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Attributions, means-end problem-solving and aggressive boys: The role of intelligence

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Case Western Reserve University, 1990
ATTRIBUTIONS, MEANS-END PROBLEM SOLVING AND
AGGRESSIVE BOYS: THE ROLE OF INTELLIGENCE

by

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Submitted in partial fulfillment of the requirements for the Degree of Doctor
of Philosophy

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ATTRIBUTIONS, MEANS-END PROBLEM SOLVING AND AGGRESSIVE BOYS: THE ROLE OF INTELLIGENCE

Abstract

by

STEVEN W. EVANS

Peer rejected and aggressive elementary school age boys have been the focus of much current research. This population is at significant risk for continued mental health difficulties into adulthood. In an attempt to define the social cognitive processes which may contribute to the aggressive and rejected nature of these children, researchers have uncovered two social cognitive processes which appear to operate differently in aggressive/rejected boys as compared to their nonaggressive/nonrejected peers. These two areas are attributions and means-end problem solving. The two studies described in this paper examine these two processes and attempt to better define their potential influence on the behavioral differences between these two groups. These studies place a special emphasis on the role of intelligence in these processes and group differences.

Results of the first study indicate that the attributional biases found in aggressive/rejected boys are partly a function of intelligence. The hypothesis was put forth that the ability to reason from past experiences and predict the motivations of others' actions is related to intelligence. Therefore, since
aggressive/rejected boys are reported to be the targets of considerable peer hostility, it was predicted that the more intelligent aggressive/rejected boys would demonstrate a greater hostile bias than the less intelligent boys. The results are consistent with that prediction however future studies are needed before completely accepting the hypothesis.

The second study reviews a variety of scoring methods for a commonly used method of testing means-end problem solving with aggressive/rejected boys. Previous studies indicate that qualitative scoring techniques are more effective with this population than quantitative techniques. This study compared the effectiveness of two qualitative techniques in predicting aggression and social withdrawal in eight to eleven year old boys. This study noted the previous findings which indicated that the effectiveness of these techniques should be considered after controlling for intelligence. Both techniques used in this study were found to predict aggressive and withdrawn behavior after controlling for intelligence.
Acknowledgements

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ATTRIBUTIONS, MEANS-END PROBLEM SOLVING AND AGGRESSIVE BOYS: THE ROLE OF INTELLIGENCE

Individual differences in social cognitive processes among children has received increasing attention over the past ten years. Boys who are considered aggressive and are rejected by their peers have been the focus of a large portion of this research. These boys have been of special interest given results from longitudinal studies which suggest that many of these boys continue to have difficulty into adulthood (Parker & Asher, 1987).

A model of social exchange was proposed by Dodge, Pettit, McClaskey, and Brown (1986) which points out specific cognitive processes which may function differently in aggressive/rejected boys than their less aggressive/rejected peers. Dodge et al. (1986) defined five cognitive steps which may operate in interpersonal situations. These are: 1) encoding, 2) interpretation, 3) response search, 4) response evaluation, and 5) enactment. These studies focus on assessment of the middle two processes.

The first study measures interpersonal attributions. These are people's judgements about the intent of another person's actions. Attributions are one result of the interpretation step in the model of social exchange described above. Previous studies have found that aggressive/rejected boys have a bias to attribute hostility to their peers in
situations of peer provocation. The first study attempts to replicate this finding and to examine the role of intelligence within this attributional process.

The second study focuses on the response search phase of the model of social exchange. Response search strategies have been assessed through measures of means-end problem solving. A variety of administration and scoring methods have been used with these measures. Not surprisingly, an assortment of sometimes contradictory findings have resulted. Study two reviews findings with this measure using aggressive/rejected boys and compares two scoring techniques’ ability to predict behavior.

Throughout the two studies the role of intelligence in interpersonal behavior is considered. While measures of intelligence have been utilized in previous studies of interpersonal processing, the role of intelligence in these processes has never been directly examined. It is argued in both studies that understanding the role of intelligence in interpersonal processing is essential to defining the influence of either attributions or means-end problem solving on behavior.
STUDY ONE

Several studies over the past ten years have demonstrated that aggressive and rejected children adopt a bias to infer hostility from others' actions. This relationship has been demonstrated with elementary school children (Dodge, 1980; Dodge & Frame, 1982; Dodge & Newman, 1981; Lochman, 1987), junior high school children (Dodge & Tomlin, 1987), and hospitalized emotionally disturbed adolescent boys (Nasby, Hayden, & DePaulo, 1980). These studies have primarily relied on the use of peer sociometrics to identify their samples of rejected/aggressive children. If the study of attributional biases is to continue to grow in both theoretical and clinical importance, it would be advantageous to identify these rejected/aggressive children with more valid behavioral assessment techniques. Therefore, the first purpose of this study was to determine if parent or teacher ratings of behavior can successfully identify aggressive and rejected children who demonstrate these attributional biases.

While attributional biases have been found in aggressive and rejected children, little is known about the cognitive mechanisms responsible for them. Dodge et al. (1986) proposed a model of social information processing. The processes leading to the formation of attributions are in many ways theoretically related to aspects of intelligence. Therefore, the second purpose of this study was to explore the potential relationship of intelligence to the attributional process.
Previous studies have demonstrated that peer ratings are successful in revealing those aggressive/rejected children with attributional biases. Peer ratings have been used to identify those students who are both most rejected and most aggressive and then to contrast this group with children who are both least aggressive and least rejected. Dodge and others have found that the aggressive/rejected children tend to believe that other children have hostile intentions towards them in situations of peer provocation, whereas nonaggressive/nonrejected children do not show this bias. This difference between the groups becomes even more pronounced when the specific events in the peer provocation situation are ambiguous (Dodge, 1980).

While peer sociometrics have been the most common measure used to determine aggression and rejection in children, the use of behavior checklists is not without precedent. Previous studies have incorporated scores from both peer sociometrics and teacher ratings of behavior. Most of these studies have used median splits on teacher ratings of aggression and rejection to help define their groups (Dodge & Frame, 1982; Dodge & Newman, 1981; Waas, 1988). Dodge and Somberg (1987) used the mean as opposed to the median as a dividing point on these scales. The use of these sample-defined points of reference for defining aggressive and rejected groups makes replication difficult and provides a vague definition of these children. Therefore,
this study used test norms as criteria for grouping instead of limits defined by the sample selected. The measure employed to identify the aggressive and rejected children was the Child Behavior Checklist (Achenbach & Edelbrock, 1983) and the Teacher Rating Form (Achenbach & Edelbrock, 1986).

Prior to a recent study by Waas (1988), differences between rejected/aggressive and nonrejected/nonaggressive children were a primary focus of study. Waas (1988) examined the separate roles of aggression and rejection in identifying children with biases. Waas demonstrated that with third and fifth grade boys, both peer rejection and aggression had independent effects on attributional biases. Using separate measures of aggression and peer rejection, Waas found that peer rejected boys had a greater expectancy of hostility from their peers than did their nonrejected counterparts. This finding was consistent across both the rejected/high aggressive group and the rejected/low aggressive group. This difference was only obtained in situations where there was little relevant social information upon which to base the attributions. No difference in attributions was found between the rejected/high aggressive and the rejected/low aggressive groups. Therefore, this study employed checklists which have separate ratings of aggression and rejection so that boys could be classified as either aggressive, rejected, or both.
The assessment of attributions has varied across studies, but has usually involved the presentation of a situation of peer provocation and asked the subject to determine whether the child (actor) in the story meant to harm the other child. These stories have been presented via videotaped presentations, role plays, and verbally. Like past studies, the stimuli employed in this study were ten stories describing peer provocation recorded on audio tape and played for the subjects.

Past research has identified a variety of potential sources of information used in forming attributions: the amount of harm caused by the actor (Costanzo, Coie, Grumet & Farnill, 1973), the actor's emotional expression (Nelson, 1980), consensus, consistency, and distinctiveness information (Hortacsu, 1987; Kelley, 1973; Rholes & Walters, 1982), and avoidability, intentionality, and motive acceptability (Grueneich, 1982; Shultz, Wright, & Schleifer, 1986). These studies have concluded that while a variety of sources of information appear salient to children over twelve years of age, their saliency is less consistent with children younger than twelve. Given the lack of consistent findings about the most critical bits of information used by children under twelve years of age, one plan would be to control those sources of information suspected of being important.

Therefore, this study controlled for amount of harm caused by the actor across stories. In addition, the stories also limited information about the actor in the story (e.g. sex, size, affective response to situation),
thereby making the stories more ambiguous. Ambiguity has exaggerated differences in attributional biases in past studies (Dodge, 1980; Waas, 1988).

Thus the present study examined levels of attributional bias between: 1) aggressive boys and nonaggressive boys, 2) rejected boys and nonrejected boys, and 3) aggressive/rejected boys and nonaggressive/nonrejected boys. Previous research would suggest that rejected/aggressive boys should demonstrate a greater bias to infer hostility in their peers than nonrejected/nonaggressive boys. Waas’ (1988) recent findings would suggest that rejected boys should demonstrate a greater hostile attributional bias than nonrejected boys. The utility of these checklists in identifying these populations was examined in this study.

The second purpose of this study was to test the hypothesis that intelligence is related to attributional processes in children. Previous studies have not looked at the role intelligence plays in attributional biases. Only the recent study by Waas (1988) employed a measure of intelligence when looking at attributions. However, Waas (1988) only used intelligence as a covariate and did not attempt to explain the theoretical importance for including intelligence. This study attempted to identify the potential relationship between intelligence and the attributional process.
While there is no direct evidence linking intelligence to attributional processes, there is growing evidence that intelligence plays a significant role in social cognitive processes in general (Fischler & Kendall, 1988; Pellegrini, Masten, Garmezy, & Ferrarese, 1987, Werry, Elkind, & Reeves, 1987). This study focused on the role of intelligence on the initial stages of information processing responsible for the formation of attributions. In a theoretical outline of these processes Dodge et al. (1986) described these initial processing steps. They labeled these initial steps "encoding" and "interpretation". In their descriptions of these stages the authors talked about processes which have long been related to general intelligence. These processes include selective attention, mentally representing encoded cues, and integrating these cues with current beliefs about the environment. It is hard to imagine that these steps could be independent of reasoning skills, language ability, basic comprehension skills, and therefore general intelligence.

A recent study by Pellegrini et al. (1987) used the results from a battery of cognitive measures administered to children (9-14 years old) to attempt to identify factors associated with academic and social competence. Three general factors were found to be predictive of competence: social comprehension, cognitive efficiency, and divergent thinking. The social comprehension factor was defined as "1) maturity of understanding about the social world, 2) ability to conceive the means
to achieve social goals, and 3) capacity to appreciate, comprehend, and generate humor".

This factor involves many of the same processes included in Dodge et al.’s (1986) description of the initial stages of processing leading up to an attribution. Pellegrini et al. (1987) found that this factor correlated quite highly with intelligence ($r = .77$) as measured by the vocabulary and block designs subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R; Wechsler, 1974). This evidence suggests that intelligence may play a role in the development of an attributional style.

Given that intelligence may be involved in the attributional process, the question now becomes what would its effect be. In one of the initial papers reporting a hostile attributional bias in aggressive/rejected boys, Dodge (1980) described a "cyclical relationship between attributions and aggressive behavior". In this cycle Dodge described how a hostile attribution bias may lead to peers labeling a child aggressive and hostile. This stigmatization may then influence peers’ future actions toward the child. Given this scenario, it is likely that aggressive and/or rejected boys will be treated differently by their peers than their nonaggressive and/or nonrejected counterparts. In fact, a recent study by Lyons, Serbin, and Marchessault (1988), found that aggressive/withdrawn fifth and sixth grade children experienced more
peer-incited aggression than their peers. Therefore, a hostile bias may in part be an accurate reflection of reality.

It may be that the smarter an aggressive child is, the more likely he is to recognize hostility in his peers and come to expect it. Intelligence may be playing a mediating role between real events and a boy’s beliefs/attributions about the environment. Therefore, a second hypothesis predicts that intelligence will positively correlate with a hostile attribution bias within the aggressive/rejected group, but will not using data from nonaggressive/nonrejected boys. In addition, bright aggressive/rejected boys should demonstrate a more pronounced hostile bias than less intelligent aggressive/rejected boys.

Method

Subjects

One hundred and eleven 8 to 11 year old (M=10.01, sd=1 year 0 months) Caucasian boys from the metropolitan area surrounding Cleveland, Ohio were recruited to participate in this project. The population was recruited from all eight to eleven year old boys in regular education and severely behaviorally handicapped classrooms in eight elementary schools in four public school districts. This reflects an approximate participation rate of forty percent. The mean Social Position Index score for mothers was 54.2 (sd=16; based on 82% of the sample reporting) and for fathers was 44.8 (sd=15; based on 77% of the sample reporting).
Measures

The Child Behavior Checklist (CBC; Achenbach & Edelbrock, 1983) was mailed to the parents of every boy who participated in the study. Ninety-one (82%) of the parents returned a completed CBC. All of the boys’ teachers who participated in the study were asked to complete a Teacher Rating Form (TRF; Achenbach & Edelbrock, 1986). One hundred and seven (96%) of these were returned. Raw scores from the Aggression and Social Withdrawal scales of the CBC and the Aggression and Unpopular scales of the TRF were used in the analysis.

The criteria for placement into aggressive or rejected groups was based on being above the 90th percentile according to the test norms. The 69th percentile served as the criteria for the nonaggressive and nonrejected groups. The use of the 69th percentile was due primarily to test constraints. Below the 69th percentile is considered the average range and the test does not differentiate boys who score below this level. This is somewhat different than peer sociometric studies which typically used groups at opposite ends of the aggression and rejection continuums. This would likely result in groups made up of children below the 50th percentile. While the technique used in this study would include these children, it may also include more average children in the nonaggressive groups.
A questionnaire soliciting sufficient information to complete the Two Factor Index of Social Position (SPI; Hollingshead, 1957) was mailed to all the parents with the CBC. This index provided independent ratings of each parents’ occupation and education along with a global weighted social position index score. The scale provided ratings of one through seven for occupation. A rating of eight for currently unemployed was added for this study.

Ten stories were written describing situations in which an actor eventually knocked a subject to the ground. Four of these stories described situations where the actions of the actor appeared intentional and four described situations where the actor’s actions appeared unintentional. The remaining two stories were designed to be completely ambiguous with regards to the intentions of the actor. A sample of a story designed to elicit a benign bias is, "You are running down the street and come to a corner. You can not see around the corner because there are high bushes in the yard. You run around the corner and run into another child. You are knocked to the ground". The validity of the attributional classifications was determined by twenty graduate students with 90% correct classification. The correspondence between the author and these raters was considered sufficient to support the validity of the stories’ match to the attributional categories.

Two variables resulted from the subjects’ responses to the attributional stories: hostile bias and benign bias. Both the hostile bias
score and benign bias score were the sum of the times a subject chose an attribution for a story that was not designed to indicate that attribution. Therefore, since there were a total of ten stories with two being ambiguous and four designed for each type of attribution, these scores ranged from zero to six. For example, if a subject attributed hostility to the actor in every story, his hostility bias score would be six and his benign bias score would be zero.

Four subtests from the WISC-R were used to measure intelligence: the Vocabulary, Similarities, Comprehension, and Picture Arrangement subtests. The four subtests individually correlate with full scale IQ between .48 and .79 with children between the ages of eight and eleven (Wechsler, 1974). The sum of scaled scores from these subtests has been found to be highly related to full scale intelligence in adult populations. Using data collected from the Wechsler Adult Intelligence Scales - Revised (Wechsler, 1981) administered to 141 high school seniors (Detterman, 1989), the sum of these subtests correlated quite highly with full scale IQ ($r=.94$), performance scale IQ ($r=.83$), and verbal scale IQ ($r=.91$).

Procedure

The attributional assessment and intelligence tests were administered in one session at the child's school. The SPI and CBC were mailed to all parents once permission was received for their child
to participate. Teachers were given the TRF and these were given back to the investigator at the school or mailed.

Two independent groups of aggressive and nonaggressive boys were formed. The first grouping was based on the CBC. Boys whose "Aggression" scale raw score was above the 90th percentile (raw score > 14) according to the test's norms were placed in a group labeled parent-rated aggressive (PA). Boys' whose "Aggression" scale raw score was below the 69th percentile (raw score < 10) were placed in a group labeled parent-rated nonaggressive (PNA).

The second grouping was based on the "Aggression" scale scores on the TRF. The same criteria as above (90th and 69th percentile based on test norms) served as the criteria for inclusion in the groups. These groups were labeled teacher-rated aggressive (TA) (raw score >23) and teacher-rated nonaggressive (TNA) (raw score < 10).

Similar groupings were formed based on measures of peer rejection. Parent-rated rejected (PR) (raw score > 3) and parent-rated nonrejected (PNR) (raw score < 2) groupings were formed using the 90th and 69th percentile cutoffs with the data from the CBC scale Social Withdrawal. Teacher-rated rejected (TR) (raw score > 4) and teacher-rated nonrejected (TNR) (raw score < 2) groups were formed with the same criteria using the Unpopular scale on the TRF.
This procedure led to the formation of eight groups. Four of these groups were defined by aggression (PA, PNA, TA, TNA) and four groups were formed based on peer rejection (TR, TNR, PR, PNR).

Finally, four other groups were formed based on these previous categories. These groupings included boys who were in the aggressive and rejected groups as defined by the parents (PAR) and teachers (TAR). These boys were contrasted with boys who were in the nonaggressive and nonrejected groups defined by the parents (PNAR) and teachers (TNAR). This procedure created two groups resulting from parent ratings (PAR and PNAR) and two from teacher ratings (TAR and TNAR).

The mean sum of four scaled scores from the WISC-R for each group was between 40.50 and 45.00 and the range of scores across all groups was 23 to 66. Multivariate analysis of variance was completed on all groups with summed intelligence score, mother’s SES, and father’s SES as the dependent variables. There were no significant differences between the groups.

Results

Attributional Differences

The first purpose of this study was to attempt to replicate previous attributional differences in aggressive and rejected boys whose status was determined by parent and teacher ratings. Initial analyses involved contrasting the groups defined by ratings of aggression. Separate
multivariate analyses of variance (MANOVA) were performed on the hostile bias scores and benign bias scores with the parent and teacher defined aggressive and nonaggressive groups. Neither analysis yielded significant differences (p > .1) between aggressive and nonaggressive children. Table 1 reports the means and standard deviations for all groups on both bias scores. This finding is inconsistent with previously reported results.

Insert Table 1 about here

Separate MANOVAs were also performed on the groups defined by teacher and parent ratings of peer rejection using hostile bias scores and benign bias scores as the dependent variables. Again, both analyses revealed statistically nonsignificant differences (p > .1).

Finally, the groups defined as both aggressive and rejected were contrasted with those defined as both nonaggressive and nonrejected. Using the bias scores as dependent variables, the MANOVAs again revealed no significant differences (p > .1).

**Intelligence Effects**

Since it was predicted that intelligence was related to attributional biases within the defined groups, correlations between the measure of intelligence and attributional biases were computed using data from the
aggressive/rejected and nonaggressive/nonrejected groups. These correlations are reported in Table 2.

Insert Table 2 about here

The pattern of correlations for the aggressive/rejected boys indicate that intelligence and a hostile bias are positively correlated in both parent and teacher defined groups (r = .38 & .62 respectively). A benign bias and intelligence are negatively correlated in both parent and teacher defined groups (r = -.57 & -.16 respectively). While not all correlations are significant, the pattern of correlations is the same across both parent and teacher defined groups. These results are consistent with the mediational role of intelligence described earlier.

There are no significant correlations using data from the nonaggressive/nonrejected groups. However, the pattern of the relationships appears to be almost opposite of what it is with the aggressive/rejected boys.

To further examine the relationship between intelligence and attributitional biases, the aggressive/rejected boys were divided into two groups. The first group included boys with above average levels of intelligence and the second group included boys with average and below average levels of intelligence. Since four WISC-R subtests were summed to measure intelligence, a standard score sum of forty was
considered average. Those aggressive/rejected boys with intelligence scores greater than forty were contrasted with those whose intelligence score was less than forty-one using the hostile bias score. Group means and standard deviations are presented in Table 3. Consistent with the predictions stated earlier, the more intelligent aggressive/rejected boys have a significantly higher hostile bias than the less intelligent aggressive/rejected boys. This finding was consistent using both parent and teacher defined groups.

____________________________

Insert Table 3 about here

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Discussion

Contrary to the predictions resulting from past studies, these results yielded no significant differences between boys' attributional biases based on behavioral groupings. There are a number of potential reasons for this lack of replication.

First, the initial question being asked in this study was whether parent and teacher checklists are able to be substituted for peer sociometrics in identifying children with hostile attributional biases. It may be that the answer is simply "no". The checklists did not discriminate between boys under the 69th percentile while the previous studies were able to make this distinction using peer sociometrics. It may have been that our nonaggressive and/or nonrejected boys were
more average and not as exemplary as those identified using peer sociometrics.

Another potential factor that may have contributed to the lack of replication is the instrument used to assess attributions. While it is similar to those described in other studies, it has not previously been used and may be tapping slightly different processes than those used before.

Finally, there may be other variables interacting with behavioral dimensions that make this sample different from those used in the previous studies. The influence of parents' beliefs and attributional styles on their children's attributional styles has not yet been assessed. Given the difficulty by many researchers to replicate these biases, it seems probable that there are other unidentified variables operating.

Another variable which may interact with behavioral measures is intelligence. This study provided evidence of a significant role for intelligence in the attributional process. The correlations between intelligence and attributional biases were consistent with the predictions based on previous research. Further support was provided for this relationship by the finding of a significantly greater hostile bias with the more intelligent aggressive/rejected boys than their less intelligent counterparts.

Two hypotheses based on previous research were tested. First, as predicted from the findings of Pellegrini et al. (1987) and Dodge et al.'s
(1986) model of interpersonal processing, intelligence was related to the attributional process. Second, these findings were also consistent with predictions stemming from Dodge's (1980) description of a "cyclical relationship between attributions and aggressive behavior". The smarter the aggressive/rejected boy is, the greater his hostile attributional bias. Both the correlational findings and the group differences indicate that within an aggressive/rejected male population, higher levels of intelligence are related to more pronounced hostile attributional biases.

As described by Dodge (1980), a hostile attribution bias may lead to further rejection by peers. Rejection is perceived as hostile and serves to validate and strengthen the hostile biases. An intelligent boy may be better able to accurately perceive the intentions of others and use this information to make predictions about the future behavior of his peers than a less intelligent boy. For this reason, the measurement of intelligence needs to be included in future studies examining attributional biases in aggressive/rejected boys.

While the behavior checklists did not sufficiently categorize these boys to replicate past findings of group differences in attributional biases, there is some evidence that they may be useful. The strength and consistency of the correlational results and the significant group differences found with the aggressive/rejected boys suggests that the checklists may have in fact sufficiently identified these boys. However, due to the checklists inability to discriminate boys below the 69th
percentile, it may be insufficient to identify a comparison group extreme enough to result in significant group differences.

There is still considerable work to be done in defining the nature of the relationship between intelligence and the attributional process. While this study provided some initial data and theories, further definition of this relationship is necessary. Previous studies have found that negative peer status persists despite significant behavioral change (Pelham, in press). Given the cycle of attributions described by Dodge (1980) and supported by these results, it may be that attributional biases are important in changing a boy's standing among his peers.

Levels of intelligence and attributional processes appear to be important in interpersonal behavior. According to the model of social exchange proposed by Dodge et al. (1986) these attributions are a result of the interpretation stage. Following the interpretation stage is the response search stage. Study two looks at the role of response search as measured by means-end problem solving in aggressive and rejected behavior.
STUDY TWO

Means-end problem solving has been repeatedly linked to children's interpersonal behavior since it was initially reported by Shure and Spivack (1972). Their test of means-end problem solving involves a series of six short stories which present the subject with an initial scenario and an ending. The subject is then expected to create a middle or means which explains the ending. While the story task itself is consistently used, the methods of administration and scoring this test have fluctuated considerably across studies. Given the variety of procedures employed with this measure, it is not surprising to find inconsistencies in the literature using this tool. If the cognitive processes assessed by this tool are to be useful in understanding children's behavior problems, the important variables resulting from this measure need to be defined and consistent assessment techniques established.

This study examines the contribution of various methods of administration and scoring and then compares the ability of two of these methods to predict antisocial behavior.

Scoring procedures have been based on both quantitative and qualitative measures. Quantitative measures include counting the number of means generated for each story, summing the number of means and obstacles presented, or summing the means, obstacles, and time references. Qualitative measures involve rating the children's responses using a series of qualitative dimensions, including the
effectiveness, level of aggression, or inappropriateness of a response (Fischler & Kendall, 1988).

Researchers adopting the quantitative approach have found that the sum of the number of means, obstacles, and time references negatively correlated with peer ratings of disruptiveness \( (r = -0.18) \) and isolation \( (r = -0.43) \) as well as teacher ratings of disruptiveness \( (r = -0.33; \) Pellegrini, 1985). Pellegrini, Masten, Garmezy, and Ferrarese (1987) found a similar relationship between children’s behavior and the sum of means and obstacles. Finally, Richard and Dodge (1982) counted the number of solutions (as opposed to means, obstacles, or time referents) generated for each story and found that this score was significantly higher for popular elementary school aged children than their isolated and aggressive peers.

Although these studies demonstrate a relationship between quantitative scoring methods and children’s behavior, the contribution these measures make to the prediction of behavior appears not to be unique. In fact, these quantitative measures significantly correlate with intelligence (Pellegrini, 1985; Pellegrini et al, 1987). Based on a recent review of the literature, Fischler and Kendall (1988) concluded that after controlling for intelligence, quantitative measures of means-end problem solving (MEPS) did not relate to childhood adjustment. Therefore, the contribution of quantitative measures of means-end
problem solving to the prediction of antisocial behavior appears to be insignificant after controlling for intelligence.

Less uniformity exists in the qualitative measurement of MEPS than in the quantitative measurement of MEPS. Two qualitative measures of the MEPS have appeared in the recent literature. A system used by Fischler and Kendall (1988; Kendall & Fischler, 1984) involves rating subjects' responses on six dimensions. These dimensions are effectiveness, inappropriateness, aggressiveness, passivity, affective understanding, and interpersonal context. Only one response is solicited to each of the six stories and it is scored along each of these six dimensions. Fischler and Kendall (1988) found that the "inappropriateness" dimension provided data related to the general internalizing factor and Social Withdrawal subscale on the Child Behavior Checklist (CBCL). The analysis used for this finding controlled for subject differences in mental age and sex.

One of the qualitative methods being tested in this study was used by Richard and Dodge (1982). Elementary school aged boys were prompted to offer as many responses as they could generate to a set of MEPS stories similar to those originally used by Shure and Spivack (1972). These responses were then categorically rated as either effective, ineffective, or aggressive. While the proportion of effective first responses did not discriminate between subjects grouped as either popular, isolated, or aggressive, the proportion of effective subsequent
responses did significantly differ between the popular subjects and their aggressive and isolated peers. Popular subjects generated a greater proportion of effective subsequent responses than their isolated and aggressive peers. It should be noted however, that mental age was not controlled for in this study.

The proportion of effective subsequent responses was based on the number of subsequent effective solutions divided by the total number of subsequent solutions. The ability of this ratio to discriminate the behaviorally based groups led the authors to conclude that although both aggressive and rejected boys can generate initial effective solutions, "When further solutions are called for, aggressive and isolated boys are unable to generate as many effective solutions as do the popular boys". This conclusion appears premature given these data. The use of a ratio does not give information on the quantity of subsequent effective solutions. A boy who gave a total of one subsequent response and this response was effective would receive a ratio of 1.00. While a boy who generated a total of ten subsequent responses and only eight were effective would receive a ratio of .80. Therefore, boys with a lower ratio do not necessarily generate fewer effective solutions than boys with a higher ratio. A more accurate conclusion would be that popular boys generated subsequent solutions which were more likely to be effective than their aggressive or isolated counterparts.
While the means-end problem solving test (MEPS) (Shure & Spivack, 1972) has been used with people of all ages, it appears to be most effective in differentiating levels of behavioral adjustment with children over seven years of age (Kendall & Fischler, 1984). MEPS scores have frequently been found to be associated with aggression and/or social isolation (Fisher & Kendall, 1988; Pellegrini, 1985; Pellegrini, Masten, Garmezy, & Ferrarese, 1987; Richard & Dodge, 1982; Shure, Spivack, & Jaeger, 1971). Aggression and social isolation in children have been found to predict pathological and maladaptive outcomes in adolescence and adulthood (Parker & Asher, 1987). Based on these observed relationships, the present study focuses on preadolescent boys’ aggression, social isolation, and means-end problem solving.

Specifically, this study attempted to further assess the ratio scoring technique used by Richard and Dodge (1982). First, this study examined whether the proportion of effective subsequent solutions would predict antisocial behavior in eight to eleven year old boys after controlling for intelligence. Second, while it is important that subsequent solutions generated to MEPS stories need to be effective, it may also be important to be able to generate numerous effective solutions. Having numerous effective responses available to choose from would increase the likelihood that someone would have an effective solution which is also consistent with their goals in the
situation. Therefore, this study also used the sum of subsequent effective responses as a measure of means-end problem solving ability. This score is unique in that it takes into account both a quantitative and qualitative dimension. Since this scoring technique is partly a quantitative measure it was important to control for the effects of intelligence on the ability of this score to predict aggression and isolation.

Richard and Dodge's (1982) results suggest that the ratios will predict antisocial behavior. However, they also suggest that peer sociometrics may be necessary to obtain the behavioral ratings required to demonstrate this relationship. Rather than employing sociometrics, this study used parent behavior rating scales to determine if the findings based on sociometric data can be generalized to behavior as observed by parents. Observational measures can help to identify the specific behaviors which are associated with problem solving patterns. Peer sociometrics assess a subject's status in a social group and is subject to changes in peers which make up the group and does not give specific behavioral information.

Method

Subjects

Eighty-eight students from regular education and classrooms for the severely behaviorally handicapped in four school districts in the metropolitan Cleveland, Ohio area served as subjects. Four students
were dropped due to noncompliance. Therefore, the final sample consisted of eighty-four males between the ages of eight and eleven (M=10 years 1 month; sd=1 year). The mother’s mean score on the Hollingshead Social Position Index (Hollingshead, 1957) was 53.6 (sd=16). The father’s mean social position index was 44.2 (sd=14). Four percent of the mothers had less than a high school education. Seventy-seven percent had completed high school and 19% had a college degree. Twelve percent of the fathers had less than a high school education. Sixty percent had completed high school and 28% had a college degree.

Measures

The six stories originally used by Shure and Spivack (1972) were orally presented, with subjects encouraged to provide as many potential responses to the situations as they could. These responses were recorded verbatim by the examiner. If a subject gave seven responses to a story, he was told to stop and listen to the next story. Since previous research by Richard and Dodge (1982) had suggested a ceiling of four responses, this study imposed a limit of seven responses per story to keep the administration time at a reasonable level. Approximately thirteen percent of the subjects gave more than four responses to at least one of the stories. The mean number of responses generated across all six stories was 16.4 (sd=7.0). These responses were subsequently labeled as either effective or ineffective. All responses
were scored by two raters with a third rater settling all disagreements. The interrater agreement was over 99%. In order to be labeled as an effective response, the student's explanation had to: 1) explain the ending, 2) not involve misrepresentations of the truth by the character in the story, and 3) not involve verbal or physical aggression.

The parents of all of the children were mailed a Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983) and a questionnaire soliciting sufficient educational and professional information to complete the Hollingshead Social Position Index (Hollingshead, 1957). Four raw scores from the Child Behavior Checklist (CBCL) were used in this study. These were the raw scores from the aggression and Social Withdrawal scales and the more global internalizing and externalizing t-scores.

Intelligence was assessed using four subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R; Wechsler, 1974). These subtests were vocabulary, similarities, comprehension, and picture arrangement. These four scaled scores were summed to produce a global rating of intelligence. The relationship between this score and full scale IQ was found to be sufficiently high to warrant their use (r > .90; see discussion in Study One).

Procedure

Once permission to participate in the study was received from the parents of the boys, the CBCL and social position index questionnaire
were mailed to the parents. All boys were tested individually in one session during the school day.

Each response to a story was rated as effective or ineffective according to the criteria defined above. Each child had seven scores resulting from this classification. The first score was the number of first responses to each story which were rated as effective. Since there were six stories, each boys’ score could range from zero to six for each story. The second score was the number of second responses to each story which were rated as effective. This procedure continued until each subject had seven scores corresponding to the frequency of effective responses for their first, second, third, fourth, fifth, sixth, and seventh response to the stories. Most children did not provide seven responses to each story. Therefore, scores less than six on each of these measures were partly a result of generating responses which were not rated as effective and partly a product of not generating that many responses. These scores were used to figure the ratio of effective responses following the first response as well as the number of subsequent effective responses. The ratio score was the sum of all effective solutions following the first response divided by all the responses following the first.

Results

The first analysis was designed to determine whether the effectiveness of first responses related to behavior. As predicted the
effectiveness of the first response to a MEPS story did not relate to behavior, thus replicating findings by Richard and Dodge (1972) and Fischler and Kendall (1988). As can be seen in Table 1, the number of effective responses given as the first response did not correlate with any of the four behavioral measures.

Insert Table 4 about here

This analysis also identified those subsequent responses most related to antisocial behavior. It seemed unlikely that the number of effective later responses (i.e. sixth, seventh responses) would be that meaningful since few boys gave later responses resulting in a floor effect. While this effect would not influence the ratio score, it would diminish the ability of a sum of effective subsequent responses score to predict behavior. As can be seen in Table 1, all correlations between the number of effective responses given as second and third responses and all four behavior ratings were significant. The direction of the correlations indicate that the higher a child was rated on any of these disorders, the fewer effective second and third responses he generated. These were the only significant correlations found between the number of effective responses and behavior. Therefore, the number of second and third effective responses were summed to produce a subsequent
effectiveness rating (SER) to be contrasted with the ratio used by Richard and Dodge (1972).

The mean ratio score was .353 (sd=.230) and the mean SER score was 2.77 (sd=1.60). The ratio and the SER correlated .46 (p<.001). Both the ratio and SER correlated with intelligence (.19 and .24 respectively; p<.05). To examine the predictive utility of the ratio and SER four multiple regressions were performed using the four behavioral ratings as dependent variables. Intelligence was the first score entered into the equations. This was followed by the ratio and then the SER. The multiple Rs, R square change, and their significance are reported in Table 2. As can be seen by these results, the ratio score significantly improved the regression equation when predicting social withdraw and aggression scores in these boys. However, the multiple R was not significant with the equations using aggression or social withdraw scores as the dependent variables and intelligence and ratio scores as the predictors. The addition of the SER score significantly improved the equations ability to predict social withdraw, externalizing, and internalizing scores. The resulting multiple Rs following the addition of the SERs were significant in all three cases. The SER also improved the regression equation for aggression although the improvement was only marginally significant (p=.06). The resulting multiple R was also marginally significant (p=.06).
The multiple regression analyses were repeated to determine if the ratio score significantly improved the predictability of behavior over intelligence and the SER. Intelligence was entered first, followed by the SER, and then the ratio. The ratio score resulted in no significant changes in R with any of the four behavioral measures. These analyses did reveal that the SER did significantly improve the ability of intelligence to predict aggression scores (p=.01) as well as social withdraw, internalizing, and externalizing scores. The regression equation with SER and intelligence predicting aggression did result in a significant multiple R (R=.28; p=.04).

Therefore, the SER demonstrated a significant relationship with all four of the behavior ratings. This relationship was greater than that of the ratio score and independent of intelligence.

Discussion

The results of this study indicate that while the ratio of effective subsequent responses to MEPS stories is helpful in predicting aggressive and withdrawn behavior in boys, it is not as effective as the number of subsequent effective responses (SER). The number of effective solutions generated after the first response was significantly related to parent ratings of aggression, social withdraw, externalizing, and
internalizing disorders in eight to eleven year old boys. This relationship was independent of intelligence.

As suggested by Richard and Dodge (1982), the effectiveness or ineffectiveness of a child's first response to these stories was not related to the behaviors measured. It seems that even aggressive and rejected boys can produce one effective solution to these situations. Consistent with the findings of Richard and Dodge (1982), this study suggests that aggressive/rejected boys are deficient in producing subsequent effective responses, that is they are less flexible in their generation of effective responses.

Much of the research in this area has provided the impetus for problem-solving interventions with children. Given the fact that quantitative measures of MEPS stories do not predict antisocial behavior after controlling for intelligence, it seems likely that interventions aimed at simply increasing the quantity of solutions a child can generate to a problem will be ineffective. However, the results of this study and others (Fischler & Kendall, 1988; Richard & Dodge, 1982) suggest that antisocial children need to learn to generate effective solutions. The results of this study further suggest that children need to be flexible in problem solving. That is they must be able to generate more than one effective solution to a given problem.

It is still unclear whether difficulty producing numerous effective responses is a deficiency in the generation of effective responses or the
monitoring of generated responses. The difference between these processes correspond to the response search and response evaluation stage in the model of interpersonal processing proposed by Dodge et al. (1986). It may be that children who are not aggressive nor rejected by their peers have more prosocial responses easily accessible to them during response search and therefore generate them easily. However, it may also be that all children generate very similar responses, but rather differences emerge in their ability to predict the effectiveness and outcome of various responses. This question remains for further study.
GENERAL DISCUSSION

The first study presented evidence suggesting that aggressive/rejected boys attributional biases are partly a function of intellectual level. Intelligent aggressive/rejected boys demonstrated significantly greater hostile attributional biases than less intelligent aggressive/rejected boys. It was hypothesized that the specific role of intelligence may be to integrate previous experiences and develop accurate expectations about peers intentions based on these experiences. Therefore, bright aggressive/rejected boys would be more likely to integrate the hostile intentions of their peers, which they frequently experience due to their rejection, into biases of hostility about future peer intentions. Less intelligent aggressive/rejected boys may be less able to accurately predict future behavior based on experience and therefore avoid developing pronounced biases.

The second study found that the number of high quality (effective;SER) responses to means-end problems was a better predictor of behavior than a ratio of effective responses. Both the ratio and the SER were based on responses generated following the initial response to a means-end problem. Specifically, these data suggested that children’s ability to generate effective second or third responses to a situation best related to behavior. This relationship between effective second and third responses and observed behavior was independent of intelligence and significantly greater than the ratio score.
Together, these studies point out the need to study how these social cognitive processes operate within different levels of cognitive capacity. These results indicate that while the steps outlined by the model of social exchange proposed by Dodge et al. (1986) may be correct, their relative importance in determining behavior may fluctuate as a function of intelligence. It may be that beyond an average level of intelligence, problem solving ability is not predictive of interpersonal behavior due to a ceiling effect. In other words, most interpersonal situations may not be sufficiently demanding to result in differences between people whose cognitive ability is beyond a certain level. Attributional processes may result in the best prediction of behavior at this level. At lower levels of intelligence, attributions may not be of much importance since people may not be capable of reliably integrating past experiences into future expectations. However, problem solving ability may heavily influence behavior since many interpersonal situations offer significant cognitive challenges.

These questions along with others concerning the role of intelligence in these processes are topics of future study. These studies do suggest that in order to improve our understanding of social cognitive processes in aggressive/rejected boys, intelligence needs to be considered.
Bibliography


Footnotes

1 It is recognized that social withdraw and peer rejection are not identical dimensions. However, social withdraw is the most similar scale to peer rejection of the CBC and is therefore being used in this study.

2 Prior to the analyses, the subjects' scores in the larger of the two contrasted groups were weighted. The weights were used to reduce the size of the larger group to the size of the smaller group and allow for more valid analyses. This technique allows the data to meet the conditions of multivariate analysis of variance and reduces the degrees of freedom.
Appendix

Reliability Information and Future Directions
RELIABILITY INFORMATION

**Behavior Checklists**

**Child Behavior Checklist (6-11 year old boys)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>One Week Test-Retest</th>
<th>Interparent Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression</td>
<td>.95</td>
<td>.80</td>
</tr>
<tr>
<td>Social W/d</td>
<td>.90</td>
<td>.62</td>
</tr>
<tr>
<td>Internalizing</td>
<td>.93</td>
<td>.61</td>
</tr>
<tr>
<td>Externalizing</td>
<td>.95</td>
<td>.77</td>
</tr>
</tbody>
</table>

**Teacher Rating Form (6-11 year old boys)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>One Week Test-Retest</th>
<th>Teacher - Teacher Aide Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggression</td>
<td>.92</td>
<td>.70</td>
</tr>
<tr>
<td>Social W/d</td>
<td>.82</td>
<td>.50</td>
</tr>
<tr>
<td>Internalizing</td>
<td>.85</td>
<td>.46</td>
</tr>
<tr>
<td>Externalizing</td>
<td>.91</td>
<td>.63</td>
</tr>
</tbody>
</table>

A meta-analysis by Achenbach, McConaughy, and Howell (1987) of 119 studies using a variety of behavior rating measures found that parent and teacher measures correlated approximately +.27. The lack of a strong correlation was attributed to the situational specificity of children's behavior.

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### Split-half reliability correlations

#### Range for children between the ages of 8.5 and 11.5

| Subtest             | Range  
|---------------------|--------
| Information         | .80-.88 
| Similarities        | .79-.81 * 
| Arithmetic          | .69-.81 
| Vocabulary          | .84-.86 * 
| Comprehension       | .71-.83 * 
| Picture Completion  | .68-.85 
| Picture Arrangement | .69-.73 * 
| Block Design        | .80-.89 
| Object Assembly     | .64-.72 
| Mazes               | .66-.77 
| VIQ                 | .93-.95 
| PIQ                 | .89-.91 
| FSIQ                | .95-.96 

* Indicates the subtests used in this study

### WISC-R

Range of correlations between each subtest and full scale IQ for children 8.5-11.5 years old

| Subtest             | Range  
|---------------------|--------
| Similarities        | .64-.76 
| Vocabulary          | .66-.79 
| Comprehension       | .60-.72 
| Picture Arrangement | .48-.60 


Attribution Measure

This instrument consisted of ten stories which described interpersonal situations involving peer provocation. Four of the stories were intended to describe situations in which the peer meant to knock the subject in the story down (see stories on the next page). Four of the stories were intended to describe situations in which the peer did not mean to knock the subject to the ground. In the two remaining stories the intentions of the peer were left as ambiguous as possible. A group of twenty graduate students and faculty members rated these stories according to peer intent. These ratings were in agreement with the intended designs of the stories in 90% of the cases.

In order to test the concordance rate for this measure with the children's data each set of four stories was split into two sets of two stories and the percent agreement within the sets was calculated. For example, data from 117 subjects were used to calculate the reliability. This yielded 234 sets of two stories which were designed to indicate that the peer meant to knock the subject down. In 199 of these sets the children's response to each story within the set was the same. Therefore, the reliability was estimated at .85 (or 119/234). The percentages for the stories are listed below.

<table>
<thead>
<tr>
<th>Story Type</th>
<th># of Stories</th>
<th>Reliability %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostile (meant it)</td>
<td>4</td>
<td>85%</td>
</tr>
<tr>
<td>Benign (didn't)</td>
<td>4</td>
<td>66%</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>2</td>
<td>79%</td>
</tr>
</tbody>
</table>
ATTRIBUTION STORIES

Hostile

You are standing in the hall waiting for a ride home. Another student walks up to you, looks at you, and then pushes you. You are knocked to the ground.

You are standing in line in your classroom waiting to sharpen your pencil. There is a shelf above the pencil sharpener on the wall. While the child in front of you is sharpening his pencil the shelf falls. It will not hit you, but it looks like it will hit the other child. Before the shelf falls on their head, the child pushes you and gets out of the way. You are knocked to the ground.

You are standing on a playground waiting for a friend. While you are standing there another child comes up to you, looks at you, and pushes you. You are knocked to the ground.

You are standing by a tree on a windy day. You are waiting for your friend. Another child is standing near you. The wind starts blowing harder and you hear a loud crack from up in the tree. A branch starts falling. You see that it is not going to fall near you but it looks like it will hit the other child. Before you can do anything, the child pushes you and jumps out of the way. You are knocked to the ground.

Benign

You are running down the sidewalk on your way home from a friend’s house. You come to a corner that you can not see around because there are a lot of bushes. You keep running, turn the corner and collide with another child who is walking toward the corner. You are knocked to the ground.

You are outside walking to a friend’s house. You hear a noise behind you and turn around to see what it is. You see a child running toward you and not watching where they are going. You don’t have time to get out of the way before being run over. You are knocked to the ground as the child runs into you.

You are in your classroom at school, but the teacher has left the room. Another child begins to clown around. You are standing at the chalkboard doing what the teacher had asked you to do. Suddenly, the child who is clowning around runs into you and knocks you to the ground.

You are at school and you are running down the hall to your classroom. Just ahead a door opens and a child walks out. You don’t have time to slow down before you collide with the child and are knocked to the ground.

Ambiguous

You are walking home from the store. While you are walking you suddenly feel something knock you down from behind. You turn around and there is another child standing there.

You are standing in the classroom waiting for your teacher to come back. Your teacher left to go to the office. You feel something push you from behind and knock you to the ground. You turn around and see another child there.

NOTE: The pronouns “they” and “their” are used incorrectly to refer to an individual child. These were used since there are no singular pronouns which do not reveal the gender of the individual.
MEPS

The solutions to these problems were rated by two raters as effective or not according to the criteria listed in the text. A third rater, blind to the first two ratings, settled all disagreements. Interrater agreement was over 99%.
CURRENT STATUS

Attributions

What we Know

1. Intelligence exerts some influence over the development of a bias.

2. Although findings are inconsistent, it appears that aggressive/rejected boys are more likely than their nonaggressive/nonrejected peers to develop hostile attributional biases.

What we Don’t Know

1. The causal role of attributional biases in aggressive behavior is unknown.

2. The role of prior experience in developing attributional biases is unknown.

3. The role of the child’s self in developing these biases is unknown.

   Psychodynamic theory would predict that these biases may be due to a child’s difficulty dealing with his own hostile intentions (i.e. projection).

4. The role of age and normal development in the development of both the ability to make attributions and the tendency to develop biases is unknown.
Means-End Problem Solving

What we Know
1. The ability of a child to generate more than one effective response to an interpersonal situations is related to internalizing and externalizing behaviors.
2. Purely quantitative measures of means-end problem solving offer little to the prediction of behavior beyond that provided by measures of intelligence.

What we Don't Know
1. The causal role of means-end problem solving in behavior is still unknown.
FUTURE DIRECTIONS

Attributions

I believe the next step involves the testing of three potential sources of variance in explaining differences in attributions. Two of these are identified on the model of attributional processes proposed by Trope. These are listed below.

1. Prior experiences: While previous studies (including this one) have controlled the first two sets of cues in Trope's model, prior cues have been left to vary. These cues could be measured by recording hostile interactions between peers over time.

2. Concept of self: I am currently looking for measures of the self for children which specifically tap their motivations. This might include rating statements such as; Sometimes I need to fight in order to protect myself. This source of variance is not included on Trope's model.

3. Intelligence: While this study provided some preliminary evidence for the inclusion of intelligence as a variable when studying attributions, a more precise understanding of its influence on the attributional process will not be attained until intelligence is measured along with the two variables described above.

Adding these measures to the current techniques will allow for a causal modelling study as well as a more precise understanding of where the individual differences lie in the attributional process. Once this is obtained treatment studies could follow to determine the causal role of attributional biases in maintaining aggressive/rejected behaviors.
Means-end Problem Solving

I believe the current status is such that treatment studies with pre and post measures of MEPS and behavior are needed. Behavioral measures will probably need to be on a naturalistic and fairly molecular level to identify any changes. It is not likely that aggressive behavior will stop with this intervention. However, some characteristics of it may change.
### Table One

Means and standard deviations of bias scores by group

<table>
<thead>
<tr>
<th>Groups defined by:</th>
<th>Parent Ratings</th>
<th>Teacher Ratings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggressive</td>
<td>2.3 (1.0)</td>
<td>2.4 (1.1)</td>
<td>Hostile Bias</td>
</tr>
<tr>
<td></td>
<td>1.7 (1.5)</td>
<td>1.4 (1.6)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>22</td>
<td>n</td>
</tr>
<tr>
<td>Nonaggressive</td>
<td>2.3 (1.0)</td>
<td>2.4 (1.0)</td>
<td>Hostile Bias</td>
</tr>
<tr>
<td></td>
<td>1.4 (1.2)</td>
<td>1.5 (1.4)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>54</td>
<td>n</td>
</tr>
<tr>
<td>Rejected</td>
<td>2.4 (1.1)</td>
<td>2.3 (1.1)</td>
<td>Hostile Bias</td>
</tr>
<tr>
<td></td>
<td>1.7 (1.6)</td>
<td>1.6 (1.7)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>46</td>
<td>n</td>
</tr>
<tr>
<td>Nonrejected</td>
<td>2.3 (0.9)</td>
<td>2.3 (1.0)</td>
<td>Hostile Bias</td>
</tr>
<tr>
<td></td>
<td>1.2 (1.2)</td>
<td>1.5 (1.2)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>35</td>
<td>n</td>
</tr>
<tr>
<td>Aggressive/Rejected</td>
<td>2.2 (1.1)</td>
<td>2.4 (1.1)</td>
<td>Hostile Bias</td>
</tr>
<tr>
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<td>2.0 (1.6)</td>
<td>1.4 (1.7)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>20</td>
<td>n</td>
</tr>
<tr>
<td>Nonaggressive/Nonrejected</td>
<td>2.3 (0.9)</td>
<td>2.5 (0.8)</td>
<td>Hostile Bias</td>
</tr>
<tr>
<td></td>
<td>1.3 (1.2)</td>
<td>1.3 (1.0)</td>
<td>Benign Bias</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>31</td>
<td>n</td>
</tr>
</tbody>
</table>
### TABLE TWO

Correlations between intelligence scores and biases within the aggressive/rejected and nonaggressive/nonrejected groups

<table>
<thead>
<tr>
<th></th>
<th>Intelligence</th>
<th>Parent Ratings</th>
<th>Teacher Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PAR</td>
<td>PNAR</td>
</tr>
<tr>
<td>Hostile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bias</td>
<td></td>
<td>.38</td>
<td>-.37</td>
</tr>
<tr>
<td></td>
<td>Benign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bias</td>
<td></td>
<td>-.57*</td>
<td>.09</td>
</tr>
</tbody>
</table>

* - p < .01
TABLE THREE

Hostile bias group means, standard deviations, and group size for the high intelligent and low intelligent aggressive/rejected boys

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th></th>
<th>High</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intelligence</strong></td>
<td></td>
<td><strong>Intelligence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Intelligence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent</td>
<td>1.38</td>
<td>**</td>
<td>2.71</td>
<td></td>
</tr>
<tr>
<td>Rated (1.06)</td>
<td>2.71</td>
<td>(0.83)</td>
<td></td>
<td></td>
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<tr>
<td>Aggressive/Rejected (8)</td>
<td>2.71</td>
<td>(0.83)</td>
<td></td>
<td></td>
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<tr>
<td>Teacher</td>
<td>1.78</td>
<td>*</td>
<td>2.91</td>
<td></td>
</tr>
<tr>
<td>Rated (1.09)</td>
<td>2.91</td>
<td>(0.94)</td>
<td></td>
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<tr>
<td>Rejected</td>
<td>(9)</td>
<td>(11)</td>
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* - p<.05

** - p<.01
TABLE FOUR
Correlations between behavioral measures and number of effective responses

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<th>Response</th>
<th>CBC Scores</th>
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<td></td>
<td>Aggression</td>
<td>Withdraw</td>
<td>Externalizing</td>
<td>Internalizing</td>
</tr>
<tr>
<td>First</td>
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<td>-.01</td>
<td>.00</td>
<td>.06</td>
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<td>-.27**</td>
<td>-.24**</td>
<td>-.23*</td>
</tr>
<tr>
<td>Third</td>
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<td>-.21*</td>
<td>-.24**</td>
<td>-.26**</td>
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<tr>
<td>Fourth</td>
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<td>.10</td>
<td>.08</td>
<td>.04</td>
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<td>Fifth</td>
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<td>-.10</td>
<td>-.02</td>
<td>.01</td>
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<td>Sixth</td>
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<td>.05</td>
<td>-.05</td>
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<td>Seventh</td>
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<td>.04</td>
<td>.08</td>
<td>.10</td>
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n=84
* = p<.05  ** = p<.01
### TABLE FIVE

Results of multiple regression analyses with SER, ratio score, and intelligence predicting behaviors

<table>
<thead>
<tr>
<th>Entered</th>
<th>Aggression</th>
<th>Withdraw</th>
<th>Externalizing</th>
<th>Internalizing</th>
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<td>.00</td>
<td>.03</td>
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<td>2) Ratio</td>
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<td>.04</td>
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<td>3) SER</td>
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<td>.31*</td>
<td>.39**</td>
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<td>.07*</td>
<td>.07**</td>
<td>.08**</td>
</tr>
</tbody>
</table>

n=84  * - p<.05  ** - p<.01