring seven dimensions of interpersonal effectiveness and adjustment were adapted from the Fels Child Behavior Scales (Richards & Simmons, 1941). They were given to the teachers of each of the second, fifth, and eighth

grade subjects. In addition to the seven independent rating scores, a total score was compiled from the combination of the scores on the individual dimensions in order to provide an overall rating of interpersonal competence.

Peer preferences were obtained simply by asking the classmates of the subjects to indicate the three children he or she would most like and least like to have as friends. Peer preference scores were obtained for each child by subtracting the weighted negative preference scores from the weighted positive preference scores.

In order for even the youngest children to accurately rate the test stimuli in the same way as the adults, the 13-point rating scale was adapted to their particular needs. The numbers +6 to -6 were accompanied by corresponding colored boxes to represent varying degrees of attitude (from strong liking to strong dislike). The colors varied from bright red for the most positive evaluation, down through successively lighter shades, to white for a neutral evaluation, and through shades of gray to black for the most negative evaluation. A thermometer analogy was used to explain the use of this scale to the children.

Both Bugenthal, Kaswan, Love, and Fox (1970) and Bugenthal, Kaswan, and Love (1970) found that a similar scale was simple enough for even young children to use. In addition, James (1969) found that such a scale reliably corresponds to a positive-negative evaluation continuum for children of 5 years and older (in Bugenthal, Kaswan, & Love, 1970). In addition to the quantitative rating, response latency was recorded for each child.

Each of the 20 children from each grade was tested individually during two sessions spaced about two weeks apart. At the beginning of the first session the examiner talked briefly and informally with each child in order to establish some rapport.

After this initial introduction the children were told that the purpose of the study was to find out how well people at different ages could understand the feelings of others. They were told that they would be asked to view a number of pictures and sentences and give their reactions about how the people were feeling. The 13-point rating scale was then presented and explained as follows:

The person who is talking to or looking at the other person either likes or dislikes (hates) that person. You can think of this scale as a thermometer. If the person likes the other person a whole lot, then the thermometer is very red. If the person likes the other one less and less, then the thermometer gets lighter and lighter. When it turns completely white, it means that the person doesn't like or dislike the other. Now if the one who is talking to or looking at the other person dislikes (hates) that person, then the thermometer gets darker and darker the more dislike the person feels. And if that person dislikes the other a whole lot, the thermometer turns completely black.

Subjects were then shown the test stimuli and their quantitative ratings were recorded. Latency of response (in seconds) was also recorded in order to provide some measure of difficulty for the various types of stimuli. Average response latency data have been presented in Appendix B. (It is important to note that while response latencies were recorded individually for the three elementary school groups, they were not recorded for the adult subjects because they were tested in groups.)

Children were seen two at a time by two different examiners. During the first session one child was given the Peabody (PPVT) while the other was shown the one-channel stimuli. After both children were

finished, they exchanged examiners and were administered the alternate measure. During the second session the same procedure was followed, except that the children now received the Picture Arrangement (PA) test and the two-channel stimuli.

The teacher ratings of social competence were obtained by presenting the scales to the teachers of the second, fifth, and eighth grade subjects and asking them to rate each child on each of the seven dimensions. Peer preferences were obtained by visiting each of the classrooms from which subjects were drawn and asking all of the students (not just those who participated as subjects) to indicate their three favorite and three least favorite people from among the 20 subjects. For the purpose a list of the 20 subjects in each grade was supplied and the students responded by placing a +1, +2, +3, or -1, -2, -3 next to the appropriate subject's name. Due to the fact that the eighth grade subjects were drawn from two classes while the second and fifth grade subjects each came from one class, the final ratings were scaled in proportion to the number of students who did the ratings.

## RESULTS

As has been mentioned previously, Tables 1, 2, and 3 present a summary of the test stimuli and their average adult ratings. Further data have been presented in the tables of Appendices A and B, which contain the mean ratings and response latencies of the test stimuli for the three elementary school groups.

Prior to investigating the major hypotheses of this study, the average intelligence test scores for the subjects in each of the three school groups were examined (see Tables 4 and 5). Table 4 shows IQ scores as measured by the Peabody Picture Vocabulary Test. Table 5 shows scaled scores rather than IQ scores. This is because the Picture Arrangement subtest of the WISC-R does not directly yield IQ scores. A scaled score of 10, however, is roughly equivalent to an IQ score of 100.

### Preliminary Analyses

A number of preliminary analyses were performed upon these data. As can be seen in Table 4, males tended to achieve higher scores on the Peabody than did females. A  $t$  test of the difference between the two means indicated that the males scored significantly higher IQ scores than did the females,  $t(58) = 2.28$ ,  $p < .025$ . Also, a  $t$  test was done to test the difference between the mean Peabody IQ scores of the eighth grade and the second and fifth grades combined. The second and fifth grade scores were combined because these two groups had the same mean

Table 4  
Mean Verbal IQ Scores (Peabody Picture Vocabulary Test)  
by Grade and Sex

Grade	Males	Females	Males and Females
2	105.5 <sup>a</sup>	92.3	98.9
5	102.1	95.7	98.9
8	113.2	103.1	108.2
TOTAL	106.9	97.0	102.0

<sup>a</sup> Based on 10 subjects per condition



Table 5  
 Mean Nonverbal Intelligence Scaled Scores  
 (Picture Arrangement Test) by Grade and Sex

Grade	Males	Females	Males and Females
2	12.1 <sup>a</sup>	11.1	11.6
5	11.4	11.4	11.4
8	11.1	10.4	10.75
TOTAL	11.53	10.97	11.25

<sup>a</sup> Based on 10 subjects per condition

IQ score. The result of the  $t$  test indicated that the eighth graders achieved significantly higher verbal IQ scores than the second and fifth graders,  $t(58) = 1.99$ ,  $p < .05$ .

The means of Table 5 were also compared by  $t$  tests. The mean Picture Arrangement (PA) scaled scores for males and females were found not to be significantly different,  $t(58) = 0.69$ . The mean scales scores for the most widely discrepant grade means (eighth grade vs. second) were also found to be not significantly different,  $t(38) = 0.77$ . Therefore, neither the grade nor sex differences which were found for the Peabody were evident for the Picture Arrangement scores. The superiority of the eighth graders in verbal but not nonverbal intelligence could possibly be due to the somewhat different ethnic backgrounds of the elementary school students. As compared with the eighth grade, the second and fifth grades appear to have been composed of a greater proportion of students whose first language was not English. While this would account for the younger children's deficit in verbal but not nonverbal intelligence, there does not seem to be any evident explanation for the superiority of males over females in Peabody performance. In addition to the above mentioned differences in measured intelligence, the college sample was found to be of higher intelligence than the elementary school samples (the average cumulative percentile score on the SAT or ACT was 62.9, which is roughly equivalent to an IQ score of 120). Also, the college sample was selected from a different population than the elementary school groups. All of these factors seem to indicate the existence of systematic background differences among the subject groups.

In order to rule out the possibility of systematic examiner

differences having affected the intelligence test scores, the mean scores for subjects tested by each examiner are presented in Table 6. The various means were compared using t tests. None of these tests was statistically significant, indicating that examiner differences did not affect the intelligence test scores of the persons tested. In contrast to the intelligence measures, all of the one- and two-channel emotional messages were administered by the same examiner and are therefore not subject to systematic examiner differences.

The major data and analyses of this study are relevant to the first four hypotheses and have therefore been presented prior to the investigation of the separate hypotheses. Table 7 shows the average deviation scores for each of the four age groups and each of the four types of messages. Table 8 presents the  $2 \times 4 \times 4$  (sex  $\times$  grade  $\times$  type of message) repeated measures analysis of variance performed upon these data. The data are also presented graphically in Figures 1 and 2, with the variable sex having been eliminated due to the fact that it was not shown to have a significant effect upon the results. The average response latencies for the three elementary school groups are shown in Table 9. These data have been plotted in Figure 3, again with sex of subject having been eliminated. Finally, Table 10 shows the  $2 \times 3 \times 4$  (sex  $\times$  grade  $\times$  type of message) repeated measures analysis of variance performed upon these data.

### Tests of Hypotheses

Hypothesis A. Accuracy of response in decoding the four types of emotional messages studied (facial, verbal, consistent, and incon-

Table 6

## Mean Intelligence Test Scores by Examiner

Examiner	Peabody Picture Vocabulary Test	Picture Arrangement Test
#1	100.96 ( <u>N</u> =27)	12.67 ( <u>N</u> =12)
#2	105.31 ( <u>N</u> =26)	10.89 ( <u>N</u> =18)
#3	93.57 ( <u>N</u> =7)	-----
#4	-----	10.67 ( <u>N</u> =18)
#5	-----	11.08 ( <u>N</u> =12)

Table 7  
Mean Deviation Scores\* According to  
Grade, Sex, and Type of Message

Grade Sex		<u>One-Channel Messages</u>		<u>Two-Channel Messages</u>		All Messages
		Facial	Verbal	Consistent	Inconsistent	
2nd	F	34.70	37.40	35.60	58.80	41.60
	M	32.80	33.60	43.40	57.20	41.75
5th	F	29.20	26.90	27.00	47.80	32.72
	M	26.70	31.20	28.60	52.40	34.72
8th	F	22.20	21.60	25.60	35.20	26.15
	M	23.30	23.90	24.20	40.40	27.95
College	F	17.70	21.20	23.60	35.30	24.45
	M	22.50	19.40	25.90	31.30	24.77
All Grades	F	25.95	26.77	27.95	44.27	
	M	26.33	27.02	30.52	45.33	

\*Deviation scores are inversely related to response accuracy. The means presented are the deviations summed across all of the messages of each type for one subject. To find the deviation of each individual message divide by 16.

Table 8

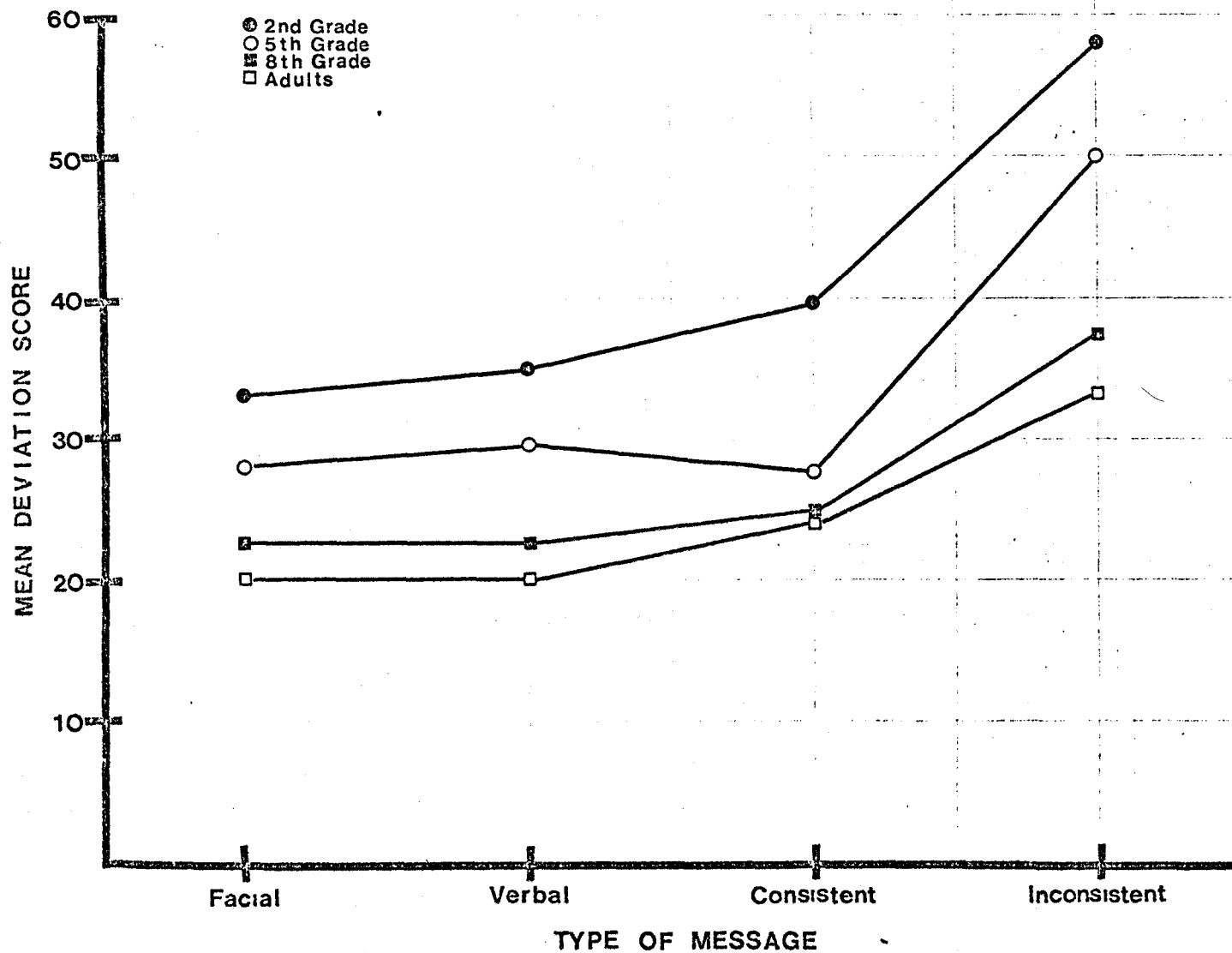
Summary of the Repeated Measures Analysis of Variance of Mean Deviation Scores, with Sex, Grade, and Message (2x4x4) as Variables

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Grade (G)	3	4684.98	22.91**
Sex (S)	1	90.31	<1.00
G x S	3	18.97	<1.00
Within Subjects	72	204.48	
Message (M)	3	6176.97	84.92**
G x M	9	168.21	2.31*
S x M	3	22.81	<1.00
G x S x M	9	94.35	1.30
Between Subjects	216	72.74	

\*  $p < .025$

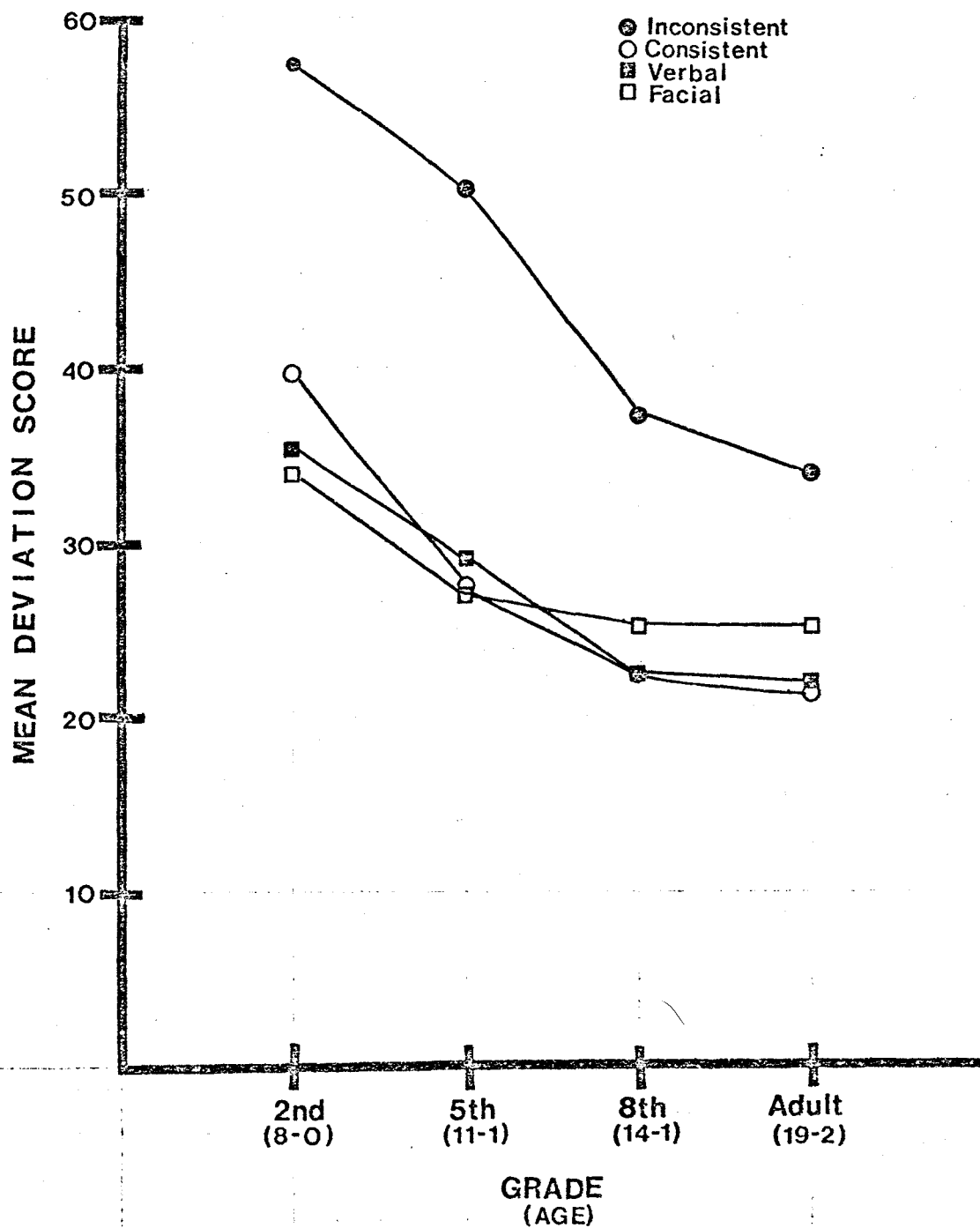
\*\*  $p < .001$

Figure 1



Mean Deviation Scores According to Grade and Type of Message

Figure 2



Age Trends in Deviation Scores



Table 9  
Mean Response Latencies\* According to  
Grade, Sex, and Type of Message

Grade	Sex	<u>One-Channel Messages</u>		<u>Two-Channel Messages</u>		All Messages
		Facial	Verbal	Consistent	Inconsistent	
2nd	F	65.00	74.20	68.40	87.00	73.65
	M	71.10	59.60	56.60	79.20	66.63
5th	F	62.60	68.00	70.60	88.60	72.45
	M	39.10	38.80	55.60	72.00	51.38
8th	F	87.20	81.40	82.20	101.80	88.15
	M	83.70	84.50	105.00	145.00	104.55
All Grades	F	71.60	74.53	73.73	92.47	
	M	64.63	60.97	72.40	98.73	

\*Latencies are inversely related to message difficulty. The means presented are the latencies summed across all of the messages of each type for one subject. To find the response latency of each individual message divide by 16.

Table 10

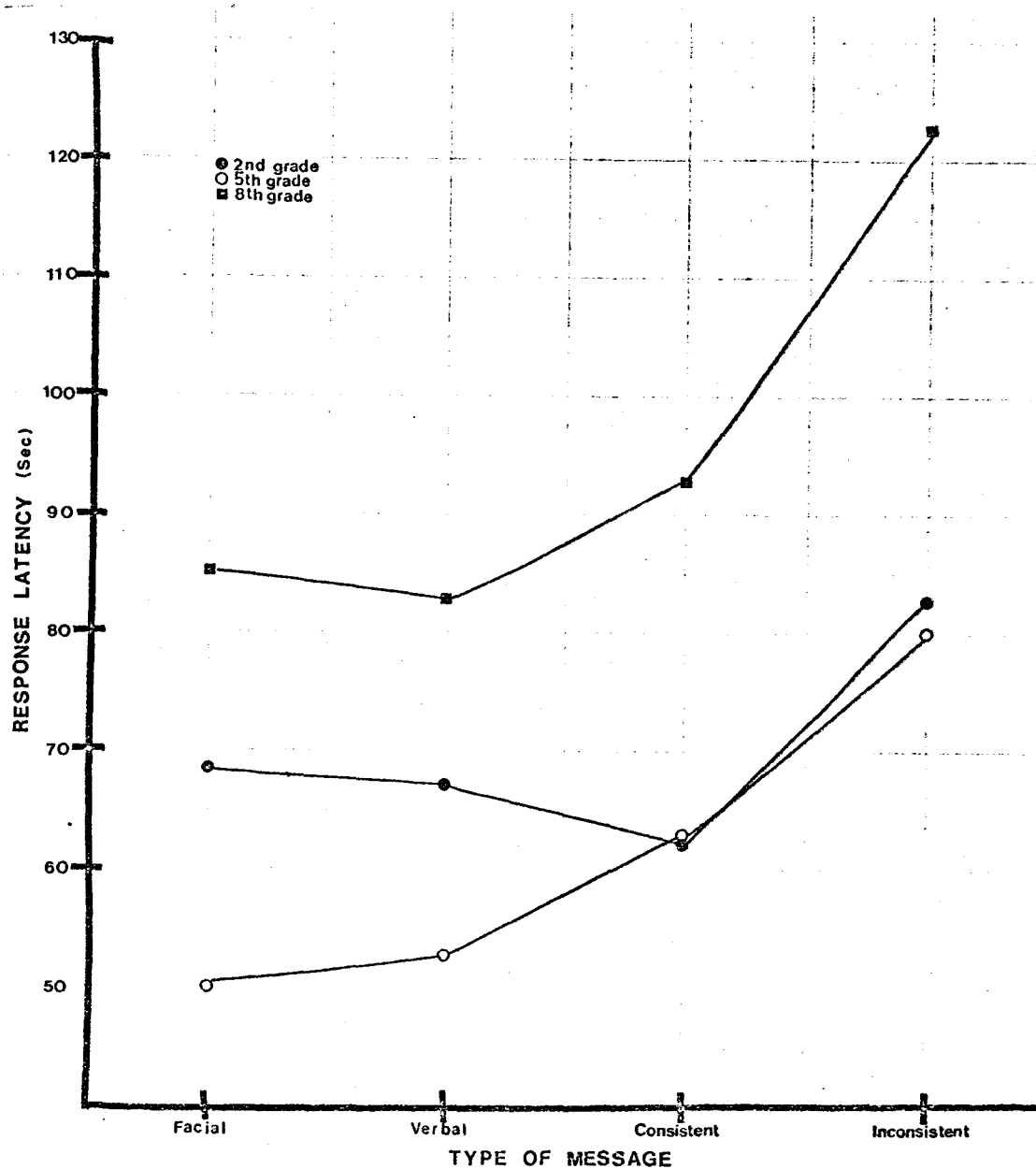
Summary of the Repeated Measures Analysis of Variance of Mean  
Response Latencies, with Sex, Grade, and Message (2x3x4) as Variables

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Grade (G)	2	25875.82	5.64*
Sex (S)	1	912.60	<1.00
G x S	2	7168.35	1.56
Within Subjects	54	4589.97	
Message (M)	3	10458.05	20.77**
G x M	6	814.91	1.62
S x M	3	1063.99	2.11
G x S x M	6	896.31	1.78
Between Subjects	162	503.48	

\* $p < .01$

\*\* $p < .001$

Figure 3



Mean Response Latency (in Seconds) According  
to Grade and Type of Message

sistent) was hypothesized to increase steadily throughout childhood. Inspection of Table 8 reveals a significant main effect for grade level on deviation scores (i.e., amount of deviation of children's ratings from adult means). This finding combined with Figure 1, which shows a clear decrease in mean deviation scores with increasing grade, provides evidence in support of the hypothesis. Thus, it appears that over the age range studied, accuracy in decoding all four types of messages did increase steadily with age.

In order to present the clearest possible representation of the development of the child's ability to accurately decode emotional messages, the data for deviation scores have been replotted in Figure 2. Here the deviation scores have been shown in relation to age and grade level so that the changes in deviation scores over time can be seen in the proper proportions. From Figure 2 it can be seen that deviation scores decrease consistently between the second and eighth grades (ages 8 to 14) and taper off thereafter. Averaged over the four messages only 14% of the total change in deviation scores occurred after the eighth grade, in spite of the fact that the age range between eighth graders and college students (14-1 to 19-2) was 46% of the entire range of ages represented in the present study. Thus, it appears that the greatest growth in the ability to accurately decode emotional messages occurs in the elementary school years, with little growth occurring after the eighth grade (or age 14). The statistical evidence for this finding has been presented in Table 11. Here it can be seen that the increases in accuracy (decreases in deviation scores) between the second and fifth and fifth and eighth grades were statistically significant in 9

Table 11

t Test Values for the Differences Between Mean Deviation  
Scores of the Different Age Groups

Grade	Facial	Type of Messages			All Messages
		Verbal	Consistent	Inconsistent	
2nd vs. 5th	2.20 <sup>*</sup>	2.34 <sup>*</sup>	3.34 <sup>***</sup>	1.83 <sup>*</sup>	3.54 <sup>***</sup>
2nd vs. 8th	4.07 <sup>***</sup>	5.02 <sup>***</sup>	3.88 <sup>***</sup>	4.01 <sup>***</sup>	5.35 <sup>***</sup>
2nd vs. College	5.38 <sup>***</sup>	6.24 <sup>***</sup>	4.08 <sup>***</sup>	6.47 <sup>***</sup>	7.76 <sup>***</sup>
5th vs. 8th	2.23 <sup>*</sup>	2.99 <sup>**</sup>	1.00	2.48 <sup>**</sup>	3.00 <sup>**</sup>
5th vs. College	3.68 <sup>***</sup>	4.42 <sup>***</sup>	1.13	4.52 <sup>***</sup>	6.02 <sup>***</sup>
8th vs. College	1.20	1.46	0.05	1.00	1.12

<sup>\*</sup>p < .05, 1 tailed

<sup>\*\*</sup>p < .01, 1 tailed

<sup>\*\*\*</sup>p < .001, 1 tailed

of 10 possible cases. The increase in accuracy between the eighth graders and college age subjects were significant in zero out of five possible cases. Again, it is clear that the greatest growth in accuracy of decoding emotional messages occurred during the childhood years.

Response latencies were also analyzed in order to provide evidence as to the greater ease with which emotional messages are comprehended with increasing age. Table 10 shows a significant main effect for grade level on latency of response. Table 9 and Figure 3 make it clear that fifth graders decoded one-channel messages more quickly than did the second graders,  $t(38) = 1.80$ ,  $p < .05$ . However, it was the eighth graders who took longer on the average to decode the four types of messages than did the second graders,  $t(38) = 2.10$ ,  $p < .05$ , two-tailed, or the fifth graders,  $t(38) = 3.16$ ,  $p < .01$ , two-tailed. Therefore, the predicted decrease in response latency with age, as a measure of the decreasing difficulty in decoding emotional messages, was not found. It appears that response latency is related both to message difficulty and to age. As a result, response latency as a measure of message difficulty is confounded by age, and as such it is meaningless to compare latency data across ages. When latency data are looked at within age groups, however, they can still provide a meaningful measure of message difficulty.

Hypothesis B. It was expected that females would decode facial, verbal, consistent, and inconsistent messages more accurately and easily than would males. The analysis of variance summarized in Tables 8 and 10 show that for both deviation scores and response latencies no main effects or interactions were found for the variable of sex.

Females in all four age groups did evidence a slight tendency to be more accurate than males in their ratings of facial, verbal, consistent and inconsistent messages (as can be seen in Table 7). However, no statistically significant sex differences were found and the null hypothesis in this case could not be rejected.

Hypothesis C. According to this hypothesis young children (second and fifth graders) should be more adept and accurate at decoding verbal messages than facial messages. While Table 8 shows a significant main effect for type of message on the deviation scores, inspection of Figure 1 makes it clear that this effect is due primarily to the inconsistent messages. Figure 1 also shows that facial and verbal messages are decoded with approximately the same degree of accuracy at each grade level. To test the hypothesis that verbal messages are decoded more accurately by the younger children than facial messages, four t tests were done. These tests produced no significant differences in mean deviation scores between facial and verbal messages for any of the four age groups. Therefore, in terms of the accuracy with which facial and verbal messages were decoded, no support was found for the hypothesis.

To determine whether facial or verbal messages are easier to decode at any age, the data on response latency were investigated. While Table 10 indicates a significant main effect for type of message, inspection of Figure 3 reveals once again that this effect is due primarily to the inconsistent messages. Figure 3 shows that second, fifth, and eighth graders tended to respond about as quickly to facial messages as they did to verbal messages. Three t tests were done to compare the mean latencies for facial and verbal messages at each grade level.

These tests yielded no significant differences, indicating that facial and verbal messages proved to be equally difficult to decode for the three elementary school groups. Thus, no support was found for the hypothesis that young children can decode verbal messages more accurately and more easily than facial messages. (Note: In the preceding analysis response latencies do provide an adequate measure of message difficulty because the comparisons were made within each group analyzed. As a result, the systematic latency differences among age groups could not have affected the data.)

Hypothesis D. It was predicted that messages which are inconsistent across two channels would be more difficult to decode, especially for young children, than would be one-channel messages and messages consistent across two channels. As has been seen previously, Tables 8 and 10 show that type of message had a significant main effect for both deviation scores and response latencies. It was also seen from Figures 1 and 3 that this effect was due primarily to the inconsistent messages. Further evidence that inconsistent messages were decoded with greater difficulty and less accuracy than facial, verbal, and consistent messages can be found in the t test results summarized in Tables 12 and 13. It can be seen in Table 12 that in all 12 comparisons, accuracy was found to be significantly lower for decoding inconsistent messages than for any of the other three. In seven of the nine comparisons of Table 13 it was found that subjects took significantly longer to decode the inconsistent messages than either facial, verbal, or consistent messages. Thus, on the basis of both deviation scores and response latencies, the hypothesis that inconsistent messages were the most



Table 12

Correlated Groups t Test Values for the Comparison  
of Mean Deviation Scores of Inconsistent Messages with  
Facial, Verbal, and Consistent Message

TYPE OF MESSAGE	GRADE LEVEL			
	Second	Fifth	Eighth	College
Inconsistent vs. Facial Messages	6.97***	5.52***	4.95***	5.27***
Inconsistent vs. Verbal Messages	7.96***	6.52***	4.09***	5.80***
Inconsistent vs. Consistent Messages	4.60***	7.74***	4.00***	2.71*

\*  $p < .05$ , 1-tailed

\*\*\*  $p < .001$ , 1-tailed

(df = 19 for all t values)

Table 13

Correlated Groups t Test Values for the Comparison  
of Mean Response Latencies of Inconsistent Messages with  
Facial, Verbal, and Consistent Messages

TYPE OF MESSAGE	GRADE LEVEL		
	<u>Second</u>	<u>Fifth</u>	<u>Eighth</u>
Inconsistent vs. Facial Messages	1.65	4.99 <sup>***</sup>	4.09 <sup>***</sup>
Inconsistent vs. Verbal Messages	1.59	4.34 <sup>***</sup>	4.67 <sup>***</sup>
Inconsistent vs. Consistent Messages	2.56 <sup>**</sup>	3.00 <sup>**</sup>	3.22 <sup>**</sup>

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<sup>\*\*</sup>p < .01, 1-tailed

<sup>\*\*\*</sup>p < .001, 1-tailed

(df = 19 for all t values)

difficult to decode has received some support.

That young children have the most difficulty in accurately decoding inconsistent messages can be seen from the deviation score data plotted in Figure 1. The two instances of least accuracy occur for second and fifth graders responding to the inconsistent messages. It appears that for the second and fifth grade subjects, inconsistent messages were decoded with proportionately less accuracy relative to the facial, verbal, and consistent messages than was the case for the eighth graders and college students. The finding that the younger children had a relatively greater difficulty in comprehending the inconsistent messages seems to account for the significant grade by message interaction shown in Table 8. Thus, there is some evidence that inconsistent messages are relatively more difficult to decode during preadolescence than during later years.

Hypothesis E. Young children were expected to rely more heavily upon verbal than facial cues for decoding inconsistent messages while adults were expected to rely more heavily upon facial cues. Therefore, an equal reliance on verbal and facial cues was expected to occur at some time during early adolescence. Table 14 presents the mean weights calculated at each age level to represent the relative contribution of each component of a two-channel inconsistent message. It is important to remember that each weight can be thought of as the percentage contribution of the facial component toward the judged degree of affect represented by the inconsistent messages. The percentage contribution of the verbal component of an inconsistent message would then be 100 per cent minus the weight for facial cues.

Table 14

Mean Weights (Percentage Contribution of Facial Channel)

According to Grade and Sex

Grade	Females	Males	Males and Females
2nd	42.40	46.40	44.40
5th	48.00	45.10	46.55
8th	64.70	53.00	58.85
College	73.80	65.00	69.40
All Grades	57.22	52.38	54.80

A summary of the 2 x 4 (sex by grade) analysis of variance performed upon the data summarized in Table 14 has been presented in Table 15. The nature of the significant main effect for grade can be seen in Figure 4, which shows a plot of the mean weights found at each grade level. From Figure 4 it is clear that the second and fifth graders relied more heavily on verbal cues for decoding inconsistent messages while the eighth graders and adults relied more heavily upon facial cues. The same result can also be seen in the alternate analysis of Table 16. This table again shows a significant tendency for children to rely more on verbal cues and adolescents and adults on facial cues for decoding inconsistent messages,  $\chi^2 (3) = 17.63, p < .001$ .

From the graph of Figure 4 it appears that the time at which children tend to rely equally on facial and verbal cues for decoding inconsistent messages can be interpolated to occur at about the sixth grade, which corresponds to a chronological age of 12. This finding is consistent with the point of equality which was hypothesized to occur at some time during early adolescence.

That the tendency to rely more heavily on facial cues for decoding inconsistent messages develops consistently throughout childhood is evident in Figure 4. The weights show a constant tendency with increasing age to approach the weights used by adults. It can be seen that there was little change between the weights of second and fifth graders,  $t(38) = 0.38, NS$ . Significant change, however, did occur between the fifth and eighth grades,  $t(38) = 1.93, p < .05$ , and between eighth grade and adulthood,  $t(38) = 1.77, p < .05$ .

Hypothesis F. It was hypothesized that children would perceive

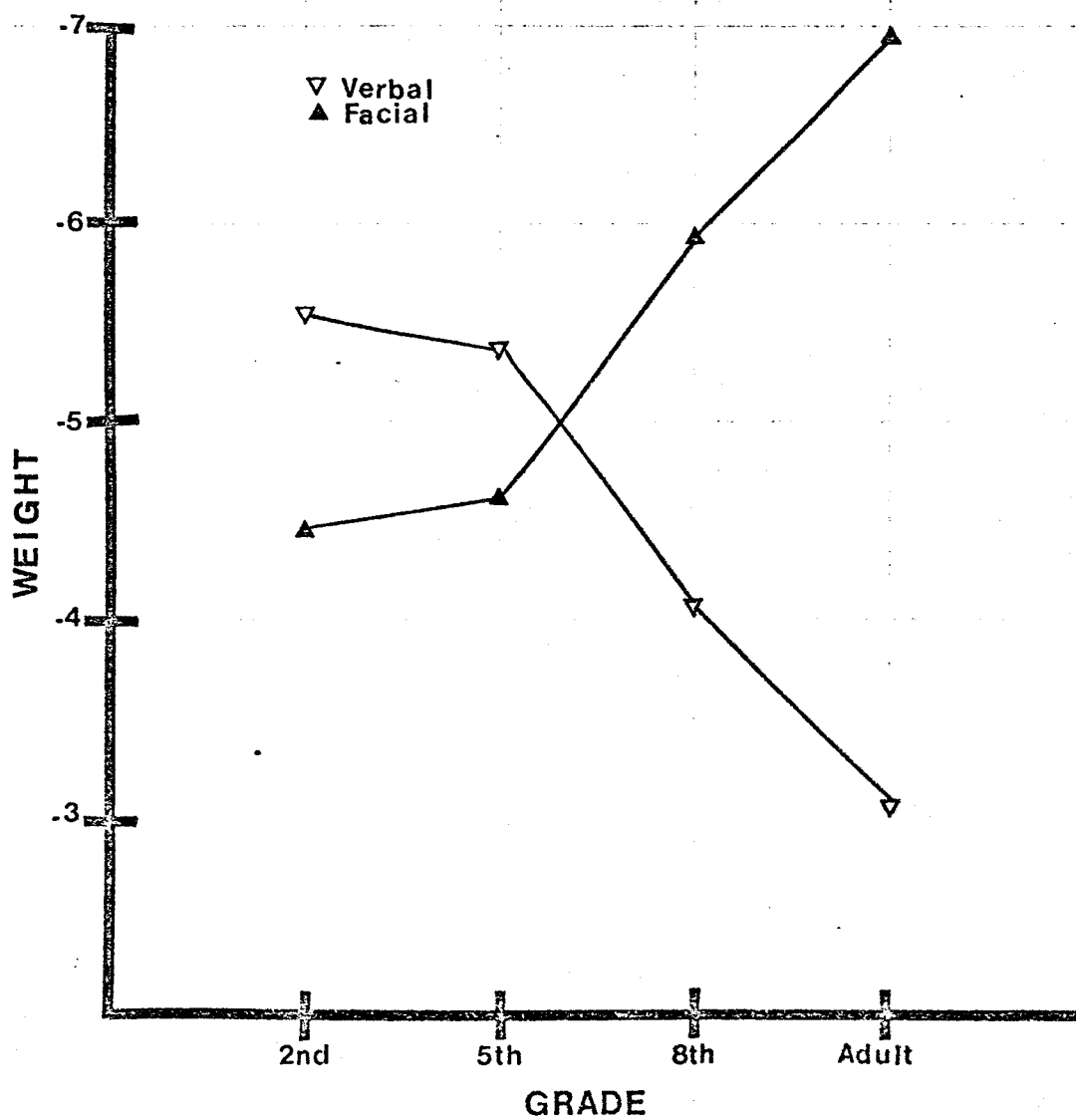
Table 15  
Summary of the Analysis of Variance of Weights  
with Sex and Grade (2x4) as Variables

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>
Grade (G)	3	2705.23	8.35**
Sex (S)	1	470.45	1.45
G x S	3	241.08	<1.00
Error	73	324.13	

---

\*\*  
p < .01

Figure 4



Weights of Facial and Verbal Components of Inconsistent Messages as a Function of Grade Level

Table 16

Number of Subjects Who Relied More Heavily On  
One Channel to Decode Two-Channel Inconsistent Messages

	<u>2nd Grade</u>	<u>5th Grade</u>	<u>8th Grade</u>	<u>College</u>
FACIAL	8	6	13	18
VERBAL	12	14	7	2



joking messages more negatively than adults and sarcastic messages more positively. For the purposes of the present study, joking messages were defined as those inconsistent messages with a positive facial component and a negative verbal component. Sarcastic messages were defined as those inconsistent messages with a negative facial component and a positive verbal component. These definitions have been substantiated by a number of investigators, including Bugenthal et al. (1970).

Table 17 presents a tabulation of all those joking and sarcastic messages which were rated either more positively or more negatively by the three elementary school groups than by the adults. From this table it can be seen that children did perceive joking messages more negatively than adults and sarcastic messages more positively. This finding was statistically significant in the second grade,  $\chi^2(1) = 21.02$ ,  $p < .001$ , and in the fifth grade,  $\chi^2(1) = 18.24$ ,  $p < .001$ , but not in the eighth grade,  $\chi^2(1) = 1.60$ . Thus, the hypothesis did receive support in the two youngest groups, but was not supported in the eighth grade.

Hypothesis G. While adults were expected to integrate inconsistent cues into a meaningful impression, children were expected to be more likely to discount inconsistent cues. For the purposes of the present study discounting was defined as the situation in which a subject gives one component of an inconsistent message a weight of 100% and the other component a weight of 0%. For example, if the two channels of an inconsistent message were independently rated +6 and -6 by a particular subject, discounting was said to have occurred if the same subject then rated the inconsistent message as either +6 or

Table 17

Number of Joking and Sarcastic Messages Rated  
More Positively or Negatively by Second,  
Fifth, and Eighth Graders Than by Adults

	<u>Second Grade</u>	
	<u>Joking</u>	<u>Sarcastic</u>
More Positively	25	54
More Negatively	55	26

	<u>Fifth Grade</u>	
	<u>Joking</u>	<u>Sarcastic</u>
More Positively	25	52
More Negatively	55	28

	<u>Eighth Grade</u>	
	<u>Joking</u>	<u>Sarcastic</u>
More Positively	36	44
More Negatively	44	36

-6. Some degree of integration was said to have taken place if the final message was given any rating other than +6 or -6. According to this criterion, the data on all instances of discounting with respect to grade level are shown in the third column of Table 18. Contrary to the hypothesis, children did not tend to discount inconsistent cues significantly more often than adults,  $\chi^2(3) = 5.67$ . In fact, there was a slight tendency for adults to do more discounting than did the children.

In order to better understand the process of discounting, the data in the third column of Table 18 were reanalyzed to show the number of instances in which the verbal or facial component of an inconsistent message was discounted. This analysis, shown in the first and second columns of Table 18 proved to be highly significant,  $\chi^2(3) = 35.17$ ,  $p < .001$ , indicating that while the second and fifth graders had a greater tendency to discount the facial component of an inconsistent message, eighth graders and college students more often discounted the verbal component.

Hypothesis H. The tendency to discount one channel of an inconsistent message was hypothesized to be greater for highly inconsistent messages than for messages with a lesser degree of inconsistency. Table 19 presents a tabulation by grade of all instances of discounting according to degree of inconsistency. Chi-square tests were done to determine whether the number of instances of discounting was significantly greater for the highly inconsistent messages. It was found that for the total sample high or low degrees of inconsistency did not significantly affect the amount of discounting which occurred,  $\chi^2(1) = 0.44$ .

Table 18

Total Instances in Which the Facial or Verbal Component  
of an Inconsistent Message was Discounted According to Grade

	<u>Discounting The Facial Component</u>	<u>Discounting The Verbal Component</u>	<u>Total</u>
2nd	24	17	41
5th	24	18	42
8th	9	30	39
College	7	52	59

Table 19

Number of Instances of Discounting as a  
Function of Grade and High and Low Degrees of Inconsistency

	<u>Low Inconsistency</u>	<u>High Inconsistency</u>
2nd Grade	19	22
5th Grade	21	21
8th Grade	15	24
College	31	28
Total	86	95

Similarly, no significant differences were found for any of the four different age groups. Therefore, the hypothesis that highly inconsistent messages increase the tendency to discount one channel of an inconsistent message did not receive support.

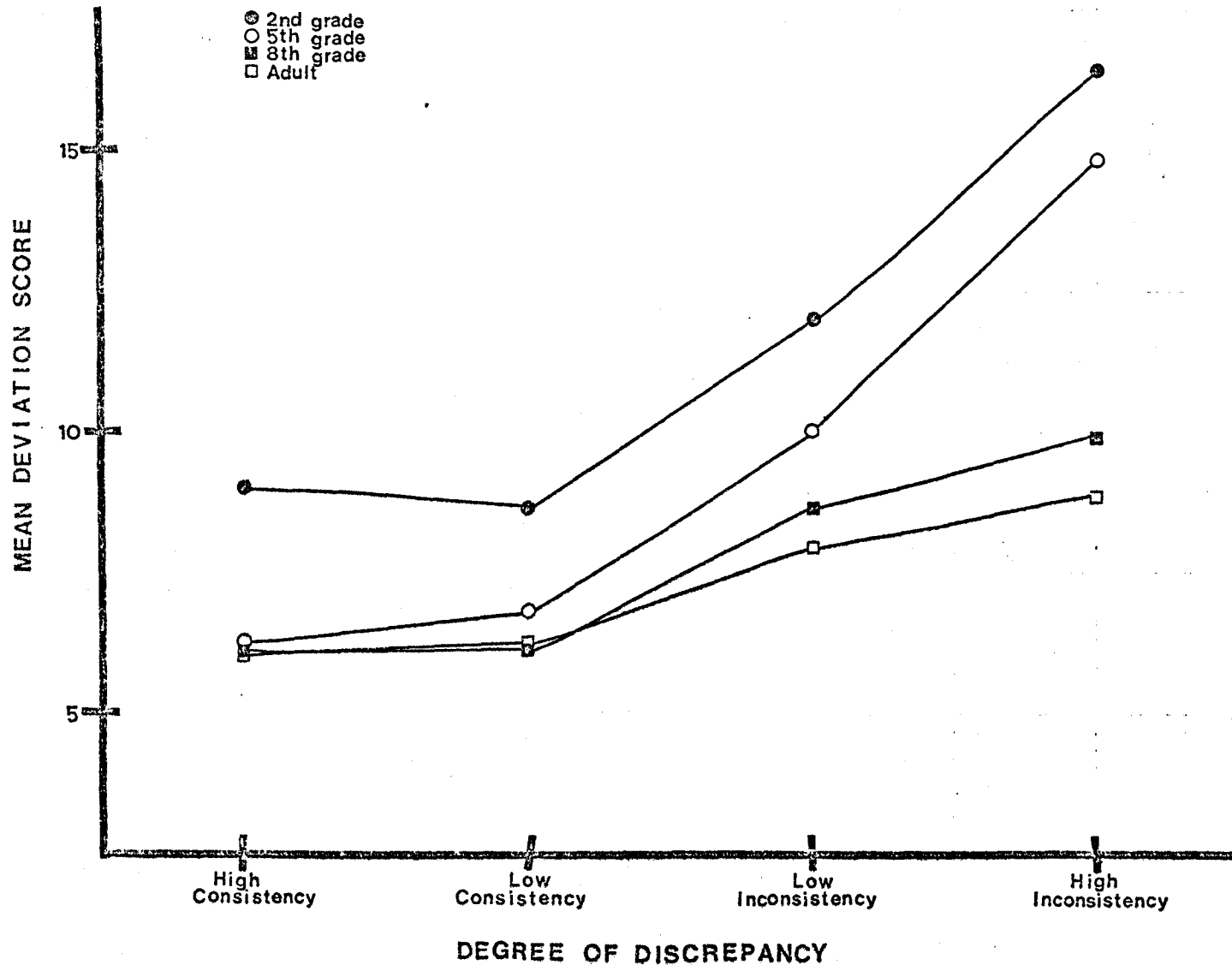
Hypothesis I. Another prediction was that highly inconsistent messages would be more difficult to decode than less inconsistent messages. However, high or low degrees of consistency were not expected to affect the difficulty of decoding messages which are consistent across two channels. Table 20 presents mean deviation scores for the four degrees of two-channel consistency or inconsistency (this will be referred to henceforth as the degree of discrepancy between channels). These data have also been presented graphically in Figure 5. A summary of the 4x4 (grade x discrepancy) repeated measures analysis of variance performed upon the data of Table 20 and Figure 5 may be found in Table 21. (Note that sex of subject has been dropped as a variable from all of the analyses to follow since it was not found to have any significant effects upon accuracy or latency in any of the preceding analyses.) A significant main effect for the degree of channel discrepancy and a significant interaction between grade and degree of discrepancy were found. In order to identify the nature of these two effects a number of t tests were performed upon the data (see Table 22).

The t test results in the first row of Table 22 show that the hypothesis was supported to the extent that high and low degrees of consistency did not affect the accuracy with which two-channel consistent messages were decoded by any of the four age groups. The hypothesis was also supported in that for the second and fifth grade groups

Table 20  
Mean Deviation Scores According to  
Grade and Degree of Discrepancy

<u>Grade</u>	<u>CONSISTENT MESSAGES</u>		<u>INCONSISTENT MESSAGES</u>	
	<u>High Con-</u> <u>sistency (HC)</u>	<u>Low Con-</u> <u>sistency (LC)</u>	<u>High Incon-</u> <u>sistency (HI)</u>	<u>Low Incon-</u> <u>sistency (LI)</u>
2nd	9.85	9.95	11.80	16.90
5th	6.30	7.40	10.20	14.65
8th	6.15	6.15	8.90	9.80
College	6.20	6.15	7.90	8.80
Total	7.13	7.31	9.70	12.54

Figure 5



Mean Deviation Scores According to Grade  
and Degree of Channel Discrepancy



Table 21

Summary of the Repeated Measures Analysis of Variance of  
Deviation Scores with Grade and Degree of Discrepancy (4x4) as Variables

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Grade (G)	3	373.99	16.01***
Within Subjects	76	23.37	
Discrepancy (D)	3	513.42	46.42***
G x D	9	33.40	3.02**
Between Subjects	228	11.06	

---

\*\*  
p < .01

\*\*\*  
p < .001

Table 22

Correlated Groups t Test Values for the Comparisons of  
Mean Deviation Scores at Various Degrees of Discrepancy

	<u>2nd Grade</u>	<u>5th Grade</u>	<u>8th Grade</u>	<u>College</u>
High Consistency vs. Low Consistency	0.35	1.46	0.00	0.06
Low Consistency vs. Low Inconsistency	2.13*	2.86**	3.19**	1.73*
Low Inconsistency vs. High Inconsistency	3.85***	3.71***	0.93	0.88

\*  $p < .05$ , 1-tailed

\*\*  $p < .01$ , 1-tailed

\*\*\*  $p < .001$ , 1-tailed

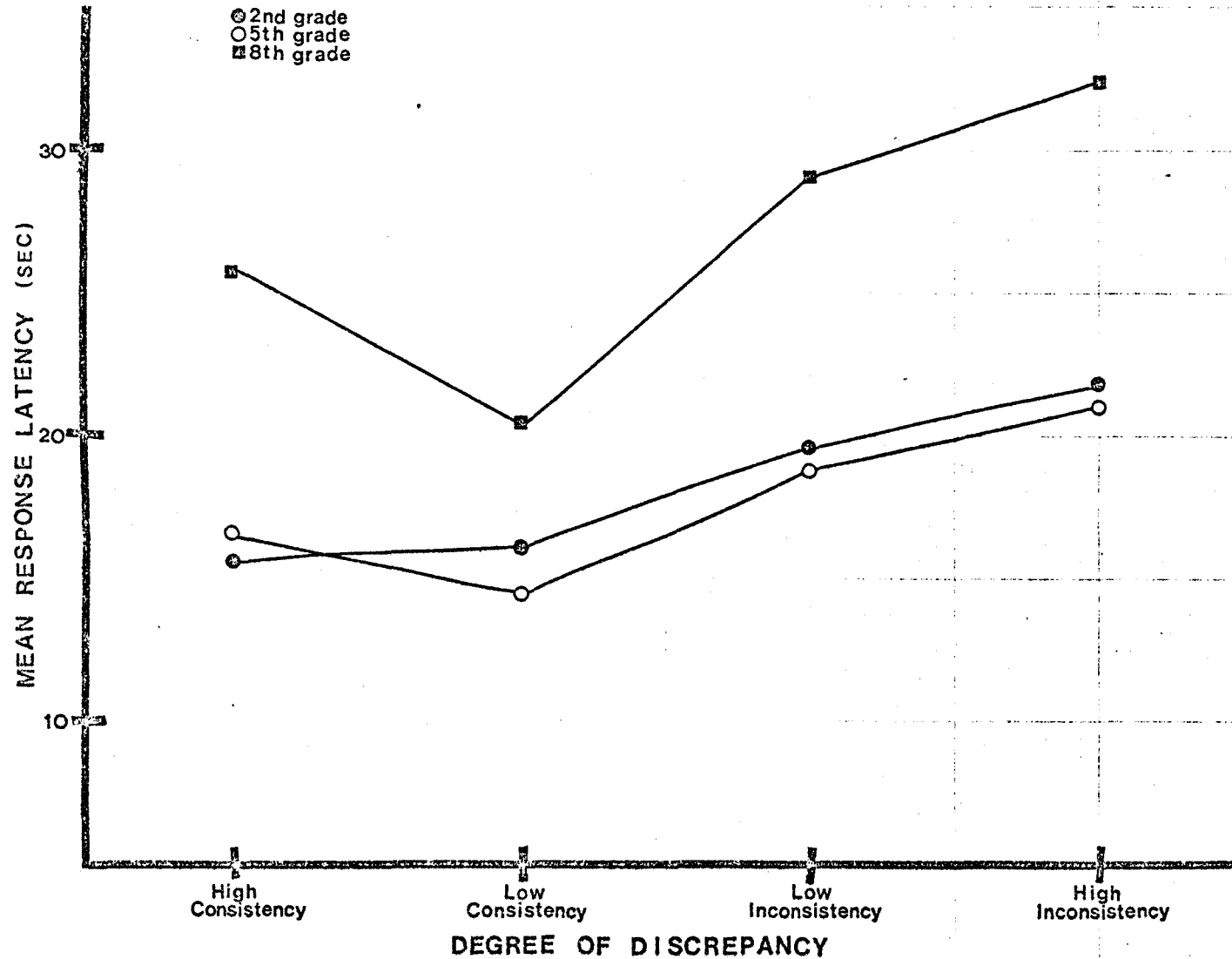
highly inconsistent messages were decoded less accurately than were messages containing a lower degree of inconsistency. The grade x discrepancy interaction reflected the fact that for the eighth grade and college samples the degree of inconsistency had no effect upon the accuracy with which inconsistent messages were decoded, while such an effect did occur in the second and fifth grades.

Hypothesis I was also tested by analyzing the response latency data. Table 23 contains the mean latencies for the four levels of discrepancy and these data have been plotted in Figure 6. In addition, a summary of the 3 x 4 (grade x discrepancy) analysis of variance performed upon these data is presented in Table 24. A significant main effect was found for grade level, indicating once again that eighth graders in general took longer to decode all types of messages than either second or fifth graders. Additionally, a significant main effect was found for the degree of discrepancy. The t tests performed upon these data are summarized in Table 25. From these analyses it is apparent that eighth graders tended to take significantly more time to decode messages with a high degree of consistency than those with a lower degree of consistency. This was an unexpected finding and was not evident at any other age. Only at the fifth grade level did a high degree of inconsistency produce significantly longer response latencies than a lower degree of inconsistency. Thus, the hypothesis that higher levels of inconsistency require more time to decode was only supported in the fifth grade group. The second and eighth grades tended to respond in the hypothesized direction, but this tendency was not statistically significant.

Table 23  
Mean Response Latencies According to  
Grade and Degree of Discrepancy

<u>Grade</u>	<u>Consistent Messages</u>		<u>Inconsistent Messages</u>	
	High	Low	Low	High
2nd	15.90	15.70	19.50	22.05
5th	16.90	14.65	18.75	21.40
8th	25.95	20.85	29.15	32.60
<hr/>				
Total	19.58	17.07	22.47	25.35

Figure 6



Mean Response Latencies According to Grade  
and Degree of Channel Discrepancy

Table 24

Summary of the Repeated Measures Analysis of Variance of Response Latencies with Grade and Degree of Discrepancy (3x4) as Variables

Source	<u>df</u>	<u>MS</u>	<u>F</u>
Grade (G)	2	2177.65	5.75**
Within Subjects	57	378.66	
Discrepancy (D)	3	769.44	16.15***
G x D	6	39.65	<1.00
Between Subjects	171	47.68	

---

\*\*  
p < .01

\*\*\*  
p < .001

Table 25

Correlated Groups t Test Values for the Comparisons of  
Mean Deviation Scores at Various Degrees of Discrepancy

	<u>2nd Grade</u>	<u>5th Grade</u>	<u>8th Grade</u>
High Consistency vs. Low Consistency	0.11	1.66	2.65**
Low Consistency vs. Low Inconsistency	1.85*	3.59***	2.61**
Low Inconsistency vs. High Inconsistency	1.30	1.87*	1.51

---

\*  $p < .05$ , 1-tailed

\*\*  $p < .01$ , 1-tailed

\*\*\*  $p < .001$ , 1-tailed

Hypothesis J. It was also predicted that the abilities to accurately decode facial, verbal, consistent, and inconsistent messages would be intercorrelated (i.e., those people who exhibit a high degree of accuracy in decoding one type of message should also tend to be accurate in decoding the other three). As can be seen in Table 26, this hypothesis was generally supported for the second and eighth grades, but not for the fifth grade and college samples. In the second and eighth grades the Pearson product-moment correlations between accuracy in decoding facial and verbal messages, facial and consistent messages, and verbal and consistent messages were all significant and in the predicted direction. Accuracy in decoding inconsistent messages, however, was correlated with only verbal accuracy in the second grade and facial accuracy in the eighth grade.

It was also expected that the intercorrelations among the deviation scores of the four types of message would be paralleled by similar intercorrelations among the latency scores. In fact, of the 18 possible correlations among the latency scores, 17 were found to be significant. However, of the 30 possible intercorrelations between deviation scores and response latencies, only one was statistically significant. This finding indicates that latency of response does not measure message difficulty in the same way that deviation scores do. Again, the latency scores provide a measure of message difficulty within subject groups, but they are inadequate for making comparisons between subjects. The correlations involving response latency have not, therefore, been presented.

Hypothesis K. Accuracy in decoding the four types of emotional



Table 26

Intercorrelations of Deviation Scores for the Four Types of Messages

	2nd Grade				5th Grade				8th Grade				College			
	F	V	C	I	F	V	C	I	F	V	C	I	F	V	C	I
FACIAL (F)		*** .72	*** .71	.16				*		** .55	*** .63	*** .69		.24	.23	.16
VERBAL (V)			* .47	* .48			.17	.13			** .52	.36			* .46	.19
CONSISTENT (C)				.14				.36				** .58				-.12
INCONSISTENT (I)																

\*  $p < .05$ , 2-tailed\*\*  $p < .01$ , 2-tailed\*\*\*  $p < .001$ , 2-tailed

messages and the tendency to decode inconsistent messages by relying primarily upon the facial component were expected to be positively related to verbal and nonverbal intelligence, teacher ratings of social competence, and peer preference ratings. The correlations of the four measures of accuracy as well as the weight measure (high values of which, it may be recalled, indicate a tendency to rely on facial cues for decoding inconsistent messages) with verbal and nonverbal intelligence are presented in Table 27. According to the prediction, all correlations were expected to be positive. It can be seen that the hypothesized correlations between accuracy and intelligence were strongest for one-channel messages in the fifth grade. The hypothesis was also supported by the verbal intelligence-verbal accuracy correlation in the second grade, but it was not supported for the eighth graders and adults. There was a tendency for two-channel accuracy to be negatively correlated with intelligence in the second and fifth grades, while this correlation became positive by the eighth grade. Correspondingly, while the tendency to rely more heavily on the facial component of an inconsistent message (weight) was negatively correlated with intelligence in the second and fifth grades, it tended to become positive by the eighth grade.

The correlations of the accuracy and weight measures with the various measures of social performance (teacher ratings and peer preferences) have been presented in Table 28. Again, all of the correlations were predicted to be positive. The hypothesized correlations between accuracy in decoding emotional meanings and social performance were generally not found in the second and eighth grades. It was found,

Table 27  
Correlation Matrix of Accuracy Scores and Weights  
with Verbal and Nonverbal Intelligence

GRADE	INTELLIGENCE	FACIAL ACCURACY	VERBAL ACCURACY	CONSISTENT ACCURACY	INCONSISTENT ACCURACY	WEIGHT
2nd (N=20)	Verbal	.23	.43*	.05	-.02	-.12
	Nonverbal	.04	.21	-.21	-.09	-.23
5th (N=20)	Verbal	.46*	.50*	-.07	-.13	-.46*
	Nonverbal	.39*	.14	-.47*	-.29	-.15
8th (N=20)	Verbal	.12	.17	.19	.27	.06
	Nonverbal	-.16	.00	.12	.22	.34
College (N=20)	Verbal	-.40*	.27	-.05	.03	.18

\*p < .05, 2-tailed

Table 28

Correlation Matrix of Accuracy Scores and Weights with Peer Nominations

and Teacher Ratings of Social Performance

SOCIAL PERFORMANCE	2nd Grade (N=20)					5th Grade (N=20)					8th Grade (N=20)				
	Facial Accuracy	Verbal Accuracy	Consistent Accuracy	Inconsistent Accuracy	Weight	Facial Accuracy	Verbal Accuracy	Consistent Accuracy	Inconsistent Accuracy	Weight	Facial Accuracy	Verbal Accuracy	Consistent Accuracy	Inconsistent Accuracy	Weight
Sense of Humor	.00	.05	-.19	.07	-.26	.41*	-.04	.21	.13	-.28	.04	-.55**	.03	.30	.26
Sensitivity	.18	.28	-.08	.14	-.35	.08	.27	-.22	.14	-.05	.04	.27	.14	.34	.32
Gregariousness	.08	.25	-.19	.09	-.28	.42*	.08	.05	-.06	-.41*	.08	-.03	-.08	-.09	-.11
Leadership	.35	.44*	.17	.16	-.43*	.56**	.27	-.06	-.15	-.52**	.20	.07	.32	.27	-.09
Mood	.05	.17	-.30	.27	-.32	.40*	-.10	-.06	-.25	-.51**	-.06	-.30	-.12	.12	.19
Lack of Cruelty (Kindness)	-.04	.19	-.28	.09	-.31	-.37	.07	-.05	.23	.01	-.22	.31	-.07	-.18	.05
Friendliness	.09	.14	-.09	-.04	-.35	.43*	.12	.08	.03	-.37	-.03	-.33	-.14	.21	.22
Average Rating	.11	.25	-.15	.13	-.37	.45*	.16	.00	.00	-.49*	.00	-.08	.03	.21	.21
Peer Nominations	.11	.39*	-.04	.14		-.04	.04	-.24	-.03	-.15	.15	-.03	.31	.14	-.02

\*p &lt; .05. \*\*p &lt; .01

however, that in the fifth grade, subjects who were most adept at decoding facial messages were also rated most highly on five of the seven dimensions of social performance rated by their teachers. The only other significant correlation in the expected direction was the finding that second graders who accurately decoded verbal messages were rated as being high in leadership ability. None of the correlations with peer preference was significant except that second graders tended to prefer to associate with students high in verbal accuracy. While the correlations of Table 28 show a tendency for one-channel accuracy to be positively related to high teacher evaluations in the second and fifth grades, these correlations fell to approximately zero in the eighth grade.

Hypothesis L. According to the final hypothesis social adjustment, as measured by the teacher ratings and peer preferences, was expected to be more strongly related to accuracy in decoding inconsistent messages than to accuracy in decoding facial, verbal, and consistent messages. This hypothesis, derived from double-bind theory, seeks to demonstrate that children who are not socially well adjusted are those who have special difficulty in comprehending inconsistent messages. However, Table 28 shows no significant correlations which support this hypothesis. Two trends do, however, emerge from the data. In the eighth grade the ability to accurately decode inconsistent messages was more strongly related to high average teacher ratings of social performance (+.21) than was accuracy in decoding either facial, verbal, or consistent messages. In addition, it was expected that social performance would be rated highest among those children who relied most heavily upon

facial cues (as do adults) for understanding inconsistent messages. A look at the correlation between the weights and the average teacher ratings (+.21) for the eighth grade shows a nonsignificant tendency for this expectation to be borne out. In the second and fifth grades, however, average social performance or adjustment was negatively related to a reliance on facial cues (-.37 and -.49 respectively). Thus, the data of Table 28 tend to indicate that both accuracy in decoding inconsistent messages and the tendency to rely more heavily on facial than verbal cues for decoding inconsistent messages have a relationship to social adjustment in early adolescence which approaches the relationship predicted in Hypothesis L. The relationship between these variables during the childhood years was not in line with the prediction, however.

Finally, while they do not have direct relevance to the hypotheses of this study, the correlations between social performance and intelligence have been presented in Table 29. It can be seen that the strongest relationships between intelligence and social performance occurred in the second grade. Peer preferences in the second grade were found to be significantly correlated with both verbal and nonverbal intelligence. The average teacher ratings for the second grade were found to be correlated more strongly with nonverbal than with verbal intelligence. In the fifth grade those students rated high in overall adjustment were found to have also scored high in verbal intelligence. In this group verbal intelligence was also most strongly related to ratings of leadership and friendliness. For the eighth graders the only significant finding was that those students rated most gregarious were the ones who scored low on the measures of both verbal and nonverbal intelligence.

Table 29

Correlation Matrix of Intelligence with Peer Nominations  
and Teacher Ratings of Social Performance

	2ND GRADE (N=20)		5TH GRADE (N=20)		8TH GRADE (N=20)	
	Verbal Intelligence	Nonverbal Intelligence	Verbal Intelligence	Nonverbal Intelligence	Verbal Intelligence	Nonverbal Intelligence
Sense of Humor	.25	.46*	.27	.09	.25	-.17
Sensitivity	.24	.50*	.30	.22	.19	.11
Gregariousness	.48*	.53**	.36	.23	-.41*	-.42*
Leadership	.55	.42	.60**	.17	.37	-.02
Mood	.18	.26	.24	-.19	.10	-.03
Lack of Cruelty (Kindness)	.13	.44*	-.10	-.13	.00	.26
Friendliness	.31	.50*	.52**	.12	.20	-.11
Average	.34	.50*	.51*	.10	.19	-.08
Peer Nominations	.46*	.58**	.08	-.19	-.13	-.24

\*  $p < .05$ , 2-tailed

\*\*  $p < .01$ , 2-tailed

## DISCUSSION

### Development of Emotional Perception

In the present study a number of hypotheses were made about the child's developing ability to comprehend various types of emotional messages and its relation to the sex of the decoder as well as his intelligence and social competence or adjustment. One of the main findings was the tendency for accuracy in decoding both one- and two-channel messages to increase with age. This finding is consistent with a number of theories and previous investigations which have characterized childhood as a time for the development of many skills, including the ability to accurately perceive the feelings, thoughts, and motives of others.

It was also found that the increase in accuracy or social sensitivity in the period after age 14 was negligible when compared with the amount of growth which occurred during the elementary school years. It seems that by the onset of adolescence the major developmental tasks have been accomplished and little else is achieved in terms of an increase in the child's social sensitivity. This is a result which is in line with Piaget's findings about the cognitive development of the child. According to Piaget the final stage of cognitive development, the stage of formal operations, develops in most children between the ages of 11 and 15. By this age, then, the child becomes able to construct his environment in much the same way as a mature adult and no major cognitive operations develop after this time. It should be mentioned that although



Piaget has focused primarily on cognitive development and the present study was concerned with the social-emotional aspects of development, these two abilities are related. As Inhelder and Piaget (1958) have put it, the social-emotional transformations:

are parallel to intellectual transformations, since affectivity can be considered as the energetic force of behavior whereas its structure defines cognitive functions. (This does not mean either that affectivity is determined by the intellect or the contrary, but that both are indissociably united in the functioning of the personality.) (pp. 347-348)

### Inconsistent Messages and the Double-Bind Theory

Another salient finding of this study was that while children tended to rely upon the verbal component of an inconsistent message in order to comprehend its overall meaning, adolescents and adults looked to the meaning contained in the facial component. This result supports the findings of the investigations of Bugenthal and Solomon who also found a greater tendency for children to rely on the verbal component of an inconsistent message. Solomon and Ali (1972) have provided a convincing argument as to why this occurs. They stated that the findings that adults and children rely on different components of an inconsistent message

may reflect differences in skill and familiarity with the language, adults having a greater accumulation of experience as speakers and listeners. In addition, there may be differences between adults and children in the cognitive and social contexts in which they as listeners are able to place the statements they hear. Adults may be more accustomed to searching for various possible meanings of the statements they hear, and more likely to expect to find hidden, underlying meanings in the less systematic, less "codable" aspects of the messages. These aspects may be learned relatively slowly because they are less clearly definable even for sophisticated speakers, and because feedback validating a judged meaning tends to be less clear and immediate than it is for words and statements in the content channel. Meanings in the noncontent channels are also probably more idiosyncratic than are

content definitions (pp. 242-243).

That the present study has shown adults to rely much more heavily on the meanings contained in the facial (nonverbal) than the verbal component of an inconsistent message is also in agreement with the work of Mehrabian. Both Mehrabian and Ferris (1967) and Mehrabian and Wiener (1967) found that adults interpret two-channel inconsistent messages as either positive or negative in accordance with how they perceive the nonverbal component of the message. Adults, then, tend to respond to two-channel inconsistent messages as if they were composed of a primary component, which determines the polarity of the perceived meaning of the total message, and a secondary component, which serves a subordinate function in that it influences the magnitude, but not the polarity, of the perceived meaning. It was this finding of a subordinate/superordinate relationship between the verbal and nonverbal components of inconsistent messages which led Mehrabian to reason that inconsistent messages are relatively simple to decode. As a result, he concluded that the assumptions of the double-bind theorists were not substantiated on two accounts. First, the assumption that the components of an inconsistent message are decoded separately was not supported for adults since the meaning of the message was found to be determined almost totally by the nonverbal component. And second, the assumption that an adaptive response to an inconsistent message would require two distinct incompatible responses was not supported by Mehrabian's findings since he demonstrated that adults did not attribute much meaning to the subordinate (verbal) component of inconsistent messages.

The findings for adult subjects alone did not provide support for

the double-bind theory of schizophrenia. However, by investigating the responses made by children of various ages to inconsistent messages, the present study was able to find some support for the assumptions of the double-bind theorists. First, for all three of the elementary school groups this study provided no clear evidence of a subordinate/superordinate relationship between the verbal and facial components of an inconsistent message. For each of the three groups the facial:verbal ratio was less than the 70:30 ratio found for the adult sample. Second, this study has shown that during childhood there are significant shifts in the relative importance of facial and verbal cues for decoding inconsistent messages. That is, during the elementary school years, when a child is most likely to be available and susceptible to inconsistent communications from his parents, the mechanisms for understanding these messages are unstable and constantly evolving. Third, the present study has shown that inconsistent messages are more difficult to decode than either facial, verbal, or two-channel consistent messages. This was true both for accuracy of response and for response latency.

The results of the present study, then, have shed some new light on the double-bind theory of schizophrenia. Contrary to the conclusions of Mehrabian, it has been shown that inconsistent messages are difficult to decode for both children and adults. They are especially difficult for children, as evidenced by the findings that both components of an inconsistent message are given approximately equal weight and such messages are likely to be decoded in different ways as the child matures. It is likely, therefore, that children have a great deal of difficulty understanding inconsistent messages. They seem to respond

to them as two separate incompatible messages which would therefore require two incompatible responses--a double-bind.

### One-Channel Messages

Another finding of the present study was that the younger children demonstrated no differential facility in decoding either facial or verbal messages. It was expected that since second and fifth graders rely more heavily on verbal cues to decode inconsistent messages they would also be quicker and more accurate in identifying single-channel verbal messages. That this expectation was not confirmed indicates that the child's greater reliance upon verbal cues for resolving inconsistency, as well as the adult's reliance on facial cues, is a phenomenon which occurs independent of any greater facility with such cues. Therefore, it may be assumed that whether one gives more weight to facial or verbal cues for resolving inconsistency is not so much a function of a greater facility with such cues, but an indication of greater interest in these particular cues, or an indication that reliance on such cues is an activity which is characteristic of the level of development of the decoder.

### Methodological Considerations

The above finding, however, should be regarded with caution due to the fact that it may have been influenced by a difficulty in terms of the comparability of the groups in this study. As can be seen in Tables 4 and 5, there was a tendency for second and fifth graders to be inferior to the older groups in verbal but not nonverbal intelligence. This deficit was accounted for by possible sociocultural

differences between the children at different ages. As a result, the fact that the younger children were not found to have been more accurate in decoding verbal than facial messages may have been due to their slight deficit in verbal intelligence. That this might indeed be the case can also be seen in Table 28. In this instance accuracy in decoding verbal messages was found to be positively related to verbal intelligence. Therefore, it will be necessary to await the results of future investigations to determine whether young children are differentially accurate in decoding verbal or facial messages.

In addition, it may be argued that all of the developmental findings of this study do not rest on a firm methodological base due to the discovery of systematic differences in verbal intelligence between the two younger and two older groups studied. That is, it can be said that those changes in accuracy and in the manner of decoding inconsistent messages which have been attributed to age can also be accounted for by a higher level of verbal intelligence. However, there is evidence that in spite of this finding the present study has been relatively unaffected by this potential methodological difficulty. Evidence for this statement can be found in three major sources. First, a significant amount of growth in accuracy was found between the second and fifth graders. No disparity in intelligence was found between these two groups, indicating that the growth which occurred could only be attributed to the difference in age. Second, the superiority in intelligence of eighth graders over second and fifth graders occurred only for the verbal intelligence measure. Since nonverbal intelligence was not significantly different, it is likely that the three elementary

school groups did not differ significantly in general intelligence. Third, and most important, Table 28 makes it clear that most of the abilities which were shown to have increased with age were not found to be significantly and positively correlated with intelligence.

The findings cited above make it highly unlikely that the increases in accuracy and the greater tendency to rely on facial cues for decoding inconsistent messages would have occurred simply as a result of an increase in verbal intelligence. In fact, a number of the correlations of Table 28 are in a negative direction, which would tend to obscure any developmental trends in the case where intelligence increased with age. The only significant positive correlations with intelligence in Table 28 occurred in the second and fifth grades for one-channel accuracy. However, since these grades were found to be of equal intelligence, the increase in accuracy could not be accounted for in any way other than the difference in age between the two groups. In spite of the fact that this study does not seem to have been rendered methodologically invalid by the intelligence differential between the age groups, efforts should be taken in future work to insure that all groups are equal or matched for intelligence and background variables.

#### Shift From Concrete to Formal Operations

An unexpected finding of this study was that eighth graders took significantly more time to decode all types of messages than did the second or fifth graders. It was expected that since response latency could be considered a measure of difficulty in decoding the various stimuli and since difficulty could be expected to decrease with age,

the eighth graders would decode the stimuli in shorter time than the two younger groups. The surprising finding that response latency was discontinuous across groups rendered latency scores an inadequate measure of message difficulty for comparisons between age groups. This finding may, however, help to shed some light on the cognitive processes which may occur when emotional messages are processed.

Since the discontinuity occurred between the fifth and eighth grades, it may be explained by the changing cognitive processes which accompany the transition from Piaget's stage of concrete operations to the stage of formal operations. According to Piaget this transition is a gradual process which begins at approximately the age of 11 or 12, at which time the child is becoming capable of reasoning not only on the basis of objects, but also on the basis of hypotheses or propositions. According to Inhelder and Piaget (1958), at the stage of formal operations "thought proceeds from a continuation of possibility, hypothesis, and deductive reasoning, instead of being limited to deductions from the actual immediate situation" (p. 16). It would seem very likely then that the eighth grade and adult subjects were able to make sense of the various emotional messages by considering a number of possible situational explanations for the occurrence of such a message, by generating hypotheses about what might be happening and by deducing plausible explanatory concepts. The second and fifth grade subjects, by comparison, would have attempted to understand the messages by a process of "multiplication or association of empirical correspondences." That is, during the stage of concrete operations, the process of decoding emotional messages can be thought of as an empirical process in which the children

"simply multiply correspondences and make new attempts to find relationships, hoping that something meaningful will automatically emerge from the abundance of data." (Inhelder & Piaget, 1958, p. 286). That these strategies seem to have been operative for different subject groups tends to fit the data of the present study in two ways. First, the elaborate and systematic processes of consideration of various possibilities, hypothesis generation, and deductive reasoning, which occurs during the stage of formal operations, would seem to require a longer amount of time to proceed than would the consideration of empirical correspondences, which occurs during the stage of concrete operations. Second, in a very impressionistic way, the eighth-grade subjects did seem to the examiner to ponder and consider their judgments about the various emotional messages. The second- and fifth-graders, by contrast, seemed to briefly scan their associations and rather abruptly produce the first rating which made sense to them.

And the interesting parallel between the work of Piaget and the results of this study is that the transition from concrete to formal operations at age 11 or 12 coincides almost exactly with the transition from the reliance on verbal to reliance on facial cues in decoding inconsistent messages, which was found to have occurred at about the age of 12. In attempting to find a causal rather than purely contemporaneous link between these two occurrences, it is again helpful to look to the work of Inhelder and Piaget (1958). They describe the transition to formal operations as being dependent on both virtuosity and the discovery of perturbations. That is, as the child's concrete operations attain a state of virtuosity, he begins to discover and be



perturbed by the fact that his experiences contain "a mixture of partial regularities and exceptions. . .which he cannot explain with any degree of certainty " (p. 282). At this transitional level, therefore, children "sooner or later have to retrace their steps for if too complicated linkages are built up, the variables left unanalyzed at one moment will later reappear as disturbing influences" (p. 286). The perturbations caused by "partial regularities and exceptions" and "complicated linkages" seem very similar to the type of perturbation which is likely to arise when subjects are presented an emotional message which contains two distinct and inconsistent channels.

In the second and fifth grades, prior to the stage of formal operations, children seem to deal with the perturbations caused by inconsistent messages in the only way available to them--they attempt to understand these puzzling communications by "multiplication or association of empirical correspondences" in the hope that some meaningful associations will emerge from the conflicting data. What the present study and others have found is that the most meaningful information which emerges from the data during the stage of concrete operations is the meaning conveyed by the verbal channel. As Solomon and Ali (1972) have said, verbal messages are likely to be more concrete, codable, and varifiable than the more subtle and idiosyncratic non-verbal messages, and therefore the verbal messages seem to be more meaningful to the young children. Older children and adults are likely to rely more on nonverbal cues for resolving inconsistency, not only because such cues are more meaningful to them through experience, but also because the transition to formal operations renders them less

prone to clutch at the most available explanatory concept. During the stage of formal operations it appears that people become more likely to attempt to fit various hypotheses to inconsistent data. They take their time and consider possibilities which exist in their minds, rather than in the concrete situation. As a result, reliance on less concrete and more subtle or esoteric cues for resolving inconsistent messages becomes possible, and indeed it even becomes the norm after the transition to the stage of formal operations.

Turning once again to the words of Inhelder and Piaget (1958) helps to shed some light on the cognitive processes which may occur when persons are faced with inconsistent messages. They describe the process of decoding two-channel data during the stage of formal operations in the following manner:

[It] consists of setting aside  $y$  in order to analyze  $x$  free from disturbing interference and vice versa. Thus, the need to exclude one factor so as to vary another results from a reversal of direction in structuring correspondences; it involves an attitude toward abstraction or separating out variables instead of toward multiplication or association of empirical correspondences. Furthermore, it appears when the subject is faced with excessive complexity and too many contradictions in the raw empirical situation (p. 286).

The implication for the present study is that when faced with inconsistent messages preformal operations children are not able to separate the discrepant channels in order to consider their effects separately. (It may be hypothesized that such messages are particularly puzzling and disturbing to them, but this will have to await verification by further research.) Children who are able to reason on the basis of formal operations do, however, possess the cognitive structures for separating the independent channels and seem to be more likely to provide

experiential, situational or other hypothetical explanations to fit the data. Because they possess the cognitive structures necessary for decoding inconsistent messages, it may be further hypothesized that by the time a child has reached the stage of formal operational thinking he is no longer as susceptible to upset, frustration, or emotional disturbance as a result of receiving a number of inconsistent or double-bind messages. Again, such an hypothesis could be the topic for future research.

#### Degree of Channel Discrepancy

The present study also investigated the effect of degree of channel discrepancy upon the ability to decode two-channel messages. As was expected, high and low degrees of consistency did not affect the accuracy with which the consistent messages were decoded. That is, two-channel consistent messages in which both channels expressed approximately the same degree of affect were no easier to decode than consistent messages containing disparate degrees of affect. However, two-channel inconsistent messages with a low degree of channel discrepancy were found to be more difficult to decode than were consistent messages. It appears, then, that the crucial factor affecting accuracy was not the degree of channel discrepancy so much as whether the affect expressed by each of the two channels was seen as complementary or contradictory.

It was also found that inconsistent messages with a high degree of channel discrepancy were decoded less accurately by the second and fifth graders than were the inconsistent messages with a lower degree

of channel discrepancy. The eighth graders and adults, however, decoded the messages containing high and low degrees of inconsistency with about equal ease. It appears, then, that as the child develops a greater ability to decode inconsistent messages he also becomes more capable of handling even highly inconsistent messages with relatively less difficulty. Highly inconsistent messages seem to be extremely difficult for young children to comprehend with the cognitive processes available to them. By adolescence, however, it seems that the cognitive processes which have developed with the stage of formal operations are much more useful for comprehending high as well as low degrees of inconsistency. As a consequence, it can be seen that messages transmitted to a young child which are highly inconsistent are likely to be extremely difficult for the child to understand. It may be hypothesized that such messages may create a great deal of stress, especially where the child is expected to make some response to the inconsistent message, and especially where negative consequences are delivered to the child contingent on an incorrect response. By adolescence, however, it appears that highly inconsistent messages are no more difficult to decode than less inconsistent messages. The adolescent, then, would have a much less difficult task than the young child in decoding highly inconsistent messages. (It is important to remember, however, that at no age were inconsistent messages found to have been decoded as easily and accurately as were one-channel messages.)

#### The Process of Discounting

One hypothesis which was made about the manner in which people

deal with inconsistency was that children would tend to discount one channel of an inconsistent message while adults would tend to integrate and combine the inconsistent components into a meaningful impression. This hypothesis did not receive support, however. It was found instead that adults discounted one part of inconsistent messages as often as did children (in about 28% of the possible cases). The difference between the two groups seemed to be that while the adults and adolescents discounted the verbal component of an inconsistent message, the younger children tended more often to discount the facial component. Thus, it appears that discounting is an equally viable mechanism for both children and adults when faced with inconsistent information. With age it seems that people may learn not to discount less, but merely what types of information to discount.

This finding is not in agreement with the prediction of Hastorf et al. (1970) that persons low in cognitive complexity (e.g., children) have a greater tendency to discount inconsistent information than do persons high in cognitive complexity (e.g., adults). One possible explanation for the failure of the present study to find evidence in support of this hypothesis may be contained in the finding that the younger subjects more often than the older subjects tended to perceive inconsistent messages as communicating a neutral affect. It is likely, then, that children more than adults may tend to discount the overall impact of an inconsistent message. They may in effect tend to discount both pieces of inconsistent information at times due to their difficulty in resolving the discrepancy in a meaningful fashion. This finding points up the possibility that a number of different mechanisms

may be used by various individuals in order to resolve the discrepancies in inconsistent communications. Further research is necessary in order to identify what these mechanisms might be and what are the characteristics (e.g., cognitive complexity, authoritarianism, locus of control, etc.) of persons who tend to rely on a particular mechanism.

Another hypothesis of the present study was that due to the fact that highly inconsistent messages are more difficult to decode than less inconsistent messages, they would be decoded more often by the mechanism of discounting. In fact, it was found that discounting occurred with approximately equal frequency for messages of high and low inconsistency. Thus, it seems that increases in difficulty and channel discrepancy were not factors which contributed to the tendency to discount. Again, further study is necessary to determine under what conditions discounting is most likely to occur.

#### Joking and Sarcastic Messages

The present study, like that of Bugenthal et al. (1970), showed that children perceived joking messages to be less positive than did adults. For the adults, joking messages (inconsistent messages in which the speaker smiled while expressing a negative attitude verbally) were seen as being positive in overall affect. That children interpreted these messages less positively than did adults indicates that children may interpret joking messages as being critical or negative when no such effect is intended. It is likely that when adults attempt to soften negative messages to children by smiling or displaying some form

of nonverbal affection, the child may not be aware of the nonverbal parts of the communication. The implication of such a finding is very clearly that, while adults intend joking messages to be positive, it would be best not to assume that children are aware of those situations in which another person is joking.

In addition, it was also found that children tended to see sarcastic messages as being more positive than did adults. Messages which expressed a positive verbal attitude which was contradicted by a negative facial expression were generally seen by children as expressing a positive degree of affect. Again, the children seemed to have been less sensitive to the message conveyed by the nonverbal channel. It seems that children may respond to communication in a much more literal way than do adults. It would be best, therefore, for adults to strive to be as congruent as possible with children, and not rely on the child's ability to perceive messages and attitudes which are conveyed nonverbally. Prior to adolescence, then, it would appear that the child is more sensitive to verbal than nonverbal messages. The axiom "Do what I say, not what I do," would tend to have some relevance, therefore, during the childhood years, as was also found by Bryan and Walbek (1970).

### Sex Differences

The results also showed that males and females were not significantly different in their responses to any of the four types of messages. Few studies of social perception have found significant sex differences. It is not surprising, therefore, that the present study failed to find

sex differences in either the accuracy or latency of responses to the emotional messages. However, it is possible that any sex differences may have been obscured by a flaw in the methodology of this study. It may be recalled that the male elementary school children were found to have scored higher in verbal intelligence than did the females. While the correlations between verbal intelligence and response accuracy were generally low, they did tend to be positive. It is likely, then, that the male children may have had an advantage over the females in decoding the emotional messages because of their higher level of verbal intelligence. Those few studies of social perception which have discovered sex differences have more often shown females to be superior to males in social perceptiveness. It is possible, therefore, that the inequality in verbal intelligence may have obscured any superiority in performance which the females may have held over the males. Thus, further research is needed in which intelligence is carefully controlled in order to eliminate any differential effects it may have upon the results.

#### Relationships Between the Abilities to Decode the Four Types of Messages

It was expected that the results of this study would show that the abilities to accurately decode facial, verbal, consistent, and inconsistent messages are intercorrelated. This expectation was borne out for the second and eighth graders, but not for the fifth graders and adults. Why this result was not consistent across all age groups is not clear. It may be due to the different rates of development of



skills in decoding the four types of messages. For example, while accuracy in decoding consistent messages increased sharply from the second to fifth grades, accuracy in decoding inconsistent messages increased most sharply after the fifth grade. However, further research will be necessary to determine whether or not the abilities to decode emotional messages transmitted through different modalities are indeed intercorrelated and why these relationships may vary with age.

An interesting finding of the present study was that accuracy in decoding inconsistent messages was correlated with accuracy in decoding verbal messages in the second grade and accuracy in decoding facial messages in the eighth grade. Again, these relationships were not found in the fifth grade and college samples. The result, however, seems to reflect the fact that young children rely on verbal cues in order to comprehend inconsistent messages, and adolescents rely more heavily on facial cues.

#### Accuracy and Intelligence

This study also found that the ability to accurately decode messages transmitted in one channel was positively correlated with intelligence for the second and fifth graders, but not for the older subjects. Failure to find significant correlations in the eighth grade and college groups may be due to two possible factors. First, since the adolescents and adult subjects were found to be more intelligent than the second and fifth graders, it is possible that the ability to accurately decode emotional messages is related to intelligence only

within the lower ranges of intellectual functioning. Or, second, it is possible that since the major portion of growth in the ability to accurately perceive the feelings of others occurs during childhood, intelligence is clearly important to the development of this ability. However, since little growth in social perceptiveness occurs after the onset of adolescence and the stage of formal operations, it is likely that intelligence comes to be less important in the ability to understand the emotional expressions of others.

This study also found a tendency for intelligence to be negatively related to accuracy in decoding two-channel messages among the second and fifth graders. This relationship, however, tended to become positive by adolescence. In addition, the tendency to rely on facial cues in decoding inconsistent messages was negatively related to intelligence in two older groups. It is likely that these results indicate that during childhood intelligence is not an important factor in the development of the ability to accurately perceive two-channel messages. Intelligence seems to become more important to the development of this ability during adolescence, however. What these findings may indicate is that intelligence is important to the ability to accurately perceive emotional meanings during those periods of life when the particular abilities are developing (e.g., childhood for one-channel messages, and adolescence for inconsistent messages), but it is less important at other times. Thus, the most intelligent persons are not those who develop the ability to understand inconsistent messages at a young age or who tend to use facial cues for decoding inconsistency, but those who develop these abilities at the appropriate time. The

implications of this result is that the development of the various abilities to understand the emotional expressions of others proceeds according to a developmental time table. The most intelligent individuals are those who during childhood perceive emotional messages as other children do (e.g., by relying on verbal cues for decoding inconsistent messages), and not those who perceive such messages in the same way as an adult.

#### Accuracy and Social Competence

The above discussion is conjectural at best, especially without additional evidence to confirm the findings of this study. However, the above results have been partly verified by some other findings of this study. It was found that second and fifth graders (but not eighth graders) who were most accurate in decoding one-channel messages, were rated most positively by teachers in average social adjustment. In addition, second and fifth graders who relied on facial cues to decode inconsistency were rated as being low in social adjustment, while eighth graders who relied on facial cues were rated high in social adjustment. Again, it appears that the well-adjusted children are those who develop the appropriate social skill at the appropriate time. Children who rely on verbal cues for decoding inconsistency are more intelligent and more socially competent than those who, like adults, rely on facial cues for decoding inconsistency.

A crucial prediction made in this study was that social adjustment would be more strongly related to the weight given to the facial component of an inconsistent message and to the ability to accurately decode

inconsistent messages than to the abilities to decode the other three types of messages. This prediction was based on the double-bind theory of Bateson et al. (1956). It was expected that those persons who have difficulty in decoding inconsistent messages would be more prone to emotional disturbance or social maladjustment than those persons who can decode inconsistent messages with relative ease and accuracy. In general, this prediction was not supported. There was, however, a tendency in the eighth grade for accuracy in decoding inconsistent messages and for the tendency to rely on facial cues for decoding inconsistency to be positively related to teacher ratings of average social adjustment. In addition, these two relationships were higher than the three correlations between the teacher ratings and the abilities to accurately decode facial, verbal, and consistent messages. It is possible, according to this finding, that difficulty in decoding inconsistent messages may be related to the occurrence of social maladjustment. However, such a relationship would be likely to appear only during adolescence, since children in general are not capable of decoding inconsistent messages with a great degree of accuracy.

It is possible, based on the findings of this study, that frequent exposure of children to perplexing inconsistent messages may lead to their having continued difficulty in decoding such messages during adolescence and adulthood, which may in turn bear some relationship to their development of social or emotional difficulties in later life. The present study has not demonstrated this fact conclusively, and further research is needed. The relationship between accuracy in decoding

emotional messages, especially inconsistent messages, needs to be demonstrated more definitively. It would also be useful to demonstrate a cause and effect relationship between accuracy in emotional perception and emotional adjustment. As yet, no such relationship has been found, and it is likely that the relationship may be due to a continuous interaction between the two during the childhood years.

#### Accuracy and Peer Nominations

The peer nomination measure used in this study did not show many meaningful correlations with the accuracy scores for the various types of messages. The only significant finding was that the most popular second graders were found to have scored high in verbal accuracy. Also, for the second grade, but not the fifth and eighth, peer nominations were found to be strongly related to intelligence. Thus, in the second grade both teacher ratings and peer preferences were strongly based on intelligence and were therefore strongly related to each other. In the fifth and eighth grades it appears that peer preferences and teacher ratings were based more on factors other than intelligence. For these two grades the peer preference scores and teacher ratings showed a significant positive correlation with each other on three and four, respectively, of the eight possible dimensions. It seems, therefore, that for the fifth and eighth grades teachers and peers tend to look at similar, but slightly different, attributes in rating the students.

It may be said that some of the significant correlations between the various measures of accuracy in decoding emotional meanings and the teacher and peer ratings of social competence (see Table 29) may have

occurred by chance. In fact, 14 significant correlations were found where 7 would be expected to have occurred by chance. Therefore, these correlations, as well as the conclusions drawn from them, should be interpreted cautiously pending their replication by further studies.

### Suggestions for Future Research

This investigator undertook to devise an instrument which would allow one to measure the accuracy with which different types of emotional messages are decoded at various ages. In addition, this study was designed to determine how inconsistent messages are decoded at different ages, and how this may be related to intellectual ability and social competence. Future directions for research in this area might include:

1. Further development and refinement of the measuring instrument, especially with the purpose of employing more complete and realistic stimuli. This could be done by using video-tape equipment.
2. The measuring instrument could be subjected to tests of its validity, including use of the multitrait-multimethod matrix.
3. Replication of the findings of this study should be undertaken. Replication should also include an extension of the age range of the subjects.
4. A wider variety of children could be studied, including the investigation of such subject variables as normal vs. pathological, introversion vs. extraversion, internal vs. external locus of control, high or low degrees of authoritarianism, high or low tolerance for ambiguity, etc. In addition, it would be valuable to study the effects

of various types of parent-child interactions or child-rearing practices upon the child's ability to comprehend emotional meanings, especially in the presence of channel inconsistency.

5. A better test of the hypotheses underlying the double-bind theory should be undertaken. This test could include the use of more realistic stimuli or actual double-bind situations, a method to keep the subjects from commenting upon or attempting to change the double-bind messages, a means for supplying negative injunctions and consequences should the inconsistent messages be incorrectly decoded, and a measure of the degree of stress or frustration produced by the presentation of the inconsistent communications.

6. Children at various stages of cognitive development (according to Piaget) could be tested on measures of cognitive functioning to determine how the use of different cognitive operations affects the child's ability to understand emotional messages transmitted through various modalities.

In summary, the present study has investigated a number of aspects of the child's ability to understand affective meanings conveyed in various ways. While it has helped to clarify some questions, it has raised a number of others through some interesting, but unexpected, findings. It is to be hoped that these questions may be resolved with the replication of the findings of this study in the future.

## SUMMARY

A measure was devised to determine how individuals respond to two-channel inconsistent messages. This measure consisted of 16 facial and 16 verbal expressions, each of which were scaled by 20 college students for their degree of expressed positive or negative affect. The measure was also given to a random sample of 20 students each from the second, fifth, and eighth grades of a Chicago public school. From the administration of this instrument it was possible to determine how quickly and accurately each subject decoded the emotional meanings conveyed by the facial, verbal, consistent, and inconsistent messages. The relative contributions of facial and verbal cues for decoding inconsistent messages were also determined. Measures of verbal and nonverbal intelligence were administered to the elementary school subjects. Teacher ratings of social competence were also obtained as well as peer-preference ratings. Twelve hypotheses were generated.

One of the major findings of this study was that accuracy in decoding both one- and two-channel emotional messages increased with age. Inconsistent messages were found to have been decoded with the most difficulty and least accuracy of the four types of messages studied. It was also found that in decoding inconsistent messages the second and fifth graders relied primarily on verbal cues while the eighth graders and college students relied on facial ones. As a result it was also found that the children interpreted joking messages more negatively



and sarcastic messages more positively than did the adult and adolescent subjects. In addition, it was hypothesized that highly inconsistent messages would be more difficult to decode than inconsistent messages with a lesser degree of channel discrepancy. This hypothesis was borne out for the second and fifth grades only. Contrary to one hypothesis, no sex differences were found at any age in the responses to either facial, verbal, consistent, and inconsistent messages. The hypothesis that children would tend more often than adults to discount, rather than integrate, inconsistent information was also not substantiated. Finally, the prediction that accuracy in perception of emotional meanings would be positively related to intelligence and social competence was generally not supported, though some positive trends did emerge from the data.

The results of this study were discussed with special reference to the double-bind theory of Bateson et al. (1956) and Piaget's conceptions of the stages of cognitive development. Some methodological difficulties of the present study were considered and directions for future research were indicated.

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## APPENDIX A

Mean Ratings and Variances of the Test Stimuli  
by Grade and Sex of Stimulus Person: Facial Stimuli

Stimulus Number	Sex of Stimulus Person	2nd Grade		5th Grade		8th Grade	
		Mean	Variance	Mean	Variance	Mean	Variance
1	F	+5.65	0.45	+5.10	6.20	+4.95	1.21
2	M	-5.20	3.01	-5.15	1.82	-4.45	1.21
3	M	-2.90	7.46	-2.60	6.78	-2.15	2.45
4	F	+4.20	6.69	+5.10	1.46	+4.35	2.77
5	M	+3.35	5.40	+4.15	1.71	+3.65	4.45
6	F	-2.30	8.43	-2.25	3.25	-1.50	1.32
7	M	+0.90	8.31	+1.75	3.78	+1.40	4.67
8	F	-4.25	5.25	-4.60	2.57	-4.15	2.98
9	M	+5.05	2.26	+5.20	1.22	+4.80	0.91
10	M	-4.95	4.47	-3.80	17.75	-4.75	3.67
11	F	+1.75	7.78	+0.70	5.06	+1.25	6.20
12	M	+4.75	3.14	+4.30	2.43	+3.85	2.45
13	F	-3.40	7.73	-3.90	3.88	-3.30	2.96
14	F	-1.80	7.33	-1.70	4.22	-2.15	2.45
15	F	+4.15	3.29	+3.15	3.50	+2.85	1.92
16	M	-2.25	6.72	-1.05	4.05	-1.45	2.37
Male Photo Mean =		+0.43	5.10	+0.38	4.95	+0.15	2.77
Female Photo Mean =		-0.04	5.86	+0.20	3.77	+0.29	2.73
Grand Mean =		+0.20	5.48	+0.29	4.36	+0.22	2.75

Mean Ratings and Variances of the  
Test Stimuli by Grade: Verbal Stimuli

Stimulus Number	2nd Grade		5th Grade		8th Grade	
	Mean	Variance	Mean	Variance	Mean	Variance
1	+4.65	3.40	+4.55	6.89	+3.85	1.50
2	+0.70	15.80	-2.20	5.01	-2.60	3.83
3	+2.90	10.52	+2.65	13.92	+2.85	7.61
4	+1.75	8.62	+1.05	7.52	+1.55	4.47
5	-4.50	7.53	-5.80	0.17	-5.00	0.74
6	+5.30	2.54	+5.25	0.72	+4.15	1.61
7	+4.95	4.68	+4.80	1.33	+3.95	3.21
8	+5.75	0.51	+5.40	2.15	+4.95	2.58
9	-1.35	9.61	-1.75	4.72	-2.30	1.91
10	-3.65	7.19	-4.45	3.73	-3.60	3.31
11	+4.65	2.66	+3.80	3.54	+2.50	3.32
12	-3.75	4.51	-3.70	5.17	-4.20	1.12
13	+5.40	2.88	+5.55	0.37	+5.10	0.52
14	-1.55	12.47	-3.35	5.61	-3.75	2.41
15	-3.35	5.40	-2.95	5.10	-2.80	3.36
16	-2.20	10.38	-1.55	3.63	-1.75	4.30
<hr/>						
Grand Mean=	+0.98	6.79	+0.46	4.35	+0.18	2.86



Mean Ratings and Variances of the Test Stimuli  
by Grade: Consistent and Inconsistent Stimuli

Stimulus Number	Channel Correspondence	2nd Grade		5th Grade		8th Grade	
		Mean	Variance	Mean	Variance	Mean	Variance
1	C	+4.75	8.09	+5.30	1.80	+4.15	3.29
2	C	-3.85	8.03	-3.85	4.13	-3.30	1.69
3	I	-0.85	12.92	0.00	9.58	+0.55	9.00
4	C	+3.75	8.72	+3.05	6.26	+2.85	6.34
5	I	-2.45	3.42	-2.95	9.42	-0.05	7.00
6	I	+1.95	12.05	+0.55	9.10	+0.75	4.83
7	C	+3.85	3.40	+3.95	3.00	+2.55	4.89
8	I	+0.05	21.94	-0.10	13.36	-2.35	9.82
9	I	+0.60	9.20	+1.20	9.54	+1.50	6.79
10	C	-4.65	6.56	-4.95	3.52	-4.85	1.82
11	C	+2.90	9.67	+2.15	3.08	+1.55	4.50
12	I	+1.05	9.42	0.00	9.58	+0.05	7.52
13	I	+2.80	13.01	+1.25	12.46	-1.80	9.22
14	C	-2.80	8.27	-3.60	3.62	-3.20	3.01
15	I	+0.85	8.87	-0.25	7.46	-0.45	7.00
16	C	-1.55	12.37	-2.15	4.03	-2.20	4.59
Consistency Mean =		+0.30	8.14	-0.01	3.68	-0.31	3.78
Inconsistency Mean =		+0.50	12.60	-0.04	10.06	-.023	7.65

## APPENDIX B

Mean Response Latencies for the Test Stimuli  
by Grade and Sex of Stimulus Person: Facial Stimuli

Stimulus Number	Sex of Stimulus Person	2nd Grade	5th Grade	8th Grade
1	F	4.30	2.75	5.05
2	M	4.10	2.80	5.45
3	M	5.15	4.60	8.95
4	F	4.15	2.90	4.35
5	M	3.75	3.05	4.55
6	F	4.60	2.95	5.20
7	M	4.95	3.60	4.65
8	F	4.15	3.75	4.65
9	M	3.80	2.75	5.25
10	M	4.55	3.25	7.80
11	F	3.70	3.45	4.20
12	M	3.75	2.80	3.90
13	F	4.30	2.80	5.70
14	F	4.40	2.60	5.00
15	F	3.35	2.95	4.00
16	M	5.05	3.75	6.70
Male Photo Mean =		4.39	3.33	5.91
Female Photo Mean =		4.11	3.01	4.77
Grand Mean =		4.25	3.17	5.34

Mean Response Latencies for the  
Test Stimuli by Grade: Verbal Stimuli

Stimulus Number	2nd Grade	5th Grade	8th Grade
1	4.10	3.50	4.75
2	4.70	4.35	5.05
3	5.45	4.05	7.70
4	4.55	5.20	8.20
5	3.55	2.30	4.50
6	3.30	2.35	3.55
7	3.65	3.15	4.00
8	2.50	1.85	4.35
9	5.05	3.10	5.25
10	3.30	2.80	4.65
11	5.25	3.20	5.05
12	4.30	3.95	4.25
13	2.85	2.35	3.95
14	4.45	3.65	5.00
15	4.35	3.95	5.10
16	5.15	3.70	7.60
Grand Mean =	4.16	3.34	5.18

Mean Response Latencies for the Test Stimuli  
by Grade: Consistent and Inconsistent Stimuli

Stimulus Number	Channel Correspondence	2nd Grade	5th Grade	8th Grade
1	C	2.70	4.00	4.35
2	C	3.95	3.30	5.20
3	I	5.40	5.05	7.50
4	C	4.35	4.45	5.20
5	I	5.20	5.40	8.30
6	I	5.30	4.90	8.85
7	C	3.90	3.45	5.60
8	I	5.45	4.60	8.45
9	I	4.70	5.20	7.00
10	C	3.40	4.00	4.75
11	C	5.05	3.50	6.90
12	I	5.95	4.80	7.85
13	I	5.45	6.60	7.10
14	C	3.50	3.70	4.90
15	I	4.10	4.10	5.75
16	C	4.75	4.90	9.95
Consistency Mean =		3.95	3.90	5.85
Inconsistency Mean =		5.20	5.10	7.60

## APPENDIX C

INSTRUCTIONS TO TEACHERS  
FOR MAKING RATINGS

117

- 1) Familiarize yourself with the scales before rating so as to focus your attention on the variables to be rated.
- 2) Concentrate on building up a generalized impression of the child's value on each variable, rather than rating on the basis of concrete incidents and details.
- 3) Probably you should not rate a single child at a time. Rate in groups if possible, rating all in the group on each variable before passing to the next variable.
- 4) Compare freely one child with another as the rating proceeds. Revise previous ratings as needed, so that when completed the sheet checks for absolute ratings and for comparative rankings as well.
- 5) Your entry on the rating line is an "X" to be placed directly on the line at the point best representing your judgement of the location of the ratee on that scale. It may fall anywhere along the line from one extreme to the other, regardless of whether it falls opposite a cue point or somewhere between or beyond the cues.
- 6) Treat each scale as a smooth gradation from one extreme to the other. Use the cue points merely as points of reference in building up your concept of the total variable, rather than as discrete items to be checked.
- 7) Each variable is a complex of loosely correlated elements, and is defined by the descriptions and all the cues on the sheet taken as a whole. Avoid mere reference to the "name" of the variable. The name is merely a convenient handle for reference and may be misleading if taken by itself to define the variable.

SENSE OF HUMOR

Description: Child sensitive to unusual, bizarre, baroque; laughs and smiles often. May "kid" others and can be "kidded"; sees self in ridiculous light.

Name: 1-

2-  
3-  
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16-  
17-  
18-  
19-  
20-

Child finds many things amusing or funny. Laughs or smiles much. Kids others successfully, humorously.

Not unusual amount of laughter, but quick to sense humorous. Often pokes fun at others.

Never laughs at own expense (can't be kidded), but sees humor in very obvious situations, inclined to be serious.

Almost never sees anything funny. Can't be kidded in any way, and never pokes fun at others. Deadpan,



SENSITIVITY TO OTHERS

Name:

Description: Overall rating on child's "tender" behaviors and sensitivity to other children's feelings, problems and needs. Three aspects of the child's apparent thoughtfulness with his peers are relevant: 1) awareness of other children's feelings, needs, problems, etc. 2) extent of his concern about them; and 3) the behavior manifestation of his awareness and concern.

Child goes out of way to insure happiness and well-being of other children; unusual awareness and concern for children's feelings, needs and problems; tends to assume responsibility for making things OK

Child interested in insuring happiness and well-being of other children; aware and concerned for their feelings, needs and problems, but does not assume responsibility for making things OK.

Child average in awareness and interest in other's feelings, needs and problems; may respond to a call for help or sympathy, but will not go out of his way.

Child is quite indifferent to other children's happiness and well-being; seems aware of their needs, problems and feelings, but just does not care.

Child is completely unaware of and unconcerned about other children's happiness and well-being; does not seem to realize that other children have needs and feelings, and therefore ignores these completely.

## GREGARIOUSNESS

**Name:**

Description: This trait concerns primarily the degree to which the child's interests are directed toward others, the group, etc. or to individual activities which do not necessarily involve the group.

[illegible]

Child absorbed at all times in group or in what others are doing. Interested in socially acceptable activities.

Child prefers group activity to individual activity, but has certain individualistic preferences.

Responds promptly to reasonable demands of group but is capable of happiness alone. Enters group activity if it doesn't make him the goat.

Rarely volunteers group association; prefers to be alone. Not unhappy, though, during routine group activity.

Insensitive to demands of and  
-responsibility for group; indivi-  
dualistic, Happier alone.

## LEADERSHIP

Description: The leader influences others; his directions or suggestions are accepted.

**Name:**

A series of 20 vertical lines, each with 11 horizontal tick marks, resembling a ruler or a scale. The lines are evenly spaced and extend across the width of the page.

Child is highly successful as a leader. His suggestions and directions are accepted by others.

Child usually a recognized leader, but sometimes his suggestions are rejected.

Child's attempts are successful with certain children or activities, but elsewhere unsuccessful.

Child's efforts at leadership  
are rarely successful.

Child is unsuccessful as a leader. Suggestions ignored or rejected by others.

MOOD (CHEERFUL-DEPRESSED)

**Name:**

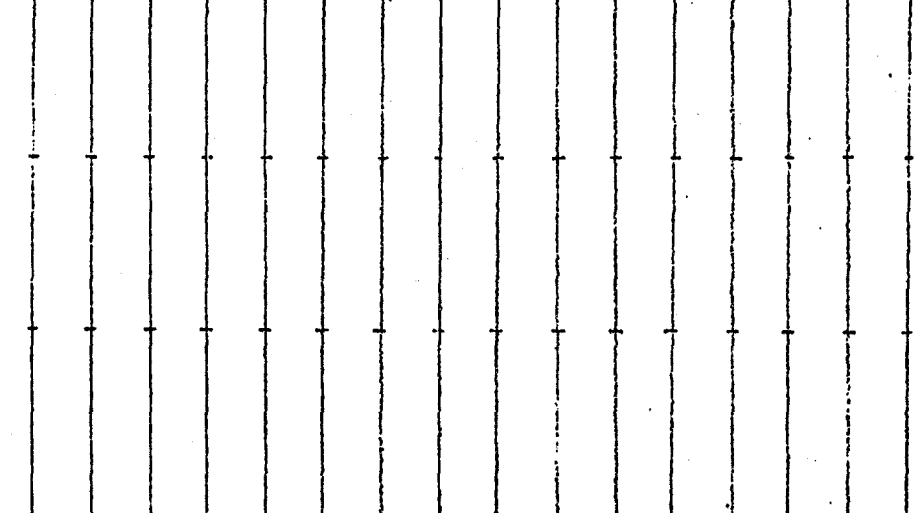
Description: This trait is characterized at the cheerful end by the child's being merry, good natured, laughing, and pleased; and at the depressed end by his being morose, gloomy, discontent, unhappy, sad. Disregard on the one hand the degree to which the child pleases you, and on the other, the manifest enthusiasm he shows. Consider the degree to which the child probably enjoys himself.

[illegible]

## CRUELTY

**Name:**

**Description:** This trait implies a tendency for the individual to hurt, harm, torment, or disturb other living organisms for his own satisfaction. The child's behavior in this respect can be expressed in physical contact, verbalization, or social fashion (such as ignoring or excluding).



Child never coldly hurts others.

Only rarely does child exhibit cruelty toward others.

Child enjoys hurting certain individuals, but does not pick on certain others with whom he may be intimate.

Child is ruthless in hurting others. Without being angered or emotionally upset, he will tease, annoy, and enjoy making others suffer.

FRIENDLINESS-SOCIAL APPREHENSIVENESS

**Name:**

Description: Friendly child tends to seek out and react positively to other children or adults. Child's success in such contact is some criterion of friendship. Friendliness implies an adaptive response on the part of the child to advances of others. Social apprehensiveness or shyness is characterized by hesitancy, by fearful behavior in response to social situations.

A series of 20 vertical lines, each with 11 horizontal tick marks, resembling a ruler or a scale. The lines are evenly spaced and extend across the width of the page.

Shows an open friendliness to everyone; quick to make clearly friendly approaches; does more than meet the other children half way.

Habitually friendly to others, but on some occasions (with new children, etc.) reserved in this respect.

Shy on first contacts with strangers and often prefers to remain at a distance; needs short association to feel at ease.

Child shy, but with a few  
—long familiar acquaintances,  
is at ease.

Child chronically shy in social situations; afraid of and avoids social contacts with children and adults.

APPROVAL SHEET

The thesis submitted by Frank Lani has been read and approved by the following committee:

Emil J. Posavac, Director  
Associate Professor, Psychology, Loyola

Jeanne M. Foley  
Professor, Psychology, Loyola

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts

December 8, 1977  
Date

Emil J. Posavac  
Director's Signature