The decoding of facial expressions and its relationship to compliance behavior in boys characterized as externalizers.

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THE DECODING OF FACIAL EXPRESSIONS
AND ITS RELATIONSHIP TO COMPLIANCE BEHAVIOR
IN BOYS CHARACTERIZED AS EXTERNALIZERS

By
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A Dissertation
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ABSTRACT

The interest in the present study was on examining the relationship between affective decoding and maladaptive behavior patterns in the classroom. Six- and ten-year-old externalizing boys and controls (classified using the Teacher's Report Form of the Child Behavior Checklist; Achenbach & Edelbrock, 1986) were compared on their ability to decode nonverbal signals of emotion as measured by the DANVA (Diagnostic Analysis of NoVerbal Accuracy Scale; Nowicki & Duke, 1989). Subjects were also compared on their interpretations of various facial expressions (happy, angry, neutral) depicted by a "teacher" to examine whether interpreting anger/hostility by such boys is related to: 1) their expectations regarding their own compliance behavior in hypothetical classroom situations and 2) teacher reports of the subjects' typical compliance behavior in the classroom. Using Multivariate Analyses of Variance, no differences were found between externalizers and controls in performance on the DANVA subtests, which included decoding of facial expressions, gestures, postures, and tone of voice reflecting the emotions of happiness, anger, sadness, and fear (p > .05). Older boys, though, were generally found to be more accurate at decoding than younger subjects (p < .05). Differences were found between externalizers and
controls in the decoding of neutral facial expressions of emotion depicted by a teacher. Specifically, Fisher Exact Test analyses indicated that externalizing boys were more likely than controls to attribute anger/hostility than other emotions to a neutral expression from a female teacher, and 10-year-old externalizing boys were significantly more likely than controls to say they would act in a noncompliant (versus compliant) manner in response ($p < .05$). The findings were discussed within the framework of Dodge's (1986) model which articulates a five-step relationship between social information processing and social behavior.
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# TABLE OF CONTENTS

ABSTRACT .................................................................................. iv

ACKNOWLEDGEMENTS ................................................................. vi

LIST OF TABLES ........................................................................... ix

LIST OF FIGURES ......................................................................... x

CHAPTER I: INTRODUCTION .......................................................... 1
  Decoding of Facial Expressions .............................................. 4
    Adults ...................................................................................... 4
    Children ................................................................................ 5
  Decoding of Facial Expressions and
    Interpersonal Functioning .................................................. 6
  Decoding of Other Nonverbal Signals and
    Interpersonal Functioning .................................................. 10
  Characteristics of Externalizing Children .......................... 12
  Externalizing Children and Noncompliance .................... 16
  Dodge's Model .......................................................................... 18
  The Present Study .................................................................. 21
  Hypotheses .............................................................................. 22

CHAPTER II: METHOD ................................................................. 25
  Subjects ................................................................................... 25
  Measures and Materials ....................................................... 27
  Procedure ................................................................................. 36
  Analyses .................................................................................. 42

CHAPTER III: RESULTS .............................................................. 48
  Hypotheses 1 and 2 ............................................................... 48
  Hypothesis 3 ........................................................................... 62
  Hypothesis 4 ........................................................................... 67
  Hypothesis 5 ........................................................................... 86

CHAPTER IV: DISCUSSION .......................................................... 89
  Dodge's Model .......................................................................... 89
    Step 1. Encoding of social cues .......................................... 90
    Step 2. Decoding of social cues--group differences .......... 91
      Decoding of social cues--age differences .................... 93
    Step 3. Response search ..................................................... 95
    Step 4. Decision step ........................................................... 96
    Step 5. Enactment ............................................................... 99
  Limitations .............................................................................. 100
  Implications ............................................................................ 104
  Directions for Future Research ........................................ 106

REFERENCES ............................................................................... 109
1. Means and Standard Deviations for Age and TRF Scores by Subject Group ........................................ 28
2. Level of Socioeconomic Status by Subject Group ... 29
3. Categories of Compliant and Noncompliant Behaviors ................................................................. 40
4. Univariate Analysis of Variance Summary Table for The Effects of Group, Age, and Group x Age on DANVA Subtest Performances ................................................. 49
5. Mean Accuracy Scores on DANVA Receptive Subtests For the Age Effect ........................................ 50
6. Mean Accuracy Scores on DANVA Receptive Subtests For Current Subjects and Male Subjects from the Study of Nowicki & Duke 1989 .................................................. 52
7. Univariate Analysis of Variance Summary Table for The Effects of Group, Age, and Group x Age on Decoding of Emotions within the DANVA Faces-Children Subtest .................................................. 54
8. Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Faces-Children Subtest ................................................................. 55
9. Univariate Analysis of Variance Summary Table for The Effects of Group, Age, and Group x Age on Decoding of Emotions within the DANVA Gestures Subtest .................................................. 57
10. Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Gestures Subtest ... 59
11. Univariate Analysis of Variance Summary Table for The Effects of Group, Age, and Group x Age on Decoding of Emotions within the DANVA Paralanguage Subtest .................................................. 60
12. Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Paralanguage Subtest ................................................................. 61
13. Interrater Reliability Coefficients by Subject Group for Classification of Responses from the Hypothetical Classroom Request Tasks ............ 68
14. Analysis of Variance Summary Table for the Sum of Compliant and Noncompliant Responses Generated in Hypothetical Classroom Request Tasks ................. 70
15. Mean Number of Combined Compliant and Noncompliant Responses Generated by Age ........................................ 71
16. Analysis of Variance Summary Table for Compliant Responses Generated in the Hypothetical Classroom Request Tasks .................................. 72
17. Mean Number of Compliant Responses Generated by Group ............................................................ 73
18. Analysis of Variance Summary Table for Noncompliant Responses Generated in the Hypothetical Classroom Request Tasks ................................ 75
19. Mean Number of Noncompliant Responses Generated by Age .............................................................. 76
20. Mean Number of Noncompliant Responses for the Expression x Group Interaction ......... 77
22. Categories of Compliant and Noncompliant Responses Developed to Classify Subjects' Rationale ........... 82
23. Percentage of Rationale Responses Falling into each Noncompliant Category by Subject Group .......... 85
24. Range of Scores, Mean Scores, and Percentiles Obtained by Children Rated as Compliant vs. Noncompliant, at each Age Level, for the Total Adaptive Functioning Score of the TRF .......... 88
LIST OF FIGURES

1. Percentage of subjects, at each age level, correctly identifying the expressions in the hypothetical classroom request tasks..................... 64

2. Percentage of subjects, at each age level, interpreting a neutral expression as reflecting anger/hostility.............................................. 66

3. Percentage of subjects generating noncompliant responses for each expression......................... 78

4. Percentage of rationale responses falling into each compliant category by subject group............... 83
CHAPTER I
INTRODUCTION

The ability to decode facial expressions of emotion has long been regarded as a skill which facilitates successful interpersonal communication (e.g., Ekman, 1982; Field & Walden, 1981; Gates, 1923). Decoding of facial expressions contributes to social interaction by conveying information about a person's affective state (Ekman & Friesen, 1975). No other form of nonverbal communication, such as body movements, gestures, or postures has been found to surpass the ability of the face to convey information about emotions (Collier, 1985; Ekman & Friesen, 1975; Rosenthal & DePaulo, 1979). The affective information gained from nonverbal cues is used to regulate behavior accordingly, a process referred to as social referencing (Klinert, Campos, Sorce, Emde, & Svejda, 1983). By implication, problems in decoding expressions, and other nonverbal signals, may play a causal role for individuals evidencing problems in behavior regulation. Indeed, recent work with populations of children having social-interpersonal difficulties (e.g., socially unpopular children) has supported a connection between facial expression decoding deficits and maladaptive social behavior (Nowicki & Duke, 1989a).

Externalizing children represent a population that has problems in relationships with adults and peers and also
manifests maladaptive social behavior (Achenbach, 1966; Quay, 1986a). The term "Externalizing" refers to one of two empirically derived broad-band groupings of behavior problems (Achenbach & Edelbrock, 1978, 1986). The externalizing group is distinguished by undercontrolled behavior, such as aggressiveness or antisocial behavior. The second broad-band group is known as "Internalizing" and is characterized by overcontrolled, inhibited behavior, such as fearfulness, sadness, and social withdrawal (Achenbach & Edelbrock, 1986). The broad-band categories have emerged repeatedly, even with a diversity in measuring instruments (e.g., questionnaires, direct observation), subjects (e.g., preschool, school-age, and adolescent children), and raters (e.g., parents, teachers) (Achenbach & Edelbrock, 1978; Quay, 1986a). The externalizing grouping, however, is associated with somewhat higher reliability and validity than the internalizing group, as the former relies less on inferences about internal processes within children for identification (Achenbach & Edelbrock, 1978; Achenbach, McConaughy, & Howell, 1987; Garrison & Earls, 1985).

Several studies have suggested that externalizing children (e.g., aggressive children, juvenile delinquents) have difficulty in decoding nonverbal messages (Argyle, 1981; Dodge, 1980; Dodge & Frame, 1981), with aggressive children described as having a bias towards inferring hostility when presented with ambiguous stimuli (Dodge,
1980; Dodge & Frame, 1982). The focus of the present research was on examining the ability of externalizing boys to decode nonverbal signals of emotion. A further interest was in determining whether decoding of facial expressions (e.g., interpreting hostility) by such boys is related to: 1) their expectations regarding their own compliance behaviors in a hypothetical classroom situation and 2) teacher reports of the subjects' typical compliance behaviors in the classroom.

This chapter will present a brief review of the literature on interpretation of facial expressions, including recent work which has demonstrated a relationship between social interaction problems in children and impairment in decoding of facial expressions. Research will also be presented which focuses on the relationship between social-interaction problems and decoding of other nonverbal signals (e.g., intention cues, or social cues reflecting the motivation underlying overt behavior). This review will be followed by a summary of the characteristics of externalizing children, and a discussion of Dodge's (1986) cognitive model with which he attempts to explain deviant responding in children by considering their performance in a sequence of steps, the first and second of which involve detection and interpretation of social cues. According to Dodge, the more inaccurately and inefficiently a child processes information at each step, the more likely that
child will respond in a manner considered incompetent by others.

Decoding of Facial Expressions

Adults. Serious attention to the decoding of expressions was initiated by Charles Darwin (Ekman, 1973; Izard, 1971). Darwin's main interest was in determining whether facial expressions of emotion are universal. While Darwin's evidence is considered weak by today's standards because of the lack of rigorousness in his methodology, he interpreted it as supporting his hypothesis (Ekman, 1973). Researchers more than 100 years later, using quite stringent procedures, have demonstrated conclusively that there are certain universally recognizable facial expressions of emotion (Boucher & Carlson, 1980; Ekman, 1973; Ekman & Friesen, 1971, 1975; Ekman, Sorensen, & Friesen, 1969; Izard, 1971; Kirouac & Doré, 1982; Shimoda, Argyle, & Ricci-Bitti, 1978). The six expressions that have been identified by most researchers as universal are happiness, sadness, fear, disgust, anger, and surprise (Ekman & Friesen, 1975), with happiness being the most widely recognizable (e.g., Kirouac & Doré, 1982, 1983, 1985).

Next to the study of the universality of facial expressions, research on sex differences in decoding ability has received the most attention in adults. Results have typically revealed either no differences (e.g., Eiland &
Richardson, 1976; Kirouac & Doré, 1982, 1983, 1985), or an advantage for females over males (e.g., Zuckerman et al., 1975, 1976). Hall (1978), in a review of 75 studies of decoding ability in adults, concluded that this trend could not be reliably explained by sample size, age, sex of sender, or communication modality (visual vs. auditory).

Children. With children, predictably, the focus of studies in this area has been on determining developmental differences in decoding ability. Various investigators, using a number of techniques, have demonstrated improved decoding accuracy with age (Camras & Allison, 1985; Felleman, Barden, Carlson, Rosenberg, & Masters, 1983; Gates, 1923; Glitter, Mostofsky, & Quincy, 1972; Izard, 1971; Harrigan, 1984; Kirouac, Doré, & Gosselin, 1985; Strong, 1978; Tremblay, Kirouac, & Doré, 1987; Walden & Field, 1982). Age trends suggest improved recognition of expression until approximately 10 years of age (Field & Walden, 1981). As with adults, happiness is generally reported as the easiest expression for children to identify (Camras & Allison, 1985; Felleman et al., 1983; Glitter et al., 1971; Harrigan, 1984; Kilbride & Yarczower, 1980; Strong, 1978; Zuckerman & Przewuzman, 1979). With regard to sex differences in children, studies employing adult facial expressions as stimuli have generally identified no sex differences in children (Gates, 1923; Ekman & Friesen, 1971;

The described findings for both adults and children, however, pertain to recognition of posed facial expressions. The study of the recognition of spontaneously produced expressions has received less attention, and the results obtained have not been as clear (Ekman, 1982). In a review of studies employing spontaneous expressions, Ekman (1982) concluded that accuracy in recognition has been demonstrated between positive and negative states, but has not been demonstrated for more specific states within these groups (e.g., happiness vs. surprise).

Decoding of Facial Expressions and Interpersonal Functioning

According to Nowicki and Duke (1989a), deficits in nonverbal communication (both in expressing and decoding signals) can be expected to be associated with interpersonal problems and emotional problems in much the same way that verbal and language deficits are associated with cognitive and academic problems. For example, a child with a problem in receptive language may be misperceived as lacking in intelligence or as not well educated. A child who uses nonverbal language inappropriately (e.g., misinterpreting an angry face as a happy one) may be perceived as different
and, consequently, may be avoided. The implications of deficits in using and understanding nonverbal language are staggering considering the importance of the nonverbal versus verbal channel in communicating emotional meaning. Mehrabian (1968a, 1968b) concluded that over 90% of information that is communicated interpersonally is carried through nonverbal channels.

Recently, the relationship between decoding of facial expressions and social functioning has been studied by Stephen Nowicki and his colleague Marshall Duke (1989a). These researchers developed a scale to measure the ability of 6- to 10-year-old children to decode and express nonverbal signals (e.g., facial expressions, postures, gestures, tone of voice). Using their instrument, called the Diagnostic Analysis of Nonverbal Accuracy (DANVA) Scale (Nowicki & Duke, 1989b), with over 1,000 children, they found that: (1) accuracy of sending and receiving nonverbal social information improves with age; (2) lower DANVA accuracy scores were related to ineffective peer behavior, as reflected by negative sociometric ratings, a finding that was stronger for receptive tests; and (3) in most instances, children who were emotionally disturbed (students in classes for severely emotionally disturbed students) were less accurate in processing nonverbal social information than nonemotionally disturbed children. Significant differences were observed between the two groups in recognition and
production of facial expressions and in recognition and expression of emotion through tone of voice (Nowicki & Duke, 1989a). Nowicki and Duke also reported that there were no significant relationships between DANVA subtest accuracy scores and IQ scores.

The relationship between impaired social functioning and decoding ability has also been demonstrated by McCauley, Kay, Ito, and Treder (1987). These researchers studied 7- to 19-year-old girls with Turner's syndrome. Individuals with this syndrome are phenotypic females who have one normal and one absent or structurally abnormal sex chromosome. Short stature and failure in gonadal development are typical of this group. According to McCauley et al., research has reliably demonstrated that girls with Turner's syndrome are similar to control groups in verbal IQ, but they exhibit deficits in visual-spatial processing. In addition, these girls are described as immature and as having poor peer relationships and a profile of behavior problems.

In their study, McCauley et al. (1987) found that the girls with Turner's syndrome performed significantly more poorly than a control group of short-stature girls in the differentiation of facial expressions of positive ("come closer") and negative ("go away") affect. This finding could not be explained by poorer visual-spatial skills in the Turner's girls because the same findings emerged when
visual-spatial ability (Performance IQ) was controlled by analysis of covariance. The decoding deficits observed in the Turner syndrome females were thought to provide a partial explanation for the typically observed finding that these females are shy, withdrawn, and have poorer social skills compared to same-aged peers.

Fuller (1988) investigated decoding of facial expressions in fourth through eighth grade conduct disordered and noncon conduct disordered boys. Except for the finding of better recognition accuracy among the nonconduct disordered males for the facial affective display of disgust, no differences emerged in recognition accuracy between the groups. Moreover, conduct disordered boys were found to be no more likely than the nonconduct disordered group to attribute a negative intent to facial displays (measured by a rating of friendliness). The failure to demonstrate expected differences between the two groups (acknowledged by Fuller) may have been the result of an overly lengthy stimulus exposure time (5 seconds). In typical interactions, decoding of facial expressions is based on an extremely brief exposure time because spontaneous expressions are typically very transient. Fuller's procedure may not have adequately simulated typical social conditions under which facial expressions are decoded.
Zuckerman and Przewuzman (1979) studied the ability of preschoolers to decode and encode facial expressions of emotion. Decoding ability involved asking children to label emotions from photographs and slides (i.e., happiness, sadness, anger, fear, surprise). Encoding ability was assessed by asking the children to model the five emotions. Zuckerman and Przewuzman found that compared to youngsters rated as having a poor adjustment to school, children rated as better adjusted demonstrated better nonverbal decoding and encoding ability.

Decoding of Other Nonverbal Signals and Interpersonal Functioning

Problems in decoding of nonverbal messages have been observed in other populations of children who are identified as having social-interpersonal difficulties. For example, Argyle (1981) demonstrated that aggressive juvenile delinquents have difficulties in discriminating approval and annoyance in others. Dodge (1980) and Dodge and Frame (1982) reported that when aggressive boys are asked to interpret ambiguous stimulus provocations directed towards them, there is a bias towards inferring hostility.

In later work, Dodge, Murphy, and Buchsbaum (1984) showed that in comparison to their socially competent peers, kindergarten, second-, and fourth-grade children who have difficulty relating to peers are deficient in the skill of
discriminating intention cues. Dodge et al. found that socially deviant children (based on peer sociometric ratings) were less accurate than popular children in the detection of prosocial and accidental intentions, and when errors occurred, they were biased in the direction of interpreting intentions as hostile. When asked, hypothetically, how they would respond to the perceived hostility, the socially deviant children were more likely than the popular children to generate aggressive responses.

In summary, facial expressions have been found to surpass other nonverbal signals in conveying information about emotions. Research on decoding of facial expressions in adults has revealed that there are at least six universally recognized facial expressions of emotion (happiness, sadness, fear, disgust, anger, and surprise). The expression of happiness has been reported as the most easily recognizable for adults and children alike. Studies examining sex differences in adults' ability to decode facial expressions of emotion have reported either no sex differences, or an advantage for females. With children, the study of developmental differences in decoding ability has revealed that decoding ability improves until about 10 years of age. In contrast to research with adults, however, sex differences have not been reported in studies involving children.
The ability to decode facial expressions of emotion, and other nonverbal signals, is considered important for successful interactions because the affective information gained from these sources is used in regulating behavior accordingly. The implication of this view is that maladaptive social functioning and problems in decoding ability should be related. Recent research (Nowicki & Duke, 1989a; McCauley et al., 1987; Dodge, 1980; Dodge et al., 1982, 1984) has demonstrated empirically the link between problems in decoding of nonverbal signals and maladaptive social functioning in three groups of children (aggressive children, socially unpopular children, and females with Turner's syndrome). Externalizing children represent a population that also exhibits maladaptive social behavior; these children share a number of the characteristics of the above youngsters. The following discussion describes externalizing children.

**Characteristics of Externalizing Children**

Two major and distinct patterns of behavior in childhood that are associated with interpersonal problems with peers and adults are Conduct Disorder and Anxiety-Withdrawal-Dysphoria (Quay, 1986a). The conduct disorder pattern is characterized by acting out on the environment, while the shy-withdrawn pattern is one of withdrawal and isolation (Quay, 1986a). These patterns correspond closely
to the categories of Externalizing vs. Internalizing which have been consistently identified in problem children by Achenbach (1966, 1985; Achenbach & Edelbrock, 1978; Edelbrock & Achenbach, 1984; Edelbrock, Greenbaum, & Conover, 1985).

Achenbach's patterns of externalizing and internalizing emerge consistently and reliably for both males and females aged 4 to 16, whether data come from case histories, or from teacher-, parent-, or self-reports (Achenbach, 1966; Achenbach & Edelbrock, 1978; Edelbrock & Achenbach, 1980, 1984; Lorion, Cowen, & Caldwell, 1974; McConaughy, Achenbach, & Gent, 1988). Recently, the externalizing and internalizing patterns have been observed for parent ratings of Dutch children aged 4 to 16, supporting cross-cultural stability of the behavior patterns (Achenbach, Conners, Quay, Verhulst, Howell, 1989; Achenbach, Verhulst, Baron & Akkerhuis, 1987; Achenbach, Verhulst, Baron, & Althaus, 1987). While the externalizing and internalizing patterns have been observed in both males and females, externalizers outnumber internalizers by approximately two to one among boys, while the ratio is reversed for girls (Achenbach, 1966).

The externalizing and internalizing patterns are broadband categories with a number of more specific patterns (narrow-band factors) subsumed within them. For example, the narrow-band factors known as "aggressive" and
"delinquent" are found under the externalizing category, and the narrow-band factors known as "depressed" and "uncommunicative" are found under the internalizing category (Achenbach, 1986, 1985). The externalizing pattern, because of its more observable manifestations, is associated with greater reliability and validity than is the internalizing one, which depends more on inferences regarding internal states for identification (Achenbach & Edelbrock, 1978; Achenbach, McConaughy, & Howell, 1987; Garrison & Earls, 1985). The narrow-band factors are not associated with the same high discriminability as the broad-band factors (Achenbach, McConaughy, & Howell, 1987; Garrison & Earls, 1985).

Quay (1986a) reported the most frequently occurring descriptors that are associated with a number of commonly identified behavior patterns. Data were obtained from approximately 61 studies of 3- to 18-year-old children (preschool and school-aged children, children diagnosed as disturbed in schools and clinics, and adjudicated delinquent children and adolescents). Conduct problem/externalizing children were observed to display behaviors such as fighting and hitting, disobedience and defiance, temper tantrums, destruction of one's own and others' property, impertinence, uncooperativeness, and refusing direction (for a comprehensive summary see Quay, 1986a, 1986b). Unlike externalizers, internalizers have not been described as
showing behavioral dyscontrol, disobedience, or defiance, but rather have been described as anxious, fearful, and timid (for a comprehensive summary see Quay, 1986a).

Other research has compared externalizers and internalizers. Externalizers have been described as having poorer social and academic functioning than internalizers (Achenbach, 1966; Achenbach & Edelbrock, 1978; McConaughy et al., 1988). Externalizing 6-to-11-year-old boys were reported by McConaughy et al. (1988) as significantly less skillful than internalizers on parent ratings of social competence and teacher ratings of adaptive functioning.

The maladaptive behavior that is characteristic of externalizers is expected to put them in conflict with others. Achenbach (1966) reported that compared to overcontrolled/internalizing children and their families, undercontrolled/externalizing children and their families are in more open conflict with other people and are less socially competent. From a learning perspective, these findings suggest that the families of externalizers have probably not provided the combination of reward contingencies and good role models which contribute to deterring antisocial responses and promoting socialized responses (Achenbach, 1966; Heatherington & Martin, 1986). Although deviant behavior is also manifested by internalizers (e.g., anxiety, withdrawal), their family backgrounds suggest a different socialization process which
produces acquisition of behavioral reactions which are more likely to involve avoidance of social contacts rather than active behaviors that intrude on others (Achenbach, 1966; Hetherington & Martin, 1986).

Research on children with nonoptimal family backgrounds (e.g., abused children, children from disrupted families) has revealed a poorer performance in decoding of emotional expressions compared to children from more stable backgrounds (e.g. nonabused children, children with both parents present) (Camras, Grow, & Ribordy, 1983; Camras et al., 1988; Reichenbach & Masters, 1983). These findings have been taken to support the view that a child’s affective experience may influence his/her judgement of emotion.

Externalizing Children and Noncompliance

The frequency with which externalizing children are described as disobedient and defiant (Achenbach, 1966; Quay, 1986a, 1986b) suggests that in both the home and school setting, these children can be expected to have problems with compliance. Serious noncompliant behavior is the most frequent reason for psychiatric referral of young children (Bentovim, 1973; Forehand, 1977; Wolff, 1961). Compliance behavior by children is valued and considered necessary, in general, by adults (Marion, 1983). Among elementary school teachers, compliance is regarded as the most desirable characteristic in their students (Hersh & Walker, 1981;
cited in Strain, Lambert, Kerr, Stagg, & Lenker, 1983). Considering this information, it is likely that issues of compliance are particularly relevant between externalizing children and adults in the school setting.

Strain et al. (1983) examined child compliance in response to commands from teachers. Nineteen teachers and 130 children in Kindergarten through Grade 3 were the focus of study. The children had been divided into two groups: "making a good social adjustment to school" (high rated) and "not making a good social adjustment to school" (low rated). Results over a four-week observation period revealed that the high rated children were more likely to comply with commands than low rated children.

Problems in decoding of facial expressions have been implicated as a source of maladaptive behavior. An examination of how problems in decoding of facial expressions can lead to inappropriate (noncompliant) behavior in the school setting would be particularly relevant for externalizing children.

Recently, Neill (1989) examined children's reactions to teacher nonverbal communication. Although Neill examined the reactions of 9- to 17-year-olds to facial expressions, gestures, and postures, only the findings with respect to facial expressions are discussed here. In the study, the children were shown line drawings of individuals identified as teachers. The pictures, which depicted prosocial and
hostile nonverbal behaviors, were similar except for facial expression (smiling vs. frowning). Findings revealed that facial expressions had a strong impact on whether children interpreted the teacher as being friendly vs. unfriendly, cheerful vs. bad tempered, interesting vs. boring, and firm vs. weak.

**Dodge's Model**

Dodge's (1986) cognitive model provides a theoretical framework within which the relationship between affective decoding and children's maladaptive behavior patterns may be examined. The model articulates sequential steps between decoding of social cues and behavioral initiation, thereby providing a means of examining at which points in the process socially incompetent children deviate from socially competent children.

Dodge (1986; Dodge et al., 1986) uses an information processing model to explain social competence in children. Dodge conceptualizes social competence as an outcome that occurs after a sequence of five steps. Each step is considered to represent a separate skill or ability. For Dodge, if a child processes information skillfully, efficiently, and accurately at each step, there is a higher probability that s/he will respond in a manner that is regarded by others as competent. Inefficient or inaccurate
processing at any step is believed to increase the probability of behaving in a deviant way.

According to Dodge's model, the first step of social information processing is encoding social cues in the environment (such as a facial expression). Due to the massive amount of information that is available in the social environment at any one time, a child must learn the skills of attending to the appropriate cues and storing this information efficiently for later use.

Once cues have been encoded, the next step involves the interpretation of these cues. The child's memory and past experiences provide a context for the understanding of these cues. According to Dodge, the first two steps are often inseparable.

The next step in processing social information is a response search. When the child has interpreted information, s/he can engage in the process of searching for possible behavioral alternatives. Examination of a child's functioning at this point allows some understanding as to whether deviant responses are a function of deviant processing up to this level, or whether deviant responses are a function of inadequate or biased search skills (e.g., the child only generates or accesses deviant responses).

The fourth step represents a decision step. At this point, the optimal occurrence would be for the child to evaluate the possible consequences of each generated
response and to estimate the likelihood of a favorable outcome.

Finally, when the optimal response is selected, the child can proceed to carry it out. Dodge refers to this process as enactment.

According to Dodge, the steps occur rapidly in time and often at an unconscious level. The steps are also assumed to occur repeatedly in a single social transaction.

Dodge asserts that the model must be applied to one specific context at a time in order to obtain useful information. This approach is necessary because children may function with a different degree of competency in different situations. To understand why a child behaves inappropriately in a certain circumstance, one must focus on that circumstance. Dodge et al. (1986) applied his model to two separate areas: peer group entry and responding to a provocation by peers.

In their first study, Dodge et al. compared the performance of kindergarten and second-graders rated by teachers and peers as socially competent or incompetent on peer group entry ability. The children saw videotaped scenes of a peer entering a group situation and were asked questions about the entry child's behavior. Then, all children were asked how they would attempt to join a situation in which peers were already engaged. Subjects were also asked to role play how they would enter such a
situation. One to two weeks later, the children were actually observed in a peer group entry task. It was found that measures of each of the five steps of processing predicted children's competence and success at this task. The children who were most likely to function adequately in a peer group entry situation were those who utilized presented cues (Step 1), who generated competent and nonaggressive strategies in response to a hypothetical entry situation (response search Step 3), who judged incompetent responses as undesirable (response evaluation Step 4), and who demonstrated effective enactment of the responses (Step 5). Similar findings were reported with a sample of clinically referred second-through-fourth grade aggressive children compared to well-adjusted controls. No differences were reported between these groups, however, for response to provocation by peers.

**The Present Study**

The first interest in the present study was in the nonverbal decoding ability of externalizing boys from regular education classrooms. The performance of externalizing and control boys (6- and 10-year-old males, classified by Achenbach & Edelbrock's [1986] system) was compared on decoding of various nonverbal signals (facial expressions, gestures, postures, and tone of voice). Boys were selected as the population of interest because
comparable research in this area has typically involved boys.

The second purpose of the study was to examine how perceptions of facial expressions play a role in determining behavior. This aspect was studied within the context of Dodge's (1986) model. In order to use Dodge's model, it was necessary to focus on a specific situation because children may behave differently depending on the circumstances (Dodge, 1986). Children's behavior in school was selected as the broad area of focus. Within the school setting, the specific area of interest selected was children's compliance/noncompliance to teachers' requests within the classroom setting.

Within the specific context, Externalizing and normal children were compared on: a) their interpretation of four facial expressions (happy, angry, and two neutral expressions), b) the responses they generated on the basis of their interpretation, c) the behaviors they said they would elect to carry out from those generated, and d) their typical performance in such situations in the school environment as measured by teacher ratings.

Hypotheses

Hypothesis 1. Based on research which has demonstrated that populations of children experiencing social interaction difficulties exhibit problems in decoding of nonverbal cues
(e.g., Dodge et al., 1982, 1984, 1986), it was hypothesized that children classified as externalizers would exhibit a poorer performance compared to normal controls in the decoding of nonverbal signals of emotion (e.g., facial expressions, postures, gestures, and tone of voice).

**Hypothesis 2.** It was predicted that accuracy scores would be higher for older (10-year-old) than younger (6-year-old) boys, as is consistently reported in developmental studies on recognition of nonverbal information.

**Hypothesis 3.** Based on work of Dodge and his associates (Dodge, 1980; Dodge & Frame, 1982; Dodge et al., 1984), with socially deviant and aggressive children, it was expected that externalizing children would be more likely than controls to attribute negative emotional states (anger/hostility) rather than other states (e.g., neutral, happy) to a neutral expression.

**Hypothesis 4.** Based on the work of Dodge and his colleagues, it was expected that when attributions of negative affect (anger/hostility) were made to a stimulus, externalizing children would be more likely than controls to generate socially inappropriate or incompetent behavioral responses (i.e., noncompliant behavior) in the situations.
Hypothesis 5. It was expected that children who
developed primarily noncompliant responses would be children
rated as noncompliant in school by their teachers.
CHAPTER 11

METHOD

Subjects

The 60 male subjects who participated in the study were drawn from regular education classes in ten elementary schools in Southern Ontario. Thirty 6-year-olds were recruited from Grades Kindergarten and 1, and thirty 10-year-olds were recruited from Grades 4 and 5.

These children were selected by the following process. Forty-six classroom teachers were asked to nominate two different types of boys: 1) boys who could be described as acting out on the environment, frequently engaging in behaviors such as being uncooperative, fighting and hitting, having temper tantrums, and being resistive, disobedient, and defiant, and 2) boys who could be described as typical and average in both behavior and academic achievement. Teachers were also asked to consider only those children without any uncorrected vision or hearing impairments, any known brain injury, or any significant learning problems (e.g., identified learning disability). Appendix A provides the instructions for nomination given to the classroom teachers.

For the boys that were nominated, the teachers were asked to send home letters of parental consent (Appendix B). The parent(s) of 125 boys returned forms giving permission for their child to participate in the study. For each of
these boys, teachers completed the Teacher's Report Form of the Child Behavior Checklist (TRF; Achenbach & Edelbrock, 1986). Using scores from the TRF children were classified as externalizers or controls.

For the purposes of this study, externalizers were boys who obtained T-scores of 60 or greater on the Externalizing scale of the TRF and whose scores on the Internalizing scale were at least 10 points lower. Control subjects were boys whose scores on both the Internalizing and Externalizing scales of the TRF fell within the T-score range of 39 to 50, but whose scores were not separated by 10 points (1 standard deviation). Of the 125 candidates, 70 children met the criteria delineated for externalizers or controls based on the TRF. At the younger age level, there were 18 externalizing subjects and 16 controls, while at the older age level, there were 16 externalizing subjects and 20 controls.

Across each of the four groups, subjects were selected that matched with respect to their parent(s)' level of socioeconomic status. Level of socioeconomic status was calculated using Hollingshead's (1975) criteria. Hollingshead delineated five levels of socioeconomic status. In the present study, the two lower levels were collapsed as subjects' scores fell primarily within the adjacent extremes of the two lower categories. Matching with this variable
resulted in 15 participants in each of the four groups (externalizers and controls, at each age level).

Table 1 summarizes the mean ages and the mean T-scores obtained on the TRF for each of the four groups selected. Results of a t-test revealed that the externalizing scores on the TRF for 6-year-old and 10-year-old experimental subjects were not significantly different, \( t(28) = 1.69, p > .05 \). The composition of groups by level of socioeconomic status in summarized in Table 2.

Measures and Materials

The Teacher Version of the Child Behavior Checklist: Boys aged 6-11 (Achenbach & Edelbrock, 1986; Edelbrock & Achenbach, 1984). The Teacher's Report Form of the Child Behavior Checklist (TRF) is a 4-page questionnaire developed to be completed by teachers or teacher aides. The TRF asks a respondent questions regarding a child's academic performance, adaptive functioning, and behavior problems. Demographic information is also requested (e.g., child's age, sex, race, grade in school). The TRF was developed from the Child Behavior Checklist--Parent's Rating Form (Achenbach, 1966; Achenbach & Edelbrock, 1978; Edelbrock & Achenbach, 1980). Items on the parent form that would be inappropriate for teachers to rate were eliminated for the TRF (e.g., disobedient at home, has nightmares, overeats).
### Table 1

**Means and Standard Deviations for Age and TRF T-Scores by Subject Group**

<table>
<thead>
<tr>
<th>Group</th>
<th>6-year-olds</th>
<th></th>
<th>10-year-olds</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Con</td>
<td>Ext</td>
<td>Con</td>
<td>Ext</td>
</tr>
<tr>
<td>Age</td>
<td>6.41</td>
<td>6.48</td>
<td>10.44</td>
<td>10.52</td>
</tr>
<tr>
<td></td>
<td>(0.33)</td>
<td>(0.44)</td>
<td>(0.34)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Externalizing</td>
<td>43.89</td>
<td>66.26</td>
<td>43.27</td>
<td>70.60</td>
</tr>
<tr>
<td>Score on TRF</td>
<td>(4.31)</td>
<td>(5.60)</td>
<td>(3.70)</td>
<td>(8.19)</td>
</tr>
<tr>
<td>Internalizing</td>
<td>45.26</td>
<td>56.26</td>
<td>44.26</td>
<td>59.06</td>
</tr>
<tr>
<td>Score on TRF</td>
<td>(3.35)</td>
<td>(6.42)</td>
<td>(3.71)</td>
<td>(7.38)</td>
</tr>
</tbody>
</table>

**Note.** Con = Controls; Ext = Externalizers. Numbers in brackets represent standard deviations.
Table 2

Level of Socioeconomic Status by Subject Group

<table>
<thead>
<tr>
<th>Social Strata</th>
<th>6-year-olds</th>
<th>10-year-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Con</td>
<td>Ext</td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>III</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>IV</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. Con = Controls; Ext = Externalizers;
I = Major business and professional;
II = Medium business, minor professional, technical;
III = Skilled craftsmen, clerical, sales workers;
IV = Machine operators, semi-skilled workers and unskilled labourers, menial service workers.

Based on Hollingshead (1975).
Current performance in academic subjects is rated on 5-point scales ranging from "far below grade" (1) to "far above grade" (5). The child's adaptive behavior functioning is assessed through four questions. The respondent is asked to rate the child compared to typical pupils of the same age on: (a) How hard he is working; (b) How appropriately he is behaving; (c) How appropriately he is learning; and (d) How happy he is. These items are rated on 7-point scales ranging from "much less" (1) to "much more" (7) and are summed to yield a total adaptive functioning score.

The TRF also includes 118 specific behavior problems that are relevant to the school setting (e.g., fails to finish things, difficulty following directions, disrupts class discipline). These items are rated on a 0-1-2 scale, for which 0 indicates a problem is "not true" of the child, 1 indicates it is "somewhat or sometimes true," and 2 indicates it is "very often true."

The TRF for boys 6-to-11-years yields a profile which includes eight factor-analytically derived behavior problem scales (narrow-band scales) labelled: Anxious, Social Withdrawal, Unpopular, Self-Destructive, Obsessive-Compulsive, Inattentive, Nervous-Overactive, and Aggressive. The first two scales load on the broad-band Internalizing factor, whereas the last three scales load on the broad band Externalizing factor. Achenbach and Edelrock (1986, p. 30) suggest that children be classified as Externalizers or
Internalizers when their total behavior problem score exceeds the 89th percentile for their sex/age group and when there is a difference of at least 10 points between their Externalizing and Internalizing scores.

The eight behavior problem scales were derived from analyzing the profiles of 450 clinically referred boys. Norms were constructed from a sample of 300 randomly selected nonreferred boys.

Edelbrock and Achenbach (1984) reported on the test-retest reliability of the TRF. Findings for a sample of 21 boys attending a special school for disturbed children revealed mean reliability coefficients of .89, .77, and .64 for a one-week, two-month, and four-month period, respectively. Edelbrock et al. (1985) reported mean test-retest reliability coefficients over a one-week interval to be .91 for the externalizing scale, .80 for the behavior problem scales, and .91 for the four adaptive scales. The sample in this study consisted of 104 disturbed boys aged 6-to-11 years.

Support for the criterion validity of the TRF was provided by Achenbach and Edelbrock (1986). These researchers demonstrated that the TRF could effectively discriminate between referred and nonreferred American children. Construct-related validity was demonstrated by a strong correspondence between the Externalizing scales of
the TFR and the Conners Teacher Rating Scale (Edelbrock et al., 1985).

**Teacher Compliance Rating.** This measure was developed by the author to obtain a rating of the child’s behavior in school in relation to compliance behavior. Teachers were asked to consider the child’s overall compliance behavior in the classroom and to decide whether: The child is typically compliant; The child is sometimes compliant, and sometimes not compliant; or, the child is typically noncompliant. Research has demonstrated that teacher ranking or rating methods are quite reliable and valid. For example, ratings on behaviors such as social competence, popularity, and social behavior have revealed close correspondence with actual observations of child performance (Connolly, 1983).

The behaviors which constitute compliance and noncompliance (Direct defiance, Simple Refusal, Passive Noncompliance, Negotiation) were defined for the teachers. These categories are the same as the ones that were used to judge children’s responses on the hypothetical classroom request tasks (described later in this chapter). The Teacher Compliance Rating Form was included with the materials given to teachers (Appendix A).

**The Diagnostic Analysis of Nonverbal Accuracy (DANVA) Scale** (Nowicki & Duke, 1989b). The DANVA is comprised of
eight subtests, four measuring nonverbal receptive abilities
and four measuring nonverbal expressive abilities. In the
present study, only the receptive subtests were
administered. A description of the receptive subtests
follows.

**Facial Expressions.** This subtest consists of 40 slides
of facial expressions. Half of the slides are of adults' 
expressions, while the remaining half are of children's
expressions. For both the adult and child faces, there are
four slides (two males and two females) for each of the
emotions of happy, angry, sad, and fearful; and four neutral
slides. Subjects' accuracy on the neutral slides cannot be
computed because they are asked to label expressions as
either happy, angry, sad, or fearful, but a "neutral"
alternative is not provided. Consequently, subjects' scores
can range from 0 to 16 for both the adult and child
expressions.

Slides of the expressions are presented for an interval
of one second. This brief exposure time is necessary in
order to simulate typical conditions in everyday
interactions (personal communication, Marshall Duke, January
26, 1990). The adults' expressions were taken from Ekman
and Friesen (1974), while the child expressions were taken
from the Children's Affect Test (described in McCauley et
al., 1987).
Postures. This subtest consists of 12 slides of an adult showing various types of postures (facial expressions are hidden). Each of the four emotions (happy, angry, sad, fearful) are represented by three slides, presented for an interval of one second. Scores can range from 0 to 12.

Slides for the postures were originally developed with adult and child models. However, because adult models' poses were more reliably responded to than were children's, only the former were included in the DANVA. The poses included in the DANVA were those that had received 80% or greater agreement when rated by groups of adults, adolescents, elementary- and preschool-aged children.

Gestures. Twelve slides of a model posing the gestures of happy, angry, sad, and fearful (without facial expressions showing) are included in this subtest. The slides are presented for an interval of one second. The gestures included in the DANVA were those selected by the same procedures described for the postures (i.e., 80% agreement by the same groups of raters). Scores on the gestures subtest can range from 0 to 12.

Paralanguage. This subtest consists of 16 trials in which the same sentence ("I am going out of the room now and I'll be back later") is said by a model to reflect one of the four emotions of happy, angry, sad, and fearful. The
tape included in the DANVA was developed by having several children who were 10- or 11-years-old read the stimulus sentence. The obtained recordings were then played for the same raters used to judge the posture and gesture stimuli. The vocalizations of one female and one male child met the criterion of being accurately identified by raters more than 80% of the time. The procedure in the DANVA is to present the female child's vocalizations, and to administer the male's if more than 16 trials are required. Scores for this subtest can then range from 0 to 16, or 0 to 32, depending on the number of trials given.

Research by Nowicki and Duke (1989a) has supported construct validity of the DANVA, as well as acceptable test-retest reliability. In support of the DANVA's construct validity, it was found that nonverbal social processing improves with age, and is related to peer popularity and emotional disturbance. Test-retest reliability was examined for 1001 children after a four week interval; coefficients of reliability were .84, .86, .77, and .74, for the facial expression, gesture, posture, and paralanguage receptive subtests, respectively. The DANVA subtests were designed to be administered individually, or in groups.

**Stimuli in the Hypothetical Classroom Request Tasks.** Slides of facial expressions for these tasks were derived from Ekman & Friesen's (1976) *Pictures of Facial Affect.*
The Pictures of Facial Affect is a collection of 110 slides made of 14 adult subjects (males and females) posing the emotions of: happiness, sadness, fear, anger, disgust, surprise, and a neutral expression. The 110 slides were those associated with the highest rater reliability from a larger pool of slides by Ekman & Friesen. Four slides were selected: two neutral expressions (one of a male face, and one of a female face), one happy expression, and one angry expression. The happy and angry expressions were represented by female posers. Females were selected as the posers because the majority of elementary school teachers are female. The slides of the four expressions were those not already included in the adult stimuli for the DANVA (i.e., stimuli: MF1-6, NR2-7, PE2-4, C2-3).

Procedure

Teachers in Grades Kindergarten, 1, 4, and 5 were given a description of the types of subjects required for the research (externalizers and controls) and, after consenting to participate, were asked to select five boys who best fit each description. Teachers were asked to refrain from nominating children known to have uncorrected vision or hearing impairments, known brain injury, or identified learning problems (Appendix A).

Teachers sent home parental consent forms (Appendix B) for those children they had nominated. The Parental Consent
Form contained a section which asked parents to provide information on their family. Responses were used to determine the family's level of socioeconomic status using Hollingshead's (1975) criteria.

For the boys whose parent(s) gave consent, teachers were given to complete the Achenbach Child Behavior Checklist--Teacher's Report Form, and the Teacher Compliance Rating Form, in that order. Children who met the criteria for externalizers or controls based on the TRF were administered the hypothetical classroom request tasks and the DANVA subtests.

The children were tested individually in a quiet room in their school. The hypothetical classroom request tasks were administered by the author and the DANVA subtests were administered, immediately following, by a female undergraduate research assistant. This order was necessary to avoid possible biasing effects in children's interpretation of stimuli in the hypothetical classroom tasks. The DANVA asks children to indicate whether various facial expressions, gestures, postures, and voices are expressing happiness, sadness, anger, or fear. If the DANVA had been presented prior to the hypothetical classroom request tasks, during which children were asked to label various facial expressions, they may have used only the previously mentioned alternatives in identifying the stimuli. Prior to beginning, each subject was given the
opportunity to accept or decline the invitation to participate (Appendix C).

The Hypothetical Classroom Request Tasks. The experimenter began by explaining to subjects that she was interested in finding out "how children can tell what other people are feeling." The children were told that they would see a slide of a facial expression and be asked to label it, after which they would be asked some questions. Children were then shown an expression (exposure time one second) (Step 1), and asked to label what they thought that person was feeling (Step 2). Examples of responses which would indicate neutrality and anger/hostility are included in Appendix D, Table D-1. Following the labeling of the expression, children were read a scenario for which they were asked to imagine the person in the stimulus slide as their teacher. Subjects were asked how they would act (respond) towards the teacher’s request/command and were encouraged to indicate more than one response if they could (Step 3). If children gave more than one response, they were asked which they would be more likely to do, and why (Step 4). If a child only generated a single response, he was also asked why he chose this action/response.

The scenarios accompanying the expressions were adapted from the work of Strain et al. (1983) in their discussion of compliance situations in the classroom setting. The
teachers in the scenarios make the following requests of the child: 1) to go to his desk and complete seatwork; 2) to pick up a piece of paper on the floor beside his desk; 3) to put away a toy with which he was playing; and 4) to stop talking and get back to work. In all descriptions, the child was told the teacher would check later as to whether the task was completed. The order of presentation of the scenarios and the facial expressions was counterbalanced. The instructions for the hypothetical classroom request tasks and the descriptions of the scenarios are included in Appendix E.

Children's responses to the hypothetical classroom tasks were tape recorded and transcribed. The responses generated by children were classified as compliant or noncompliant. The definitions for compliance/noncompliance were adapted from the work of Kuczynski, Kochanska, Radke-Yarrow, and Girnius-Brown (1987). These researchers studied young children's behavioral responses to parental commands and derived one category which reflected compliance and four categories which reflected noncompliance. These response categories are described in Table 3. Once children's responses were classified as compliant/noncompliant, an interrater reliability check was conducted by having a second individual classify the responses of half of the children at each age level.
| Compliance | Obedience to the request which is immediate; the child does not consider delaying to comply. |
| Direct Defiance | Overt refusal to perform the requested behavior, with angry, defiant, or negative affect, includes temper tantrums and whining. |
| Simple Refusal | Verbal refusal that is not accompanied by negative affect (e.g., "No," "I don't want to," "Uh...uh.") |
| Passive Noncompliance | The child does not perform the requested behavior, but does not overtly refuse or deny; the child does not acknowledge the request/command. |
| Negotiation | The child attempts to reach a mutually agreed upon directive. The child proposes bargains, alternate solutions or compromises, offers or asks for alternative explanations or excuses (e.g., "Why," "I have a better idea," "I'll do it later"). |

Adapted from Kuczynski et al., 1987.
As described, the children were also asked to give their rationale for acting in the way they had indicated they would. Probing was not used in order to avoid influencing children's subsequent responses. Categories were generated by the author to classify the children's rationale responses. An interrater reliability check was performed by having a second rater classify the responses of half of the children at each age level.

The DANVA subtests. The four receptive tests of the DANVA were presented to each child individually. The order of the subtests was: facial expressions (adult, then child expressions), postures, gestures, and paralanguage (female voice, then male voice).

Provided with the DANVA are data sheets listing the emotions so that a subject has only to check off one of the four response alternatives for each slide (happy, sad, angry, fearful). The order in which the emotions are listed varies for each subtest. The older subjects, because they could read, were asked to check off the alternatives themselves. As it was expected that not all younger children could read, they were presented the alternatives on large cards and familiarized with them. For each stimulus, the research assistant read the alternatives, while pointing to the cards. Children were then asked to indicate which expression they thought was represented in the stimulus, and
the response was recorded. Instructions to subjects for each subtest are included in Appendix F. Before leaving the testing session, children were asked not to disclose to their classmates information about the materials and procedures to which they had been exposed.

**Analyses**

The design of the study consists of a factorial combination of group (externalizers, controls), age (6, 10), and task (DANVA subtests, hypothetical classroom request tasks). The task variable was manipulated within subjects.

**Hypotheses 1 and 2.** These hypotheses predicted that control group members would be more accurate at decoding nonverbal information than would subjects in the externalizing group and that older boys would be more accurate than would younger ones. To examine these group (externalizers, controls) and age (6-years, 10-years) effects, a Multivariate Analysis of Variance (MANOVA) was performed. The dependent variables were the total scores on each DANVA subtest. The data were analyzed using Statistical Analysis Systems programs (SAS Institute, 1985).

Similar procedures were used to investigate group and age effects in decoding the four emotions represented within each DANVA subtest (happiness, anger, sadness, fear). A MANOVA was performed for each DANVA subtest; the dependent
variables were the percentage of responses correctly decoded for each emotion depicted.

**Hypothesis 3.** This hypothesis concerned children's interpretation of the four expressions used in the hypothetical classroom request tasks. For each expression (happy, angry, female-neutral, male-neutral), at each age level, Fisher's Exact Probability Tests for 2 x 2 tables (Siegel & Castellan, 1988) were used to determine whether more controls than externalizers correctly interpreted an expression. Fisher's tests were also used to examine whether more older subjects than younger ones made a correct identification when data were collapsed across groups.

It was predicted that externalizing boys would be more likely than controls to attribute negative emotional states (anger/hostility) than other states (e.g., happy, neutral) to a neutral expression. Fisher's exact tests of probability were used to examine differences between groups, at each age level, in the number of subjects who interpreted an expression as reflecting anger/hostility versus other emotional states.

**Hypothesis 4.** This hypothesis concerned the behavioral responses subjects generated for the expressions depicted in the hypothetical classroom request tasks. The primary interest was in examining the prediction that when
attributions of negative affect (anger/hostility) are made to a stimulus, externalizing children would be more likely than controls to generate socially inappropriate or incompetent behavioral responses (i.e., noncompliant behavior).

To begin, subjects' transcribed responses were classified by the author according to the categories outlined in Table 3. An interjudge reliability check was conducted by having a female undergraduate categorize the responses of 32 children (8 protocols randomly selected from each group, at each age level). Interrater reliability for the classification of response categories was calculated using the formula: Number of Agreements between judges divided by the Sum of the Number of Agreements and Disagreements (Bailey & Bostow, 1979).

Then, using repeated measures Analysis of Variance (ANOVA) (SAS Institute, 1985), comparisons were made between groups and ages to determine whether differences existed in: a) the total number of responses subjects were able to generate for each expression, b) the total number of compliant responses they were able to generate for each expression, and c) the total number of noncompliant responses they were able to generate for each expression.

Following this, for each expression, at each age level, Fisher's exact tests of probability were used to determine whether more externalizing boys than controls gave
noncompliant responses (i.e., one or more noncompliant responses or a combination of compliant and noncompliant responses) versus solely compliant responses.

Next, for each group of boys at each age level, Fisher's exact tests were conducted to examine the prediction that when attributions of negative affect (vs. another interpretation) are made to a stimulus, externalizing subjects would be more likely than controls to generate a noncompliant than compliant response.

In addition to being asked what they would do in the described scenarios (i.e., "How would you act if..."), subjects were asked what they would behave in such a manner. If a subject gave more than one response, he was asked to indicate which response he would be most likely to carry out, and for this response, to indicate his reason(s). Categories were generated by the author to classify the subjects' rationale. Using the categories, a second judge (female undergraduate) classified the responses of 32 subjects (8 protocols from each group at each age level). Interjudge reliability for the classification of these responses was calculated using the formula described previously.

**Hypothesis 5.** Hypothesis 5 predicted that children who were rated as noncompliant by their teacher (based on information from the Teacher Compliance Rating Form) would
be more likely than children rated as compliant to generate noncompliant responses in the hypothetical classroom request tasks. In order to test this hypothesis, a Point Biserial Correlation was performed for each age level. The dichotomous variable in these calculations was children's ratings by their teacher as compliant vs. noncompliant. The continuous variable was children's overall scores on the hypothetical classroom request tasks, calculated as follows. For each of the tasks, children's final decisions on how they said they would act were utilized. A child received a score of 1 if, for each of the four scenarios, he generated a compliant action (categories in Table 3). A score of 2 was allocated if the child gave compliant responses for three of the scenarios, and a noncompliant response for the remaining one. A score of 3 was associated with two noncompliant responses and two compliant ones, and a score of 4 with three noncompliant responses and one compliant response. A score of 5 was given to a child whose final decision reflected acting in noncompliant manner for all four of the scenarios.

Using the same dichotomous variable, another Point Biserial Correlation was conducted for each age level. The purpose of these analyses was to examine whether children rated as noncompliant would have lower scores on the Adaptive Functioning Scale of the Achenbach Teacher's Report Form than children rated as compliant. The continuous
variable for these calculations was children's T-scores for their Total Adaptive Score.
CHAPTER III
RESULTS

The results are presented in order of the hypothesized effects.

Hypotheses 1 and 2

To test the hypothesis that decoding accuracy on the DANVA would be better for controls than externalizers and for older than younger subjects, a 2 x 2 Multivariate Analysis of Variance (MANOVA) was performed. The five dependent variables were total scores on the DANVA subtests: Faces-Adults, Faces-Children, Postures, Gestures, and Paralanguage. The independent variables were group (externalizers, controls) and age (6 years, 10 years). When indicated, differences between means were examined using the Tukey test (SAS Institute, 1985).

With the use of Wilk's criterion, the combined DVs were significantly related to age, $F(5, 52) = 13.12, p < .0001$, but not to group, $F(5, 52) = 1.32, p > .05$, or to the Group x Age interaction, $F(5, 52) = 1.79, p > .05$. The results reflected a moderately high association between the combined DVs and the main effect of age, $\eta^2 = .56$. The univariate analyses for the five dependent variables are summarized in Table 4.

Subjects' mean scores on the DANVA subtests, by age, are presented in Table 5. On all the DANVA subtests, with
Table 4

Univariate Analysis of Variance Summary Table for the Effects of Group, Age, and Group x Age on DANVA Subtest Performances

<table>
<thead>
<tr>
<th>Effect</th>
<th>Dependent Variable</th>
<th>Univariate F (1, 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Faces-Adult</td>
<td>.89</td>
</tr>
<tr>
<td></td>
<td>Faces-Children</td>
<td>3.42</td>
</tr>
<tr>
<td></td>
<td>Postures</td>
<td>.66</td>
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<tr>
<td></td>
<td>Gestures</td>
<td>2.17</td>
</tr>
<tr>
<td></td>
<td>Paralanguage</td>
<td>3.68</td>
</tr>
<tr>
<td>Age</td>
<td>Faces-Adult</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>Faces-Children</td>
<td>7.13**</td>
</tr>
<tr>
<td></td>
<td>Postures</td>
<td>10.97**</td>
</tr>
<tr>
<td></td>
<td>Gestures</td>
<td>20.77**</td>
</tr>
<tr>
<td></td>
<td>Paralanguage</td>
<td>60.40**</td>
</tr>
<tr>
<td>Group x Age</td>
<td>Faces-Adult</td>
<td>.00</td>
</tr>
<tr>
<td>Interaction</td>
<td>Faces-Children</td>
<td>1.69</td>
</tr>
<tr>
<td></td>
<td>Postures</td>
<td>6.57*</td>
</tr>
<tr>
<td></td>
<td>Gestures</td>
<td>.59</td>
</tr>
<tr>
<td></td>
<td>Paralanguage</td>
<td>.02</td>
</tr>
</tbody>
</table>

*p < .05.  **p < .01.
### Table 5

**Mean Accuracy Scores on DANVA Receptive Subtests for the Age Effect**

<table>
<thead>
<tr>
<th>DANVA Subtest</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faces-Adult ((x/16))</td>
<td>11.80</td>
<td>12.20</td>
</tr>
<tr>
<td></td>
<td>(2.67)</td>
<td>(2.75)</td>
</tr>
<tr>
<td>Faces-Children ((x/16))</td>
<td>9.43</td>
<td>10.73**</td>
</tr>
<tr>
<td></td>
<td>(2.19)</td>
<td>(1.64)</td>
</tr>
<tr>
<td>Postures ((x/12))</td>
<td>5.03</td>
<td>6.80**</td>
</tr>
<tr>
<td></td>
<td>(2.28)</td>
<td>(2.02)</td>
</tr>
<tr>
<td>Gestures ((x/12))</td>
<td>5.27</td>
<td>7.43**</td>
</tr>
<tr>
<td></td>
<td>(2.38)</td>
<td>(1.10)</td>
</tr>
<tr>
<td>Paralanguage ((x/32))</td>
<td>17.07</td>
<td>27.60**</td>
</tr>
<tr>
<td></td>
<td>(6.00)</td>
<td>(4.55)</td>
</tr>
</tbody>
</table>

**Note.** Numbers in parentheses are standard deviations.

**p < .001.**
the exception of Faces-Adult, the older children correctly identified significantly more of the stimuli than younger children. Table 6 summarizes the mean scores on the DANVA subtests for the subjects in the current study, as well as the mean scores obtained by male subjects of approximately corresponding age levels in the research of Nowicki and Duke (1989a).

As can be seen in Table 4, the Group x Age interaction for the Postures subtest emerged significant, $F(1,56) = 6.57$, $p < .05$. However, the obtained means were not significantly different ($p > .05$). Although the group effect in the multivariate analysis did not meet statistical significance, obtained mean scores were primarily in the expected direction of higher scores (more accurate decoding) for control subjects than externalizers. Means for the group effect are displayed in Appendix G, Table G-1.

Further to the above calculations, analyses were also performed to examine group (externalizers, controls) and age (6 years, 10 years) differences in the decoding of the four emotions represented within each DANVA subtest (happy, angry, sad, fearful). A $2 \times 2$ MANOVA was conducted for each subtest and the dependent variables were percentage of stimuli correctly identified as happy, angry, sad, and fearful.
Table 6

Mean Accuracy Scores on DANVA Receptive Subtests For Current Subjects and Male Subjects from the Study of Nowicki & Duke (1989)\(^{a}\)

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Current Subjects</th>
<th>Subjects of Nowicki &amp; Duke</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6-year-olds</td>
<td>10-year-olds</td>
</tr>
<tr>
<td>Facial Expressions ((x/32)^{b})</td>
<td>21.23</td>
<td>22.93</td>
</tr>
<tr>
<td>Postures ((x/12))</td>
<td>5.03</td>
<td>6.80</td>
</tr>
<tr>
<td>Gestures ((x/12))</td>
<td>5.27</td>
<td>7.43</td>
</tr>
<tr>
<td>Paralanguage ((x/16)^{c})</td>
<td>7.93</td>
<td>13.17</td>
</tr>
</tbody>
</table>


\(^{b}\)Sum of scores on Faces-Adult and Faces-Children Subtests.

\(^{c}\)Scores on Paralanguage Subtest (Female Voice).
Faces-Adult Subtest. With the use of Wilk's criterion, the combined DVs were not significantly related to group, \( F(4, 53) = 1.79, p > .05 \), to age \( F(4, 53) = 1.35, p > .05 \), or to the Group x Age interaction, \( F(4, 53) = .03, p > .05 \). Means for the group and age effects are summarized in Appendix G, Tables G-2 and G-3, respectively. Although the group and age effects did not reach significance, most of the means were in the expected direction of higher scores for controls than externalizers and older than younger subjects.

Faces-Children Subtest. With the use of Wilk's criterion, the DVs were significantly related to age, \( F(4, 53) = 4.79, p < .002 \), but not to group, \( F(4, 53) = 1.83, p > .05 \), or to the Group x Age interaction, \( F(4, 53) = 1.79, p > .05 \). The results reflected a moderate association between the combined DVs and the effect of age, \( \eta^2 = .27 \). Univariate analyses for the four dependent variables are summarized in Table 7.

Cell means for the age effect are displayed in Table 8. These findings revealed that for the emotions of happiness and anger, older boys correctly decoded significantly more of the children's expressions than did younger boys. No significant differences emerged for the emotions of sadness and fear.
Table 7

Univariate Analysis of Variance Summary Table for the Effects of Group, Age, and Group x Age on Decoding of Emotions Within the DANVA Faces-Children Subtest

<table>
<thead>
<tr>
<th>Effect</th>
<th>Dependent Variable</th>
<th>Univariate F (1,56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Happy Stimuli</td>
<td>7.00**</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>.00</td>
</tr>
<tr>
<td>Age</td>
<td>Happy Stimuli</td>
<td>10.94**</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>5.53*</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>2.27</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>.70</td>
</tr>
<tr>
<td>Group x Age</td>
<td>Happy Stimuli</td>
<td>7.00**</td>
</tr>
<tr>
<td>Interaction</td>
<td>Angry Stimuli</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>.04</td>
</tr>
</tbody>
</table>

*p < .05. **p < .01.
Table 8

Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Faces-Children Subtest

<table>
<thead>
<tr>
<th>Emotion Depicted</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>92%</td>
<td>100%*</td>
</tr>
<tr>
<td>Angry</td>
<td>67%</td>
<td>80%*</td>
</tr>
<tr>
<td>Sad</td>
<td>48%</td>
<td>58%</td>
</tr>
<tr>
<td>Fearful</td>
<td>35%</td>
<td>29%</td>
</tr>
</tbody>
</table>

*p < .05.
As summarized in Table 7, in addition to the univariate effect of age, two other univariate effects emerged significant for the Happy expression: group, $F(1, 56) = 7.00, p < .01$, and Group x Age, $F(1, 56) = 7.00, p < .01$. The means obtained for the group effect (Happy expression) are displayed in Appendix G, Table G-4; they were significantly different ($p < .05$). The means for the Group x age interaction were not significantly different.

**Postures.** With the use of Wilk’s criterion, the combined DVs were not significantly related to group, $F(4, 53) = 1.41, p > .05$, or to the Group x Age interaction, $F(4, 53) = 2.11, p > .05$, but approached significance for the age effect, $F(4, 53) = 2.44, p > .06$. The means obtained for the group and age effects are summarized in Appendix G, Tables G-5 and G-6, respectively. These means fell into the expected pattern of better decoding scores for controls than externalizers and older than younger boys.

**Gestures.** With the use of Wilk’s criterion, the combined DV’s were significantly related to age, $F(4, 53) = 5.64, p < .001$, but not to group, $F(4, 53) = .64, p > .05$, or to the Group x Age interaction, $F(4, 53) = .44, p > .05$. The results reflected a moderate association between the combined DVs and age, $\eta^2 = .30$. The univariate analyses for the four dependent variables are represented in Table 9.
Table 9

Univariate Analysis of Variance Summary Table for the Effects of Group, Age, and Group x Age on Decoding of Emotions Within the DANVA Gestures Subtest

<table>
<thead>
<tr>
<th>Effect</th>
<th>Dependent Variable</th>
<th>Univariate F (1, 56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Happy Stimuli</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>1.45</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>0.50</td>
</tr>
<tr>
<td>Age</td>
<td>Happy Stimuli</td>
<td>7.59**</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>11.48**</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>3.22</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>5.41*</td>
</tr>
<tr>
<td>Group x Age</td>
<td>Happy Stimuli</td>
<td>1.70</td>
</tr>
<tr>
<td>Interaction</td>
<td>Angry Stimuli</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>0.01</td>
</tr>
</tbody>
</table>

*p < .05.  **p < .01.
A summary of mean scores for the age effect is displayed in Table 10. These findings showed that for the emotions of happiness, anger, and fear depicted through gestures, older boys correctly decoded significantly more stimuli than younger boys. The means obtained for the group effect are displayed in Appendix G, Table G-7. The pattern of these means was in the expected direction of higher scores for control than externalizing boys.

Paralanguage. With the use of Wilk's criterion, the combined DVs were significant, related to age, $F(4, 53) = 14.72, p < .001$, but not to group, $F(4, 53) = 1.13, p > .05$, or to the Group x Age Interaction, $F(4, 53) = 1.19, p > .05$. The results reflected a moderately high association between the combined DVs and age, $\eta^2 = .53$. The univariate analyses for the four dependent variables are exhibited in Table 11.

Mean scores for the age effect are summarized in Table 12. These findings revealed that for each emotion represented through tone of voice, older boys correctly decoded significantly more stimuli than did the younger ones.

As seen in Table 11, the univariate effect of group emerged significant for the Sad stimuli, $F(1,56) = 4.66, p < .05$. Means for the univariate group effect are summarized in Appendix G, Table G-8. These means were in the expected
Table 10

Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Gestures Subtest

<table>
<thead>
<tr>
<th>Emotion Depicted</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>39%</td>
<td>55%*</td>
</tr>
<tr>
<td>Angry</td>
<td>44%</td>
<td>65%*</td>
</tr>
<tr>
<td>Sad</td>
<td>59%</td>
<td>80%</td>
</tr>
<tr>
<td>Fearful</td>
<td>40%</td>
<td>60%*</td>
</tr>
</tbody>
</table>

*p < .05.
Table 11

Univariate Analysis of Variance Summary Table for the Effects of Group, Age, and Group x Age on Decoding of Emotions within the DANVA Paralanguage Subtest

<table>
<thead>
<tr>
<th>Effect</th>
<th>Dependent Variable</th>
<th>Univariate F (1,56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Happy Stimuli</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>4.56*</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>2.08</td>
</tr>
<tr>
<td>Age</td>
<td>Happy Stimuli</td>
<td>18.30**</td>
</tr>
<tr>
<td></td>
<td>Angry Stimuli</td>
<td>15.31**</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>44.48**</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>40.01**</td>
</tr>
<tr>
<td>Group x Age</td>
<td>Happy Stimuli</td>
<td>.57</td>
</tr>
<tr>
<td>Interaction</td>
<td>Angry Stimuli</td>
<td>2.82</td>
</tr>
<tr>
<td></td>
<td>Sad Stimuli</td>
<td>.52</td>
</tr>
<tr>
<td></td>
<td>Fearful Stimuli</td>
<td>.31</td>
</tr>
</tbody>
</table>

*p < .05.  **p < .01.
Table 12

Percentage-correct Responses, by Age, for Each Emotion Depicted in the DANVA Paralanguage Subtest

<table>
<thead>
<tr>
<th>Emotion Depicted</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>76%</td>
<td>94%*</td>
</tr>
<tr>
<td>Angry</td>
<td>76%</td>
<td>96%*</td>
</tr>
<tr>
<td>Sad</td>
<td>43%</td>
<td>82%*</td>
</tr>
<tr>
<td>Fearful</td>
<td>35%</td>
<td>83%*</td>
</tr>
</tbody>
</table>

*p < .05.
pattern of better decoding accuracy for controls than externalizers. The means were significantly different for the Sad stimuli ($X = 69\%$ vs. $56\%$ for controls and externalizers, respectively).

**Hypothesis 3**

Subjects' accuracy in decoding the stimuli used in the hypothetical classroom request tasks (female happy, female angry, female neutral, male neutral) was examined using Fisher Exact Probability Tests for $2 \times 2$ tables. For each expression, separate tests were conducted for 6-year-old and 10-year-old subjects to analyze group (externalizers, controls) differences in the number of subjects giving a correct vs. incorrect interpretation. Fisher exact tests were also used to examine age differences when the group variable was collapsed. Probabilities greater than or equal to $\alpha = .05$ were taken as significant. The responses accepted as correct for each expression are summarized in Appendix D, Table D-1. Table D-1 also lists the responses that were considered to reflect an interpretation of anger or hostility for the neutral stimuli.

**Happy Expression.** For both the younger and older subjects, no differences between groups were observed in decoding this expression, $p = 1.00$ and $.50$, for the 6-year-old and 10-year-old subjects, respectively. Similarly, no
age differences emerged, \( p = .50 \). All boys, with the exception of one 10-year-old control subject, correctly identified this expression as "happy." These latter findings are illustrated in Figure 1.

**Angry Expression.** Group differences were nonsignificant for both 6-year-olds (\( p = .22 \)) and 10-year-olds (\( p = .24 \)) in decoding the expression depicting the emotion of anger. The majority of externalizers and controls at each age were correct in identifying the stimulus. Overall, though, significantly more older boys than younger boys made a correct identification, \( p = .02 \) (see Figure 1).

**Female-Neutral Expression.** No group differences in decoding accuracy were revealed for the female-neutral expression, \( p = 1.00 \) and .30, for the younger and older subjects, respectively. Both externalizers and controls were primarily unsuccessful at identifying the neutral emotion. Age differences approached significance, \( p = .06 \). The trend was in the direction of better decoding performance for older than younger subjects (see Figure 1).

**Male-Neutral Expression.** Group differences in decoding accuracy did not emerge for the male-neutral expression for either the 6-year-olds, \( p = 1.00 \), or the 10-year-olds, \( p = .50 \). Both groups exhibited difficulty in identifying the
Figure 1. Percentage of subjects, at each age level, correctly identifying the expressions in the hypothetical classroom request tasks.
neutral emotion. However, significantly more 10-year-olds than 6-year-olds made a correct identification, $p = .03$ (See Figure 1).

The hypothesis was also examined, at each age level, that in the decoding of the neutral expressions, more externalizers than controls would interpret an expression as reflecting anger/hostility than other emotions. Fisher's exact tests were utilized in these analyses.

**Female-neutral expression.** Although findings were in the expected direction at each age level, analyses using Fisher's exact tests revealed that, only at the younger age level, were externalizers significantly more likely than controls to interpret hostility than other emotions for the female-neutral expression, $p = .05$. For the 10-year-olds, differences between groups approached significance, $p = .11$. These findings are illustrated in Figure 2.

**Male-neutral expression.** At each age level findings emerged in the expected direction: more externalizing boys than controls decoded the male-neutral expression as reflecting hostility vs. other emotions. However, the differences did not meet statistical significance, $p = .22$ for younger subjects and $p = .17$ for older subjects. These findings are depicted in Figure 2.
Figure 2. Percentage of subjects, at each age level, interpreting a neutral expression as reflecting anger/hostility vs. other emotions.
Hypothesis 4

It was predicted that when attributions of negative affect (anger/hostility) were made to a stimulus, externalizing children would be more likely than controls to generate socially inappropriate or incompetent behavioral responses (i.e., noncompliant behavior). To examine this prediction, the responses that subjects generated in the hypothetical classroom request tasks were considered.

Boys' responses were classified according to the categories outlined in Table 3 (i.e., compliant/noncompliant). Once the responses were classified by the author, an interrater reliability check was conducted by having a female undergraduate unfamiliar with the purpose of the study classify the responses of eight children in each of the externalizing and control groups at each age level. Reliability coefficients were calculated using the formula: Number of agreements divided by the sum of the Number of agreements plus disagreements. The resulting reliability coefficients ranged from .91 to 1.00 (see Table 13).

For each subject, for each of the four expressions used in the hypothetical classroom request tasks, totals were determined for: number of responses produced (sum of compliant and noncompliant responses), the number of compliant responses generated, and the number of noncompliant responses generated. The interest was in
Table 13

Interrater Reliability Coefficients by Subject Group for Classification of Responses from the Hypothetical Classroom Request Tasks

<table>
<thead>
<tr>
<th>Response</th>
<th>6-year-olds</th>
<th>10-year-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Con</td>
<td>Ext</td>
</tr>
<tr>
<td>Compliant/Noncompliant</td>
<td>.91</td>
<td>1.00</td>
</tr>
<tr>
<td>Rationale</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note. Con = Controls; Ext = Externalizers.
examining whether group (externalizers vs. controls) and age (6-year-olds vs. 10-year-olds) differences existed.

For each type of response output, a 2 (group) x 2 (age) x 4 (expression) Analysis of Variance was performed, with repeated measures on the last factor. The results of these analyses are summarized below.

**Number of Compliant plus Noncompliant Responses.** Results of this analysis, summarized in Table 14, revealed a significant age effect, $F(1, 56) = 4.69, p > .03$. Subsequent mean comparisons using the Tukey test indicated that for the male-neutral expression 10-year-olds produced significantly more responses than 6-year-olds (see Table 15). The same pattern was observed for the remaining expressions, although differences were not statistically reliable.

**Number of Compliant Responses.** As summarized in Table 16, one effect emerged as significant in this analysis: group, $F(1, 56) = 6.76, p < .01$. Subsequent mean comparisons using the Tukey test revealed that for the expressions of happy, female-neutral, and male-neutral, controls generated a significantly higher number of compliant responses than externalizers. Although findings were in the same direction for the expression of anger, results were not statistically significant (see Table 17).
Table 14

Analysis of Variance Summary Table for the Sum of Compliant and Noncompliant Responses Generated in the Hypothetical Classroom Request Tasks

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.25</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>4.69*</td>
</tr>
<tr>
<td>Group x Age</td>
<td>1</td>
<td>.03</td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expression</td>
<td>3</td>
<td>1.98</td>
</tr>
<tr>
<td>Expression x Group</td>
<td>3</td>
<td>2.10</td>
</tr>
<tr>
<td>Expression x Age</td>
<td>3</td>
<td>.89</td>
</tr>
<tr>
<td>Expression x Group x Age</td>
<td>3</td>
<td>1.49</td>
</tr>
</tbody>
</table>

*p < .05.
Table 15

Mean Number of Combined Compliant and Noncompliant Responses Generated by Age

<table>
<thead>
<tr>
<th>Expression</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>1.03</td>
<td>1.10</td>
</tr>
<tr>
<td>Angry</td>
<td>1.03</td>
<td>1.06</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>1.07</td>
<td>1.20</td>
</tr>
<tr>
<td>Male-Neutral</td>
<td>1.07</td>
<td>1.27*</td>
</tr>
</tbody>
</table>

*p < .05.
Table 16

**Analysis of Variance Summary Table for Compliant Responses Generated in the Hypothetical Classroom Request Tasks**

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>6.76**</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>2.43</td>
</tr>
<tr>
<td>Group x Age</td>
<td>1</td>
<td>3.64</td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expression</td>
<td>3</td>
<td>.57</td>
</tr>
<tr>
<td>Expression x Group</td>
<td>3</td>
<td>.16</td>
</tr>
<tr>
<td>Expression x Age</td>
<td>3</td>
<td>.99</td>
</tr>
<tr>
<td>Expression x Group x Age</td>
<td>3</td>
<td>1.40</td>
</tr>
</tbody>
</table>

**p < .01.**
Table 17

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>1.00</td>
<td>.87*</td>
</tr>
<tr>
<td>Angry</td>
<td>1.00</td>
<td>.90</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>1.03</td>
<td>.90*</td>
</tr>
<tr>
<td>Male-Neutral</td>
<td>1.00</td>
<td>.87*</td>
</tr>
</tbody>
</table>

*p < .05.
Number of Noncompliant Responses. The results of this analysis, summarized in Table 18, revealed a significant age effect, $F(1, 56) = 7.25, p < .01$. The Expression x Group interaction approached significance, $F(3, 168) = 2.48, p < .06$. Mean comparisons for the age effect indicated that for each expression, the number of noncompliant responses generated was higher for older than younger boys and that differences were statistically significant for the expressions of happiness and male-neutral (see Table 19). As summarized in Table 20, a review of means for the expression x group interaction revealed that for three of the expressions, externalizing boys gave a higher number of noncompliant responses than controls, but only the means for the male-neutral expression were significantly different.

Whereas the previous analyses focused on the amount of output a child produced, the following analyses considered the number of subjects in each group, at each age level, that gave noncompliant (solely noncompliant or a combination of compliant and noncompliant responses) vs. solely compliant responses, for each expression. Analyses using Fisher's exact tests revealed that for the male-neutral expression, for 10-year-olds, significantly more externalizing boys than controls gave noncompliant responses, $p = .02$. As illustrated in Figure 3, the same
Table 18

Analysis of Variance Summary Table for Noncompliant Responses Generated in the Hypothetical Classroom Request Tasks.

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Between Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>1.99</td>
</tr>
<tr>
<td>Age</td>
<td>1</td>
<td>7.25**</td>
</tr>
<tr>
<td>Group x Age</td>
<td>1</td>
<td>1.99</td>
</tr>
<tr>
<td><strong>Within Subjects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expression</td>
<td>3</td>
<td>2.02</td>
</tr>
<tr>
<td>Expression x Group</td>
<td>3</td>
<td>2.48</td>
</tr>
<tr>
<td>Expression x Age</td>
<td>3</td>
<td>1.09</td>
</tr>
<tr>
<td>Expression x Group x Age</td>
<td>3</td>
<td>2.02</td>
</tr>
</tbody>
</table>

**p < .01.
Table 19
Mean Number of Noncompliant Responses Generated by Age

<table>
<thead>
<tr>
<th>Expression</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>.03</td>
<td>.23*</td>
</tr>
<tr>
<td>Angry</td>
<td>.07</td>
<td>.13</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>.06</td>
<td>.23</td>
</tr>
<tr>
<td>Male-Neutral</td>
<td>.10</td>
<td>.37*</td>
</tr>
</tbody>
</table>

*p < .05.
Table 20

Mean Number of Noncompliant Responses for the Expression x Group Interaction

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>.10</td>
<td>.16</td>
</tr>
<tr>
<td>Angry</td>
<td>.07</td>
<td>.13</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>.17</td>
<td>.13</td>
</tr>
<tr>
<td>Male-Neutral</td>
<td>.10</td>
<td>.37*</td>
</tr>
</tbody>
</table>

*p < .05.
Figure 3. Percentage of subjects generating noncompliant responses for each expression.
pattern was observed in almost all cases, but differences did not meet statistical significance.

The prediction was examined that when attributions of negative affect are made to a stimulus, subjects would be more likely to generate a noncompliant than compliant response. The data utilized for these analyses were subjects' final decisions in how they would respond in the situations given. Therefore, if subjects indicated several different ways they would respond, only their final decision was used (e.g.,"You told me several things you would do. If you were going to do just one thing, which one would you do?").

Analyses using Fisher's exact tests were conducted for the four expressions, for both groups, at each age level. One analysis emerged significant: for the female-neutral expression, 10-year-old externalizing boys were more likely to give a noncompliant than compliant response when the stimulus was interpreted as hostile rather than nonhostile. Results of the Fisher's exact tests are summarized in Table 21. Although Fisher's exact probabilities did not meet statistical significance for the remaining expressions, it can be observed that probabilities were generally lower (i.e., closer to significance) for the externalizing than control subjects at each age level.

Considered next were children's reasons for "why" they would behave in the manner they had indicated for their
Table 2i

Summary of Obtained Probabilities by Subject Group for Fisher's Exact Test Analyses Investigating Compliant vs. Noncompliant Responses Produced in Response to a Hostile vs. Nonhostile Interpretation

<table>
<thead>
<tr>
<th>Expression</th>
<th>6-year-olds</th>
<th></th>
<th>10-year-olds</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Con</td>
<td>Ext</td>
<td>Con</td>
<td>Ext</td>
</tr>
<tr>
<td>Happy</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Angry</td>
<td>1.00</td>
<td>.80</td>
<td>1.00</td>
<td>.99</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>1.00</td>
<td>1.00</td>
<td>.87</td>
<td>.02</td>
</tr>
<tr>
<td>Male-Neutral</td>
<td>1.00</td>
<td>.47</td>
<td>.67</td>
<td>.48</td>
</tr>
</tbody>
</table>

*Note.* Con = Controls; Ext = Externalizers.
final decision. Four categories of responses were developed to classify children's rationale for acting in a compliant way and three categories were developed to classify their rationale for acting in a noncompliant way. These are summarized in Table 22.

Using the categories in Table 22, a female undergraduate classified the responses of 32 subjects (8 protocols randomly selected from each group at each age level). An interrater reliability check was performed using the same formula described earlier for this purpose. As summarized in Table 11, reliability coefficients ranged from .97 to 1.00.

Figure 4 depicts the percentage of responses that fell into each compliant category by group and age. The categories of Other, Obedience to Authority, Understanding Partial, and Understanding Explicit were considered to reflect a continuum from vague responses to more specific responses. To examine whether group and age differences existed in the production of vague vs. more specific responses, Chi Square analyses corrected for continuity (2 x 2 tables) (Castellan & Siegel, 1988) were performed. Data were collapsed for the four expressions. The categories of Other and Obedience to Authority were considered vague responses and the categories of Understanding Partial and Understanding Explicit were considered more specific ones.

Findings revealed that for 10-year-olds, externalizing
Table 22

**Categories of Compliant and Noncompliant Reasons Developed to Classify Subjects' Rationale For Their Decisions**

<table>
<thead>
<tr>
<th>Compliant Categories</th>
<th>Noncompliant Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Explicit</td>
<td>Indicating noncompliance and offering an explanation of the consequences this would produce for others, but not the self (e.g., &quot;I would make a lot of noise after to get back at her;&quot; &quot;I'd rather not do anything cause that way she gets mad at me&quot;).</td>
</tr>
<tr>
<td>Understanding Partial</td>
<td>Indicating noncompliance and offering an explanation that does not include an appreciation of consequences for the self or others (e.g., &quot;Because I was mad&quot; or &quot;Because I want to talk to my friend&quot;).</td>
</tr>
<tr>
<td>Obedience to Authority</td>
<td>Other Responses offering no clear reasons for acting (e.g., &quot;Because,&quot; &quot;I don't know&quot;).</td>
</tr>
</tbody>
</table>
Figure 4. Percentage of rationale responses falling into each compliant category by subject group.
boys were more likely to give specific responses than controls, \(X^2 (1, N = 120) = 14.73, p < .001\). Findings were in the same direction for 6-year-olds but the differences between groups were not statistically significant, \(X^2 (1, N = 120) = .06, p > .05\). For controls, age differences did not emerge in the production of vague vs. specific responses, \(X^2 (1, N = 120) = .09, p > .05\). However, in the case of externalizers, significantly more older than younger boys gave more specific responses than vague responses, \(X^2 (1, N = 120) = 5.90, p < .01\).

If the categories are viewed as a continuum, Figure 4 reflects some trends: for both groups, with age, the number of Other and Obedience to Authority responses decreased as the number of Understanding Partial responses increased. For the Externalizing group, this was accompanied by an increase in the number of Understanding Explicit responses, whereas for the control group, the number of Understanding Explicit responses stayed about the same with age.

Table 23 summarizes the percentage of rationale responses that fell into each of the noncompliant categories, by subject group. A review of Table 23 suggests that most of the noncompliant reasoning was produced by 10-year-old externalizing boys.
<table>
<thead>
<tr>
<th>Category</th>
<th>6-year-olds</th>
<th>10-year-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Con</td>
<td>Ext</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>3.3</td>
</tr>
<tr>
<td>LAC</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>UL</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Note.** Con = Controls; Ext = Externalizers; O = Other; LAC = Lack of Appreciation of Consequences; UL = Understanding Limited.
Hypothesis 5

The prediction was made that children who were rated as noncompliant by their teacher would be more likely than children rated as compliant to generate noncompliant responses in the hypothetical classroom request tasks. To examine this prediction, a Point Biserial Correlation was calculated for each age level (Ferguson, 1976). The dichotomous variable was children's classification on the Teacher Compliance Rating Form. A weight of 0 was assigned to children classified as Compliant (i.e., Overall, this child's behavior in the classroom is typically compliant). A weight of 1 was assigned to children rated as Noncompliant (i.e., Overall, this child's behavior in the classroom is sometimes compliant, and sometimes not compliant/Overall this child's behavior in the classroom is typically not compliant). A review of the data revealed that all the children who met the criteria for controls were classified by their teachers as compliant, and all children who met the criteria for externalizers were rated as noncompliant. As explained in the Method section, the continuous variable in these analyses was the scores assigned to children based on their decisions in the hypothetical classroom request tasks.

For both the 6-year-old and 10-year-old subjects, the association between the dichotomous and continuous variable was in the expected direction, but it did not reach significance ($t > .05$). The point biserial correlation
coefficients of \( r = -0.26 \) and \( r = -0.29 \) were obtained for the younger and older boys, respectively, showing the relationship that children who were rated as more compliant were those who tended to obtain lower scores.

At each age level, analyses employing Point Biserial Correlations were also used to examine the association between children's ratings as compliant or noncompliant and their level of adaptive functioning, as measured by their Total Adaptive score on the TRF. Findings revealed a significant association between ratings by teachers and adaptive functioning scores (\( t < .05 \)). The point biserial coefficients \( (r) \) were .76 and .72, for the younger and older subjects, respectively. Children rated as noncompliant obtained lower scores on the Adaptive Functioning measure of the TRF than children rated as compliant (see Table 24).
Table 24

Range of Scores and Mean Scores Obtained by Children Rated as Compliant vs. Noncompliant, at each Age Level, for the Total Adaptive Functioning Score of the TRF

<table>
<thead>
<tr>
<th>Age</th>
<th>Range of Scores</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range of Scores</td>
<td>Mean Score</td>
</tr>
</tbody>
</table>
|           | (n) Minimum - Maximum | (Score)
| 6-year-olds |                   |            |
| Compliant (Controls) | (42) 48 - 64 (91) | 54 (81) |
| Noncompliant (Externalizers) | (2) 30 - 48 (42) | 39 (14) |
| 10-year-olds  |                   |            |
| Compliant (Controls) | (12) 38 - 64 (91) | 50 (50) |
| Noncompliant (Externalizers) | (2) 27 - 48 (42) | 35 (7) |

Note. T-scores for the Total Adaptive Functioning Score have a maximum range of 25 - 75. Numbers in parentheses adjacent to T-scores are percentile equivalents.
CHAPTER IV

DISCUSSION

This chapter presents a discussion of the findings within the context of Dodge's model. This is followed by a discussion of some of the limitations of the present study, as well as implications of the findings, and some possible directions for further research. To begin, Dodge's model is briefly reiterated.

Dodge's Model

Dodge (1986; Dodge et al., 1986) uses an information processing model to explain social competence in children. According to Dodge, social competence (i.e., acting in a manner regarded as competent by others) is an outcome of the processing that occurs following a sequence of five steps.

In Dodge's model, the first step of social information processing is encoding social cues in the environment. The second step involves interpreting these cues. When a child has interpreted the information, s/he can engage in the act of searching for ways to behave in response, which is the third step. Once the alternatives have been generated, the fourth step involves deciding on which alternative to implement. The final step is to carry out the action decided upon.

Theoretically, the steps in the model can occur very quickly and numerous times in a single social interaction.
Dodge's premise is that if a child processes information skillfully and accurately at each step, there is a greater likelihood that s/he will respond in a manner that is regarded by others as competent. Inefficient or inaccurate processing is believed to increase the probability of behaving in ways considered deviant by others.

The focus of the present study was on examining how boys characterized as externalizers differ from controls in the decoding of nonverbal information. A second interest was in examining how perceptions of facial expressions can play a role in determining behavior within the context of the classroom setting. Externalizing boys and controls were compared on their performance at each step of Dodge's model. Developmental differences were also examined as the sample consisted of 6-year-old and 10-year-old externalizing and control subjects. Results for each step are discussed in the following section.

**Step 1. Encoding of social cues.** In typical interactions, social cues arrive simultaneously from a variety of sources (e.g., expressions, postures, gestures). With experience, it is presumed that we learn the signals that are most helpful in assisting us to determine another person's affective state (Dodge, 1986; Dodge et al., 1986). In this study, most aspects of this step were controlled by
presenting subjects with specific stimuli to attend to (e.g., slides of faces).

Step 2. Decoding of social cues--group differences.
It was hypothesized that children classified as externalizers would exhibit a poorer performance compared to controls in the decoding of nonverbal signals of emotion. Furthermore, it was predicted that boys characterized as externalizers would be more likely than controls to attribute negative emotional states (anger/hostility) rather than other states (e.g., neutral, happy) to a neutral expression.

In this study, statistically significant differences were not found between control and externalizing boys in the decoding of the stimuli for the DANVA subtests (i.e., expressions, postures, gestures, tone of voice), or for the decoding of the stimuli within each DANVA subtest (i.e., happy, angry, sad, fearful). Similarly, there were no significant differences between controls and externalizers in decoding the expressions that were represented in the hypothetical classroom request tasks (happy, angry, female-neutral, male-neutral). Despite these results, the observed overall trend was in the expected direction of lower scores for externalizers than controls.

The lack of significant group differences was unexpected, as a number of studies have demonstrated that
children experiencing social interaction difficulties exhibit problems compared to controls in the decoding of nonverbal cues (e.g., Dodge et al., 1982, 1984, 1986; McCauley et al., 1987; Nowicki & Duke, 1989a), including nonverbal cues that can be considered "universally understood," such as happy, angry, or sad.

Group differences emerged, however, when errors in decoding were examined for the stimuli in the hypothetical classroom request tasks. For the female-neutral expression, significantly more 6-year-old externalizers than controls attributed anger or hostility to the stimulus than other emotional states. For 10-year-olds, the same pattern was revealed, and the results approached significance. These results were as hypothesized. As predicted, findings for the male-neutral expression were also in the same direction, but the results did not meet statistical significance.

The finding that externalizers were more likely than controls to attribute hostility to a neutral stimulus is consistent with previous studies. A number of researchers (Argyle, 1981; Dodge, 1980; Dodge et al., 1982) have demonstrated that children with characteristics similar to those of externalizers (e.g., aggressive boys, juvenile delinquents) have a greater tendency towards inferring hostility from an ambiguous stimulus than controls (e.g., nonaggressive boys). Findings of the work of Dodge (1980;
Lodge et al., 1982), however, suggested that aggressive boys were able to differentiate accidental and benign intentions.

Taken together, the performance of the boys in decoding the stimuli in the DANVA subtests and the hypothetical classroom request tasks, suggests that externalizers (as defined in this study) are generally as efficient as controls in the decoding of stimuli reflecting "universal" nonverbal information (e.g., happy, angry, sad, fearful). However, externalizers have a stronger tendency to misattribute anger or hostility to neutral stimuli, particularly when the expression is associated with a female teacher as opposed to a male teacher. The finding that results were generally significant for the female-neutral "teacher's" expression has important implications because most elementary school teachers are females.

Decoding of social cues--age differences. As was predicted, in almost all cases, 10-year-olds were significantly more accurate at decoding nonverbal signals of emotion than 6-year-olds. This finding is consistent with the developmental improvement in decoding accuracy that is repeatedly noted in the literature (e.g., Camras & Allison, 1985; Felleman et al., Field & Walden, 1981; Harrigan, 1984; Izard, 1971; Krouac, Doré, & Gosselin, 1985; Nowicki & Duke, 1989a; Strong, 1978; Tremblay, Krouac, & Doré, 1987; Walden & Field, 1982).
Comparisons were made between the decoding ability on the DANVA of the present subjects and that of the subjects in the work of Nowicki and Duke (1989a). Although the pattern of scores were comparable between studies (i.e., decoding accuracy was higher for Facial Expressions and Paralanguage Subtests than Gestures and Postures Subtests), the scores of the boys in the study of Nowicki and Duke were consistently higher on all subtests.

One explanation for this difference may lie in the composition of the groups. The groups in the present research were composed of 6-year-olds and 10-year-olds. The groups in the work of Nowicki and Duke were composed of Grade One and Grade Five boys. Children in Grade One are typically 6- to 7-years-old, while those in Grade Five are typically 10- to 11-years-old. As developmental studies have demonstrated that decoding accuracy improves with age, if the groups of Nowicki and Duke contained a high proportion of "older" boys, this may have raised the overall performance of the group.

Another difference between the composition of the present sample and the sample of Nowicki and Duke may involve the family status of the child. In the present study, groups were matched on parent(s) level of socioeconomic status using Hollingshead's criteria. In the study of Nowicki and Duke, groups were matched based on the occupational status of the parent(s). In investigating the
relationship between occupational status and decoding performance, Nowicki and Duke found that for the Receptive Gestures and Postures subtests, for males, lower scores on the DANVA were associated were lower ratings of occupational status. The distribution of subjects across status level was not presented in the DANVA's description. If differences between samples existed in terms of family status, and this variable has an impact on children's decoding ability, it would be expected that this should lead to some differences in the findings of the two studies. Nowicki and Duke's findings lend support the view that a child's experience may influence his/her judgement of emotion.

**Step 3. Response search.** Once social information is decoded, the next step in the process involves searching for possible behavioral alternatives. Findings revealed that, overall, 10-year-olds produced significantly more responses than 6-year-olds. This finding is consistent with developmental studies that have demonstrated that as children grow older, the responses they generate when problem solving differ not only in quality but quantity (e.g., Flavell, 1971; Kail & Bisanz, 1982). Results also showed that the controls produced significantly more compliant responses than the externalizers, and that this was accompanied by a tendency for the externalizers to
produce more non-compliant responses than the controls, particularly in the case of older externalizing boys.

**Step 4: Decision Step.** Based on the work of Dodge and his colleagues, it was expected that when attributions of negative affect were made to a facial expression, externalizing boys would be more likely than controls to say they would act in manner considered socially inappropriate (i.e., noncompliant) in response to certain hypothetical classroom situations. For the female-neutral expression, 6-year-old externalizers were significantly more likely than controls to interpret the expression as reflecting anger/hostility than other emotions. However, results showed that the externalizers were not more likely than the controls to say that they would decide to act in a noncompliant way. In the case of 10-year-olds, the predicted pattern of externalizers being more likely to interpret anger/hostility than other states for the female-neutral expression approached significance. However, unlike the younger subjects, the 10-year-old externalizing boys who interpreted the female-neutral expression as angry/hostile were significantly more likely to decide to act in a noncompliant versus compliant manner than those who interpreted the expression as nonhostile. For the expressions of happiness and anger, almost all subjects in
each group made correct interpretations of the stimulus and indicated they would decide to act in a compliant manner.

Taken together with the results of Step 3, it would seem that, in general, typical boys (controls) are significantly more likely than externalizing boys to generate compliant behavioral alternatives, while externalizing boys have more of a tendency than controls to generate noncompliant behavioral alternatives. However, when faced with a female-teacher making a request, and her expression is relatively clear (i.e., happy, angry), externalizers and controls both say they would comply with her request, even if they had considered not complying. The same pattern does not appear to be true when the female teacher's expression is a neutral one, and decoding that expression is difficult. In this case, externalizers are more likely than controls to interpret that expression as reflecting hostility, and in the case of older boys, more likely to decide to act in a noncompliant manner.

The finding that differences between externalizers and controls emerged in dealing with neutral stimuli is consistent with previous research. For example, Dodge (1980) compared aggressive and nonaggressive boys from grades 2, 4, and 6 on the hypothetical responses generated to a situation in which a peer had acted with a hostile intent, benign intent, or ambiguous intent on the subject. Findings showed that all boys acted with more aggression
when the intent was hostile than when it was benign. However, aggressive boys responded to the ambiguous intent as though it had been a hostile one and nonaggressive boys responded to the ambiguous intent as if it had been a benign one. These results were replicated in later work (Dodge & Frame, 1982). Findings from the present study would seem to suggest that a similar situation may be operating in the case of children's responses to teachers' neutral expressions in the classroom.

However, a major difference exists between the studies of Dodge (1980; Dodge & Frame, 1982) and the present work. Dodge asked boys to respond to situations with peers, whereas in the present study, boys were asked to respond to situations with adults. The findings of the present study would suggest that externalizing boys and controls are likely to be compliant with authority figures, when the message they are communicating is very clear (e.g., happiness, anger). However, when the emotional state of the adult in the classroom making the request is not clear, there is a greater likelihood of externalizers interpreting that emotional state as angry/hostile and then acting in a noncompliant manner in response.

Why would children decide to act in a compliant vs. a noncompliant way? This question was investigated by looking at the reasons children gave for making their final
decisions. For all boys, four types of compliant responses emerged, and they were considered to reflect a continuum from vague to more specific reasoning. What distinguished the specific responses was an appreciation of the consequences that would result from acting in a manner that would be considered inappropriate by most adults.

Findings revealed that 10-year-old externalizing boys were significantly more likely than controls to produce specific compliant responses. In other words, more externalizers than controls articulated that responding in a noncompliant manner would lead to negative consequences (Understanding Partial or Understanding Explicit). The same pattern was observed for the 6-year-old boys, but results were not significant. At the same time, most of the noncompliant responding was produced by older externalizing boys. The boys who gave noncompliant responses seemed to be unable to explain why they would elect to behave as they had indicated (Other), or they seemed to indicate that acting in a noncompliant way had a benefit (e.g., aggravating the source of the "hostile" expression), but they did not carry this reasoning further (i.e., in the long-run this will likely put me in a disfavorable position with this authority figure).

**Step 5. Enactment.** Information about children's actual behavior in the classroom was obtained from the
Teacher Compliance Rating Form. Although results were not significant, they were in the expected direction. That is, the children who were rated as compliant in the class were those children who tended to generate compliant responses in the hypothetical classroom request tasks. Similarly, children who were rated as noncompliant in the class were those who tended to generate noncompliant responses in the test situation. Teachers' ratings of the subjects' adaptive functioning (based on the Adaptive Scale of the Teacher's Report Form) revealed a significant association between lower adaptive functioning scores and noncompliance.

Limitations

Subjects in the present study were classified as externalizers versus controls based on ratings by teachers on Teacher's Report Form (TRF) of the Child Behavior Checklist (Achenbach & Edelbrock, 1986). Achenbach and Edelbrock (1986) consider Externalizing scores on the TRF that fall above the 89th percentile as being in the "clinical range". Externalizing boys in this study were children who obtained scores at or above the 84th percentile on the Externalizing scale of the TRF. Consequently, the group represented a milder manifestation of externalizing pathology. This sample selection procedure was consistent with the goal of the present study to investigate the effects of decoding skills in a typical classroom setting,
but it did likely lead to fewer significant findings than if the externalizers had been selected from a special education or clinical population.

In this study, it was found that boys who were rated as noncompliant by their teacher (based on information from the Teacher Compliance Rating Form) tended to produce more noncompliant responses than boys rated as compliant. However, this relationship did not reach significance. The Teacher Compliance Rating Form was developed to obtain information about children's typical compliance behavior in the classroom, but the questions may have been too global. If more specific questions had been asked (e.g., Is this child compliant when you ask him to do tasks such as...), more concise information about the relationship between children's descriptions of how they say they behave and how they actually behave could have been obtained.

In this study the stimuli employed were slides of posed nonverbal signals of emotion. A longstanding controversy exists in studies of decoding of expressions on the issue of whether posed expressions are the appropriate stimuli for recognition studies. Posed expressions have been criticized as being too exaggerated and artificial (Ekman, 1982), and a concern has been raised regarding whether the same findings
would emerge if spontaneous expressions were used as stimuli.

Methodologically, obtaining spontaneous expressions is difficult (Ekman, 1982). First, there is the problem of recording them, as spontaneous expressions can be quite brief. Then, there exists a question of ethics: How much deception is permissible to obtain spontaneous reactions to various stimuli or situations (e.g., those eliciting fear or anger). As in most deceptive research, the argument has been advanced that if subjects are alerted that their behavior will be monitored (i.e., expressions), this can alter their typical reactions (Ekman, 1982).

The issue of using posed versus spontaneous photographs, or even videotapes, becomes irrelevant for critics who argue that such methodology does not approach the processes that occur naturally in the environment (e.g., Hebb, 1946). An alternative to studying both the decoding of expressions and related behavior is to observe persons unobtrusively in everyday situations (Charlesworth, 1988). While this is certainly a promising suggestion, it also has associated with it the problem of deception. As only posed stimuli were used in the present research, caution should be exercised in generalizing the results to nonposed or spontaneous nonverbal cues.
The limited number of stimuli that were employed in the hypothetical classroom request tasks also reduces the generalizability of the findings. The question can be asked whether the current findings relate only to the faces that were used, or whether the findings apply to other faces depicting the same expression. As well, the stimuli used in the hypothetical classroom request tasks (from Ekman & Friesen's [1976] *Pictures of Facial Affect*) were normed based on adults' interpretations of the expressions. Stimuli that were normed on children would have been preferable, particularly with regards to the neutral stimuli.

Subjects in this study were directly asked questions about how they would behave towards their teacher. While children were assured that their responses would remain confidential, the possibility does exist that some participants may not have been entirely candid about their predicted behavior, either to avoid possible repercussions, or to please the examiner by providing "socially appropriate" responses. These factors have been identified as affecting the reliability and validity of information obtained through interview techniques (e.g., Mash & Terdal, 1988; Sattler, 1988).

The above possibility, however, is based on the assumption that persons are able to predict, within an
interview situation, how they would behave in actual life circumstances, and research suggests that people are not always able to accurately predict how they would behave. For example, Caplan and Hay (1989) observed the spontaneous responses of preschoolers to the distress of their peers in the classroom and they found a low rate of social responding. In interviews with the children, these researchers found that the preschoolers had an appreciation of the social norms surrounding bystander intervention and many were capable of assisting, but they did not necessarily intervene. In the present study, it is possible that when placed in actual circumstances, the behavior of the present subjects (i.e., compliance/noncompliance) might not be in agreement with the way they indicated they would behave.

Despite the risk of these factors operating, the interview procedure employed offered the opportunity to investigate some of the cognitive processing that can be occurring when deciding whether or not to act in a compliant manner. For example, information from subjects suggested that some boys who are externalizers do not think of only acting in noncompliant ways.

Implications

Findings suggested that some externalizing boys seem to be just as efficient as controls in decoding expressions, and to understand, quite well, the benefits of complying
with a teacher's request in the classroom. The impressions of teachers that they often do not behave in a compliant manner may suggest that being noncompliant, for these children, is regarded as leading to more benefits than being compliant. For example, a boy who desires attention from his teacher may find he receives this attention when he does not behave as expected. The incentive for being compliant may not be strong if a reward (i.e., attention) is not forthcoming when he is compliant. In order to strengthen the compliance behavior of these children, the most apparent strategy would involve reinforcing them when compliance behavior is observed.

Barkley (1987) developed a parent training program for decreasing noncompliance behavior in children while increasing compliance behavior. One of the first comments that Barkley makes is that it may be necessary to "catch" children at being good, so that they can be reinforced. The same strategy can be applied in the classroom. That is, a teacher may need to be attentive to the externalizing child and be prepared to reward the child when s/he observes compliance behavior, rather than only waiting for the child to misbehave and, possibly punishing that child, in order to discourage noncompliant behavior.

Observations would suggest that there are also externalizing boys who can decode expressions of emotion as efficiently as controls (Step 2), but who do not appear to
understand the benefits of complying and who tend to generate noncompliant responses. These children would appear to require assistance in broadening their behavioral repertoire and appreciating the consequences of their actions (Steps 3 and 4). For example, a teacher involved with such a child may need to be very concrete in issuing commands (e.g., "Please pick up the paper beside your desk in one minute, or you will miss the first five minutes of recess.

Finally, there seem to be externalizing boys who have a tendency to decode neutral facial expressions of emotion as reflecting anger/hostility and to subsequently behave in a noncompliant way in response. Considering Dodge's model, these boys can be expected to be at a greater disadvantage than the others described because their processing begins to be inefficient or deviant at an earlier stage (Step 2). For these boys, teachers may need to tailor their instructions prior to issuing commands, with information about their feelings and intentions. For example, "Having a neat classroom makes me very happy. Please pick up the paper beside your desk in one minute, or you will miss the first five minutes of recess."

Directions for Future Research

The results of the present study suggest that replication in a special education or clinical population
exhibiting higher levels of externalizing pathology could be fruitful. Such a study could offer insight into finding out whether children with more severe manifestations of externalizing behavior experience less success at decoding nonverbal cues of emotion and how such perceptions can affect behavior.

Direct observation of children within the classroom setting to substantiate the behavior they indicate they would carry out is also recommended, as well as further exploration of the types of noncompliant behavior children produce, and how this behavior may change with age. For example, are younger externalizing children more likely to express noncompliance as a direct refusal, but as they develop cognitively and are, presumably, better able to reason, is noncompliance more likely to be expressed in the form of negotiating with the teacher?

Finally, the present work did not address the issue of why externalizing boys performed differently than controls in the interpretation of neutral expressions. Work by various researchers (e.g., Nowicki and Duke, 1989a; Camras et al., 1983; Camras et al., 1985) has offered the clue that experience (e.g., within the family) may be affecting the manner in which children interpret the nonverbal cues of
others. The particular aspects that may be involved in this process, however, have not yet been delineated.
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Appendix A

Teacher's Selection Criteria, Consent and Rating Forms

Dear Teacher,

I am conducting a study on how well children understand nonverbal cues and how they react to nonverbal cues. I am requesting your assistance in selecting students to participate in my study. The study is being conducted in partial fulfillment of my requirements for a Ph.D. degree in Developmental Psychology at the University of Windsor. Your School Board and Principal have kindly given permission for this research to take place. Your involvement is voluntary.

For participation in the study, I am looking for two different types of boys. The first type can be described as a child who acts out on the environment. This type of child frequently engages in behaviors such as being uncooperative, fighting and hitting, having temper tantrums, and being resistant, disobedient, and defiant. The second type of child is one that you would describe as typical and average in both behavior and academic achievement.

I am requesting your assistance in nominating five boys from your classroom who meet each description. However, these children should not have: a) any uncorrected vision or hearing impairments, b) any known brain injury, or c) any significant learning problems (e.g., identified learning disability).

I am asking that the attached parental consent forms be given to the children you have nominated. Parents will be instructed to return the forms to me, care of the school.

For those children whose parents give permission for participation in the study, I ask your further assistance in completing two short surveys on these children's behavior in the classroom. One form is a 4-page questionnaire and it will require approximately 15 minutes to complete. The other form asks additional information not included in the questionnaire and should take a few moments to complete. I ask that you please complete the longer form first, and the shorter form last. Based on the information I receive, I will be asking some of these children to view slides of nonverbal cues and to answer some questions about these. The procedure will require no more than 30-45 minutes per child.

The results of the study will be discussed with my academic advisor and committee. A summary of the study may be published. However, at no time will your identity or the
identity of any of the boys or their parents be released; these will be known only to myself.

Your role in the nominating and rating of subjects is very much valued and appreciated. If you require any further information, or clarification, please do not hesitate to contact me at the University of Windsor (253-4232, Ext 2218).

This research has been approved by the Ethics Committee of the University of Windsor's Psychology Department. The chairperson of the committee is Dr. Jim Porter and he may be contacted for any concerns regarding the procedures in the study (253-4232, Ext 7012). My academic advisor is Dr. Sylvia Voelker (253-4232, Ext 2249).

I enclose two copies of a consent form, requested by the Ethics Committee, to indicate your agreement to participate if you grant it. One copy is for your records, the other is to be returned to me.

Thank-you

Diane Zanier, M.A.
Teacher Consent Form

I ____________________ (Teacher's Name) voluntarily agree to participate in the study being conducted by Diane Zanier, M.A. on decoding of nonverbal cues in boys. I understand that I will be requested to nominate students as participants using the description provided and to send home letters of Parental Consent for these children. I understand that for some of these children I will be asked to complete two questionnaires on the behavior of each of these students in the classroom.

I am aware that I may contact Diane Zanier for any questions regarding the study (253-4232, Ext 2218). I am also aware that the study has been approved by the Ethics Committee of the University of Windsor's Psychology Department and that the principal has given his permission to conduct the research in the school.

I understand that if I have any concerns regarding the procedures in the study I may contact Dr. Jim Porter, Chairperson of the Ethics Committee at the University of Windsor (253-4232, Ext 7012).

I understand that the research will be discussed with Diane Zanier's academic advisor and committee and that the results of the study may be published. However, anonymity of the participants (teachers, students, parents, schools) is assured.

Signature:________________________

Date:________________________
Teacher Compliance Rating Form

Child's Name and Birth Date: ________________________________

Please consider this child's compliance behavior in the classroom.

Compliance is defined as immediate or almost immediate obedience to your requests.

There are several types of noncompliant behavior:

1. Direct defiance--overt refusal to perform a requested behavior, with angry, defiant or negative affect, includes temper tantrums.
2. Simple refusal--verbal refusal that is not accompanied by negative affect (e.g., "No," "I don't want to," "Uh...uh.")
3. Passive noncompliance--The child does not perform the requested behavior, but does not overtly refuse or deny; child does not acknowledge the request/command.
4. Negotiation--Child attempts to reach a mutually agreed upon directive; proposes bargains, alternate solutions, or compromises; offers or asks for alternative explanations or excuses (e.g., "Why," "I have a better idea," "I'll do it later."

Consider the behaviors described above and select the one statement that best describes this boy's compliance behavior in the classroom:

_____ Overall, this child's behavior in the classroom is typically compliant.

_____ Overall, this child's behavior in the classroom is sometimes compliant, and sometimes noncompliant.**

_____ Overall, this child's behavior in the classroom is typically not compliant.**

**If you selected either of the last two alternatives, which type of noncompliant behavior would you say this child engages in most frequently? (please check one only):
1) Direct defiance _____ 2) Simple refusal _____
3) Passive noncompliance _____ 4) Negotiation _____
Appendix B

Parental Consent Form

Dear Parent(s)

I am writing to request your permission to allow your child to participate in a study that is currently being conducted in his school. The study is looking at how well children understand nonverbal cues and how they react to nonverbal cues. Your principal and the School Board have kindly given permission for this research to take place.

This study is being conducted as part of the requirements for my doctorate degree in psychology at the University of Windsor. Some 6- and 10-year-old children have been asked to participate.

In this research, I would like to see whether children's ability to understand nonverbal cues is related to their behavior. In order to do this, I request your permission to ask your child's teacher to fill out two short questionnaires about your child's behavior in school. Following this, some children will be individually shown slide pictures of nonverbal cues and asked questions about these. Some of the children's answers will be tape recorded in order to keep the session as short as possible. This session will take place in the school and will take between 30 and 45 minutes. The game-like quality of these tasks makes them appealing to children.

Involvement in the study is voluntary and your permission may be withdrawn at any time. If you will allow your child to participate, I ask you to please sign the attached consent form. I would also appreciate if you would answer the few brief questions below the consent form on family statistics. I require this information so that I may have a brief description of the children and families that have chosen to participate in the study. I ask that you seal the form in the envelope addressed to myself and have your child return it to his school. I will be the only person to see this information.

Please understand that all the information I receive from you, your child, or your child's teacher will remain confidential. The results of the study will be discussed with my academic advisor and committee. A summary of the study may be published. However, at no time will your identity or the identity of your child, teacher, or school be identified. This information will be known only to myself.

126
If you require any further information about the study, please do not hesitate to contact me at the University of Windsor (253-4232, Ext 2218). I will be pleased to address any concerns you may have.

This research has been approved by the Ethics Committee of the University of Windsor's Psychology Department. The Ethics Committee is available to you for reporting any concerns regarding the procedures of the study. Dr. Jim Porter is Chairperson of the Ethics Committee and he can be reached at the University of Windsor (253-4232, Ext 7012). Dr. Sylvia Voelker is my academic advisor (253-4232, Ext 2249).

Sincerely,

Diane Zanier, M.A.
Parental Consent Form

I ________________________________ (Parent's Name)
give permission for my child ____________________________ (Child's Name) to participate in the study on nonverbal cues being conducted by Diane Zanier, M.A. I understand that participation is voluntary and that my permission may be withdrawn at any time.

I am aware that as part of the study my child's teacher will be asked to complete two short questionnaires on my child's behavior at school and that my child may be shown slide pictures of nonverbal cues and asked questions about these. I am aware that some of my child's responses will be tape recorded and this information, as well as information from teachers, will be kept confidential.

I understand that while the findings of the study will be discussed with Diane Zanier's academic advisor and committee and that a summary may be published, at no time will the identity of any of the participants be revealed.

I am aware that I may contact Diane Zanier if I have any questions regarding the study (253-4232, Ext 2218). I am also aware that this research has been approved by the Ethics Committee of the University of Windsor's Psychology Department. I understand that the Ethics Committee is available to me for reporting any concerns regarding the procedures of the study. The Chairperson of the Ethics Committee is Dr. Jim Porter and he may be contacted at the University of Windsor (253-4232, Ext 7012). Dr. Sylvia Voelker is the academic advisor for this project.

_________________________ Parent's Signature

_________________________ Child's Birth Date

_________________________ Today's Date
Parent Questionnaire--Family Statistics

1. Child's name (who will participate in the study).
   ________________________________________________

2. Child's grade in school ________.

3. Number of children in the home ________.

4. Parental Information
   a) Marital status (please circle one): married, single, separated, divorced, widowed

   b) Level of school completed:    Mother    Father
      - less than grade seven  _____    _____
      - grade nine            _____    _____
      - grade 10 or 11        _____    _____
      - high school graduate  _____    _____
      - partial college (or at least one year) or specialized training __    __
      - standard college or university graduation __    __
      - graduate professional training (e.g., graduate degree) __    __

   c) Please specify training/schooling beyond high school:__________ (M) __________ (F)

   d) Occupation (please list): ________________ (M)
        __________________________ (F)

   e) Presently employed (yes/no)    (M)    (F)
      Full time ______    _____
      Part time ______    _____

Thank-you

Diane Zanier, M.A.
Appendix C

Consent for Subjects

The following was said to the child prior to beginning.

"I would like to know if you would like to help me out today. What I would ask you to do is to watch some slides and then to answer some questions about them. I will have to tape record some of the things you say to me so that we can work more quickly. But I want you to know that I will not be telling your teachers or any of the other kids what you say to me and I won't let them listen to the tapes.

When I'm finished talking with all the kids I'd like to see, I have to write up a big project. My teachers will read it and it might be put in a book but no one will know who the kids are that helped me out. That will be a secret that only I will know.

Do you think you'd like to help me out by seeing the slides and answering the questions? You don't have to if you don't want to--you won't get into any trouble if you say "No", it's up to you. What would you like to do?"
## Appendix D

### Table D-1

**Labels Considered Correct and Incorrect For Decoding of the Facial Expressions In the Hypothetical Classroom Request Tasks**

<table>
<thead>
<tr>
<th>Expression</th>
<th>Correct Interpretation</th>
<th>Incorrect Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>*Happy (56) *Glad (2) *Very happy (1)</td>
<td><strong>Sad (1)</strong></td>
</tr>
<tr>
<td>Angry</td>
<td>*Angry (23) *Mad (16) *Mean (2) *Mean, angry (1) *Mean, mad (1)</td>
<td>**Sad (4) *Happy (3) *Silly (1) *Sick (1) *Medicine, lonely, sad (1) *Sad, afraid (1)</td>
</tr>
<tr>
<td>Female-Neutral</td>
<td>Kind of like a normal day, kind of boring, tiring (1) Nothing's bugging you, not happy, not sad, just plain (1) In between, so-so, okay (1) Normal, not excited, not happy or sad (1)</td>
<td>**Sad (23) *Sad (1) *Mad (1) *Angry (2) *Sort of mad (2) *A little angry (1) *Grumpy, angry (1) *Sort of mad or angry (1) *Sad or mad (1) *In the middle, happy and mad (1) *Not too happy mood, bad mood (1) *Happy and sad (1) *Sad, so and so (1) *So-so, sad (1) *Sort of sad (1) *Kind-of sad (1) *Sort of happy, unhappy (1) *Happy (3) *Glad (1) *Bored (3) *Kind of bored (1) *Depressed, bored (1) *Depressed (1) *Tired (1) *Really, really sick (1) *Hurt (1) *Laughing, feeling ticklish (1)</td>
</tr>
<tr>
<td>Male</td>
<td>Neutral</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Normal (1)</td>
<td>Neutral, nothing’s bugging you, not happy, not sad, just plain (1)</td>
<td></td>
</tr>
<tr>
<td>So-so, okay (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>So-so, inbetween, okay (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>So-so, not feeling happy, not feeling sad, just regular (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sad</strong> (13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Happy</strong> (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mad</strong> (6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Angry</strong> (4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little bit angry (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not great, but not really sad, grumpy (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in a good mood, grumpy (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grumpy, angry (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shocked, somebody got hit (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In the middle happy and mad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little angry, stubborn (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed, strange, feeling mad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sort of mad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kind of sad or angry (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling so-so, sort of sad, but happy (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kind of normal, kind of mad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sort of happy (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good, strange (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depressed (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unhappy</strong> (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Little sad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Okay, kind-of sad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sort of sad (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspicious (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>So-so, kind of sick (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad, really sick (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confused (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kind of stuffy (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazed (1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proud (1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * = Responses obtained in the samples of Putnam (1979) and Strong (1978). These were considered exactly or almost perfectly interchangeable interpretations for the expressions.

** = Responses regarded as completely wrong in the samples of Putnam (1979) and Strong (1978).

† = Examples of responses that were regarded as indicating a "neutral" expression in the studies of Haidtland (1977), Putnam (1979), and/or Strong (1978): Feels nothing; Doesn’t feel anything; Nothing; Is not feeling anything, is not thinking about anything; Looking like they’re not feeling any particular way.

Responses that were interpreted as reflecting hostility by Harrigan (1984), Putnam (1979), and/or Strong (1978) are printed in bold. Responses unique to this sample that were considered to reflect hostility are underlined.

Numbers in brackets represent frequencies.
Appendix E

Instructions for the Hypothetical Classroom Request Tasks

The experimenter began by saying: "I am going to show you a slide of someone's face. I'd like you to look at the face and tell me what you think that person is feeling. I'm going to show you the face for a very short time, so you'll have to look carefully. After you tell me what you think the person is feeling, I'm going to read you something about that person and ask you some questions about what you think. Do you understand? Do you have any questions before we start?"

The slide of the first facial expression was exposed for one second and then the subject was asked: "What do you think this person is feeling?" If the subject failed to respond, he was asked: "What is this person feeling like?" If the subject still failed to respond, the experimenter said: "Tell me about this person?" If the child described a behavior, rather than an affect, he was asked: "How does that make a person feel inside?" (adapted from Putnam, 1978). Following the subject's response, a scenario was presented and questions regarding the scenario were asked.

Scenario A

"Suppose this person who is feeling _______ (subject's response is inserted here) is your teacher. How would you act if the teacher looked at you with that face showing s/he was feeling _______ and told you to go sit down in your desk and do your seat work? You know that later s/he will check and make sure you did it. How would you act, what would you do?"

If the child gave only one response, he was asked: "Is there anything else you might do?"

Following this, a child that generated more than one response, was asked: "You told me several things you would do. If you were going to do just one thing, which one would you do? Why?" For a child that generated a single response the experimenter said: "You said that you would _______ (insert the child's response), why would you do that?"

Scenario B

"Suppose this person who is feeling _______ is your teacher. Suppose that your teacher notices that there is a piece of paper on the floor beside your desk. You didn't see it because someone dropped it there accidentally. How
would you act if the teacher looked at you with that face showing s/he was feeling ______ and asked you to pick up the paper and throw it in the garbage. You know that later s/he'll check and make sure you did it. How would you act, what would you do?" After this, children were asked the same questions that followed Scenario A.

Scenario C

"Suppose this person who is feeling ______ is your teacher. Suppose you are playing with a toy one of your friends just passed to you. How would you act if the teacher looked at you with that face showing s/he was feeling ______ and told you to put the toy away. What would you do? You know that later s/he'll check to see if you did it." This was followed by the same questions given after Scenario A.

Scenario D

"Suppose this person who is feeling ______ is your teacher. Suppose you were talking with one of your friends while sitting at your desk. How would you act if the teacher looked at you with that face showing s/he was feeling ______ and s/he told you to stop talking and get back to work. What would you do?" The questions following Scenario A were read after the description.
Appendix F

Instructions for the DANVA Subtests

Instructions for Older Subjects

The examiner passed out the packet of answer sheets for the four subtests. The children were instructed to place their names on the front page. The following instructions were then given:

"I want to find out how accurate children are at guessing how other people feel. You are going to see slides and listen to recordings and then guess how the people you will see and listen to are feeling."

Facial Expressions Subtest

"Please look at your answer sheet. As you can see, each number has four choices next to it: happy, angry, sad, and fearful. Another word for fearful is afraid or scared.

I am going to show you slides of adult and child faces. After you see the face, I want you to guess how you think that person is feeling and make a check next to that feeling on the answer sheet.

Do you understand? The examiner could give examples to reflect what the feelings meant, if a subject asked.

Okay, find number 1 on your answer sheet. Good. I want to tell you that the faces will only be shown for a very short time so you are going to have to pay very close attention. I will say "Ready" before each slide so that you can be looking at the screen."

"Pencil set? Ready?" After the first slide was shown, the examiner said, "Now, was that face happy, sad, angry, or fearful? Place a check next to the feeling you thought it was."

The 20 adult slides were shown first for an interval of one second. At the end of the twenty slides, the children were complimented on their work and told the following:

"The next slides will be of children. They have caps on so that it will be easier to see their faces. Find number 21 on your answer sheet. Good. Ready."

The Postures subtest followed next, and children were instructed to turn to the answer sheet for that subtest.
Postures Subtest

When the children had the proper answer sheet, the following instructions were given:

"I am going to show you slides of people who are showing different kinds of postures with their bodies. Have you heard that word before "postures"? Do you know what it means?" (To help a child understand, a posture such as one for sleeping was demonstrated.)

Then the experimenter continued. "I want you to look at each posture and guess whether it is happy, sad, angry, or fearful."

Again, I will say "Ready" before each slide comes on. Ok? Find number 1 on your answer sheet. Ready."

After the first slide was presented, the examiner said: "Now was that a happy, sad, angry, or fearful posture?" If the child appeared to understand the task, this line was not repeated for subsequent items.

The twelve posture slides were presented for an interval of one second. At the end of the slides, children were complimented on their efforts, as on the previous subtest, and then asked to turn to the answer sheet for the Gestures subtest.

Gestures Subtest

The following instructions were given to children.

"I am going to show slides of people making gestures with their hands. I want you to look at each gesture and guess whether it is a fearful, sad, angry, or happy gesture. I will say "ready" before each slide is presented. Do you have any questions? Okay, find number 1 on your answer sheet. Ready."

After showing the first slide, the examiner said "Now was that a fearful, sad, angry, or happy gesture."

After the slides were presented, children were asked to turn to the answer sheet for the listening subtest and were again complimented on their efforts.

Paralanguage Subtest

The following instructions were given to children:
"This time I want you to listen very carefully to something I am going to play. A person is going to be saying the same sentence a number of times, but each time you hear it I want you to guess whether the person saying it is happy, sad, angry, or fearful.

Find number 1 on your answer sheet. Good. Listen carefully. Here is the first time you will hear the sentence. Ready."

When the first sentence was presented, the examiner said: "That was the first sentence. Was that first person you heard feeling happy, sad, angry, or fearful."

Sixteen trials were presented on Side A of the audio tape and the same procedure was repeated for the 16 trials on Side B of the tape.

Upon leaving, children were asked not to divulge the particulars of the session to their classmates. "I'd like to ask you to please not tell the other kids in you class about the pictures you saw and the questions you were asked so that when it's their turn they can be surprised."

**Instructions for Younger Subjects**

A set of four white cards (10 cm x 17.5 cm) was placed in front of the child. Each card contained the name of one of the four emotions for the DANVA subtests (happy, angry, sad, fearful). The child was asked: "Do you think you know any of these words?" Unless the child demonstrated that he could read each word, the examiner proceeded to familiarize the child with the printed words.

With the exception of reminders to record their selections in the record booklet, the younger children were given the same verbal instructions as the older participants. After each slide, however, the examiner quickly repeated the alternatives for the child while pointing to them and asked the child to point the answer while saying it aloud. The examiner then recorded the child's selection on the data sheets.
APPENDIX G
Supplementary Tables

Table G-1

Mean Scores on the DANVA subtests by Group

<table>
<thead>
<tr>
<th>DANVA Subtest</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faces-Adult (x/16)</td>
<td>12 (75%)</td>
<td>12 (75%)</td>
</tr>
<tr>
<td>Faces-Child (x/16)</td>
<td>11 (69%)</td>
<td>7 (44%)</td>
</tr>
<tr>
<td>Postures (x/12)</td>
<td>6 (50%)</td>
<td>6 (50%)</td>
</tr>
<tr>
<td>Gestures (x/12)</td>
<td>7 (58%)</td>
<td>6 (50%)</td>
</tr>
<tr>
<td>Paralanguage (x/32)</td>
<td>24 (75%)</td>
<td>21 (66%)</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-2

Means for the DANYA Faces-Adult Subtest by Group

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>96%</td>
<td>93% «</td>
</tr>
<tr>
<td>Angry</td>
<td>68%</td>
<td>70%</td>
</tr>
<tr>
<td>Sad</td>
<td>58%</td>
<td>53% «</td>
</tr>
<tr>
<td>Fearful</td>
<td>89%</td>
<td>73% «</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-3

Means for the DANVA Faces-Adult Subtest by Age

<table>
<thead>
<tr>
<th>Expression</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>91%</td>
<td>98%</td>
</tr>
<tr>
<td>Angry</td>
<td>68%</td>
<td>70%</td>
</tr>
<tr>
<td>Sad</td>
<td>59%</td>
<td>52%</td>
</tr>
<tr>
<td>Fearful</td>
<td>76%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-4

Means for the DANVA Faces-Children Subtest by Group

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>99%</td>
<td>93%</td>
</tr>
<tr>
<td>Angry</td>
<td>75%</td>
<td>72%</td>
</tr>
<tr>
<td>Sad</td>
<td>55%</td>
<td>51%</td>
</tr>
<tr>
<td>Fearful</td>
<td>33%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction
Table G-5

Means for the DANVA Postures Subtest by Group

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>43%</td>
<td>37% «</td>
</tr>
<tr>
<td>Angry</td>
<td>46%</td>
<td>38% «</td>
</tr>
<tr>
<td>Sad</td>
<td>68%</td>
<td>57% «</td>
</tr>
<tr>
<td>Fearful</td>
<td>51%</td>
<td>50% «</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-6

Means for the DA, VA Postures Subtest by Age

<table>
<thead>
<tr>
<th>Expression</th>
<th>6 years</th>
<th>10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>33%</td>
<td>47%</td>
</tr>
<tr>
<td>Angry</td>
<td>34%</td>
<td>49%</td>
</tr>
<tr>
<td>Sad</td>
<td>58%</td>
<td>67%</td>
</tr>
<tr>
<td>Fearful</td>
<td>41%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-7

Means for the DANVA Gestures Subtest by Group

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>49%</td>
<td>45%</td>
</tr>
<tr>
<td>Angry</td>
<td>58%</td>
<td>50%</td>
</tr>
<tr>
<td>Sad</td>
<td>74%</td>
<td>65%</td>
</tr>
<tr>
<td>Fearful</td>
<td>53%</td>
<td>48%</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
Table G-8

Means for the DANVA Paralanguage Subtest by Group

<table>
<thead>
<tr>
<th>Expression</th>
<th>Controls</th>
<th>Externalizers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>87%</td>
<td>83%</td>
</tr>
<tr>
<td>Angry</td>
<td>87%</td>
<td>86%</td>
</tr>
<tr>
<td>Sad</td>
<td>69%</td>
<td>56%</td>
</tr>
<tr>
<td>Fearful</td>
<td>65%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Note. « = Pattern of means is in the predicted direction.
VITA AUCTORIS

1960  Born in Windsor, Ontario, Canada to Angela and Luigi Zunier.

1983  Graduated with the degree of Honours Bachelor of Arts from the University of Windsor, Ontario (Double Major: English and Psychology). Board of Governors Medallist.

1985  Graduated with the degree of Master of Arts (Developmental Psychology) from the University of Windsor.