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A comparison of developmentally delayed preschoolers on selected measures of activity and observed behaviors

Schottenstein, Karen Mabo, Ph.D.

The Ohio State University, 1990
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A COMPARISON OF DEVELOPMENTALLY DELAYED PRESCHOOLERS ON SELECTED MEASURES OF ACTIVITY AND OBSERVED BEHAVIORS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of the Ohio State University

By

Karen Mabo Schottenstein, B.A., M.S.

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1990

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ACKNOWLEDGEMENTS

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Chapter I
Introduction

Hyperactivity (AD-HD) is reported to be one of the most common reasons for referring children to child guidance clinics (Barkley, 1981, 1988). The American Psychiatric Association, in its Diagnostic and Statistical Manual - Revised, 1987, (DSM-III-R), estimates a prevalence rate of 3% in school age children. Boys are diagnosed with hyperactivity much more frequently than girls, with a ratio of 3 or 4:1 (Barkley, 1988).

It is thought that hyperactivity has its origins in early childhood (Barkley, 1981, 1988, Ross & Ross, 1982). Many young children who show characteristics of hyperactivity, continue to do so during the school years and beyond. With all the recent interest in hyperactivity, there has been little focus on the preschool years or on the developmentally disabled. Hyperactivity has been difficult to diagnose in infants because children of this age often display behaviors common to hyperactivity (Campbell, S.B., Breaux, A.M., Ewing, L.J., & Szumowski, E.K. 1986; Campbell, S.B., Breaux, A.M., Ewing, L.J., Szumowski, E.K., & Pierce, E.,
Tantrums, defiance, restlessness, and difficulty paying attention are often typical toddler and preschooler behaviors and show developmental change (Campbell et al., 1982). As a result, many children do not receive professional attention until entering formal schooling at age 5 or 6 when difficulties in handling the classroom routine are noticed. With school age children, clinicians often rely on reports of both parents and teachers to define hyperactive children. This dual diagnostic criterion generally is not possible with younger children. Also, younger children, due to their age, do not have the long history of behavioral problems which are used in diagnosing older children (Campbell et al., 1982).

Numerous methods have been used to diagnose hyperactivity. Rating scales are quite popular, especially due to their ease of administration as well as being cost and time efficient. The Conner's (1969) scales are very popular with school age children. The Behar Preschool Behavior Questionnaire (1977) is frequently used with preschool children. Significant differences have been found between normal and disturbed children on the total Preschool Behavior Questionnaire and the three subscales of hostility/aggression, anxious/fearfulness, and hyperactivity/distractibility (Behar, 1977). The
The Behar Preschool Behavior Questionnaire (PBQ) has been used by Campbell and her associates at the University of Pittsburgh in several studies of young children (1986a, b; 1985; 1982) in studying hyperactivity. Follow up in one to three years shows that the Behar Preschool Behavior Questionnaire has been successful in identifying hyperactive young children and that these problems tend to be stable (Campbell, 1985). Kimball (1987) found that the PBQ was successful in discriminating ADD in both normal and developmentally delayed children. A factor analytic study by Rheinscheld (1989) of the PBQ with developmentally delayed children ages 3 to 6 years found that the PBQ did, in fact, measure the same dimensions in developmentally delayed children as in normal children. Test-retest reliability of the PBQ with developmentally delayed children is not known.

The Child Behavior Checklist (Achenbach & Edelbrock, 1983) a scale for children ages 4 to 16 years to assess childhood psychopathology, has been shown to discriminate ADD/H children from normal and from other clinical groups of children (Barkley, 1988; Edelbrock & Rancurello, 1985).

The Child Behavior Checklist (CBCL) has recently been extended downward for children 2 to 3 years old (Achenbach, Edelbrock & Howell, 1987). It too has been able to discriminate disturbed from normal children. The
CBCL like the PBQ has been developed for use primarily with children of normal intelligence.

Routh and Schroeder (1976) have developed a standardized playroom observation procedure to measure activity level in children. Hyperactive children with an average age of 7 years, with either normal intelligence or mental retardation, had significantly higher playroom activity scores in both free play and restricted activity. No differences were found between the normal and the mentally retarded children. The authors conclude that prior to suggesting that chronological age may be an appropriate reference in evaluating activity level in children, more information is necessary on activity levels in mentally retarded children of varying IQ and mental age (Routh & Schroeder, 1976). In a downward extension of the playroom procedure, Routh, Walton and Padan-Belkin (1978) examined activity level in children as young as 10 months (only children without gross sensory or motor deficit or neurological abnormalities were included in the study). A developmental trend was noted in the activity level of children ages 3 to 5 years. With an increase in age, there was a decrease in activity level in the children. These same findings were also found by Routh, Schroeder & O'Tuama (1974). Kimball (1987) compared developmentally delayed and non-delayed preschool boys with boys having attention deficit disorder (ADD) in their response to
measures of vigilance and in activity level using the playroom observation procedure. Quadrant changes and toy changes were able to successfully discriminate ADD in the preschool aged boys. The playroom observation procedure has been used to find support for a separate dimension of hyperactivity from aggression (Milich, Loney & Landau, 1982), as well as to discriminate between hyperactive and non hyperactive school age boys (Cunningham & Barkley, 1979; Roberts, Ray & Ray, 1984).

Weiss (1985) notes that in the past 20 years, hyperactivity has become the most researched and best known of childhood disorders. Even so, little research exists with developmentally disabled children and in particular preschool age developmentally disabled children. Tizard (1968a, b) observed developmentally delayed children in institutions and found that overactive children moved more frequently than did the controls. Kimball (1987) found that the PBQ was able to discriminate ADD from non ADD children in both developmentally disabled and normal preschool age boys. Rheinscheld (1989) found that the factor structure of the PBQ to be similar for developmentally delayed children ages 3–6 years as in the original studies with normal children.

Two rating scales, among others, have been designed specifically to assess behavior in the mentally retarded. The AAMR Adaptive Behavior Scale (Nihira, Foster,
Shellhaas & Leland, 1974) is a residential and community rating scale for mentally retarded children and adults. It is divided into two parts: Part I measures adaptive skill and coping behavior. Part II measures maladaptive behaviors related to personality, behavior and organic disorders. The Aberrant Behavior Checklist (Aman, Singh, Stewart & Field, 1985a, b) was developed to assess drug and treatment effects in institutionalized mentally retarded persons. The Adaptive Behavior Scale for Infants and Young Children (ABSI) (Leland, Shoae, McElwain, & Christie, 1980) is a rating scale used in the evaluation of young children ages two weeks to six years. The ABSI was developed as a downward extension of the AAMR Adaptive Behavior Scale and likewise includes two parts. Part one measures adaptive skill behaviors, whereas part II addresses maladaptive behaviors. Norms are not available for part II, because it includes behaviors typically found in infants. The recorded behaviors are noted as to whether or not they present a problem, and their frequency.

While a number of scales have been developed to index behavior in the developmentally delayed, there is little known about the relationship of the scales to other conventional measures of hyperactivity (eg., playroom observation procedures, PBQ). The Nisonger Child Behavior Rating Form is a checklist currently being developed for
use with the developmentally disabled. The Nisonger Child Behavior Rating Form is an abbreviated version of the Child Behavior Checklist (Achenbach & Edelbrock, 1983), which has been adapted for developmentally delayed children. This dissertation will compare three measures of hyperactivity in developmentally delayed preschool children in an attempt to validate the hyperactivity/inattention scale on the Nisonger Child Behavior Rating Form.

Research Questions
1. Will ratings on the Nisonger Child Behavior Rating Form (CBRF) correlate positively with playroom observation ratings of behavior?
2. Will ratings on the Nisonger CBRF Hyperactivity/Inattention scale correlate significantly with the Preschool Behavior Questionnaire (PBQ) Hyperactivity/Distractibility factor and/or with other factors on the PBQ?
3. Will there be a significant negative correlation between developmental age and the Nisonger CBRF H/I factor, or the PBQ H/D factor, or play quadrant changes, or toy touches, or toy changes or conventional play?
4. Will the Nisonger CBRF demonstrate stability over time (i.e. test-retest reliability)?
5. Will the Nisonger CBRF H/I scale, the PBQ H/D scale and play observation variables remain significantly
correlated when the effect of developmental age is partialled out (partial-correlation/covariate)?

**SPECIAL TERMS**

**Developmental Delay** - A disability associated with mental retardation, cerebral palsy, epilepsy, or another neurological condition of an individual that is closely related to mental retardation or requires similar treatment and that originates in early childhood, is likely to continue, and constitutes a substantial handicap to the individual. (Grossman, 1983, p.168).

**Community Center Board for Developmental Disabilities Preschool program** - A special education preschool program for children ages 3 to 6 years old who are demonstrating delays of at least 20% in two or more developmental areas or 50% in one area. The preschool offers speech, occupational and physical therapy as well as social work and psychological services to the children and their families. Classes meet daily for 2 1/2 hours.

**Attention Deficit-Hyperactivity Disorder** - is a developmental disorder of attention span, impulsivity and/or overactivity as well as rule-governed behavior, in which these deficits are significantly inappropriate for the child's mental age; has an onset in early childhood; are significantly pervasive or cross-situational in nature; are generally chronic or persistent over time; and
are not the direct result of severe language delays, deafness, blindness, autism or childhood psychosis (Barkley, 1988, p.72).
Chapter II

Review of the Literature

Hyperactivity has been recognized since at least the turn of the century. Dr. Still in 1902 is often credited as being the first to describe what is known today as Attention Deficit-Hyperactivity Disorder (Routh, 1986; Ross & Ross, 1982). He described children as having deficits in moral character (Routh, 1986; Ross & Ross, 1982). In the 1940's Strauss and Lehtinen (1947) described a disorder called Minimal Brain Damage. It was felt that hyperactive children demonstrated problems similar to World War II soldiers who had sustained head injuries. Overactivity, distractibility, inattention and poor impulse control were thus thought to be caused by minimal brain damage. The concept of Minimal Brain Damage/Dysfunction (MBD) continued in popularity until the 1960's. MBD children were thought to be of at least average intelligence having mild to severe learning and behavioral problems. Difficulty in being able to prove the existence of MBD led to the eventual shift of the focus from that type of brain damage (Barkley, 1988; Routh, 1986). Laufer and Denhoff (1957) described the
hyperkinetic behavior syndrome. Symptoms included short attention span, impulsivity, low frustration tolerance, hyperactivity and poor school performance. The 1970's saw an increase in focus on attentional deficits and impulse control as primary deficits in this disorder as well as overactivity (Barkley, 1988). Barkley also notes that Werry (1985) sees ADD/H as being on a continuum with normal behavior. Douglas (1972) reports that the major problem for hyperactive children is not overactivity, but rather deficits in attention and impulse control. She also stresses the early onset of this disorder. Douglas (1984) cites four primary dispositions in ADD children:

1. Strong need for immediate gratification.
2. Weak inclination to invest attention and effort in demanding tasks.
3. Impaired ability to inhibit impulsive responding.
4. Impaired ability to modulate arousal or alertness to meet situational demands (p.147).

The American Psychiatric Association, DSM-III (APA, 1980) labelled this disorder Attention Deficit Disorder with or without hyperactivity. Inattention, impulsivity and overactivity were described as the three primary symptoms. In the most recent revision, DSM III-R (APA, 1987) hyperactivity is now called Attention Deficit-Hyperactivity Disorder.
Barkley (1988; 1981) proposes more stringent guidelines than those outlined in DSM III-R in diagnosing AD-HD.

1. Parent/teacher complaints of inattention, impulsivity, overactivity and poor rule-governed behavior.

2. On standardized behavior rating scales, a score at least 2 standard deviations above the mean for normal children.

3. Onset of problems by 6 years of age.

4. Duration of at least 12 months.

5. IQ greater than 85; if 70-85, then using criteria #2, comparing children of same mental age.

6. Exclusion of significant language delay, sensory handicaps or severe psychopathology.


Using these criteria, Barkley (1988) thus defines AD-HD as: A developmental disorder of attention span, impulsivity and/or overactivity as well as rule-governed behavior, in which these deficits are significantly inappropriate for the child's mental age; has an onset in early childhood; are significantly pervasive or cross-situational in nature; are generally chronic or persistent over time; and are not the direct result of severe language delays, deafness, blindness, autism or childhood psychosis (p.72).
Behavior rating scales are the most common method used in diagnosing AD-HD. Rating scales are generally global measures that are easily influenced by the cognitive and motivational characteristics of the respondent as well as the child (Ross & Ross, 1982). Conners' rating scales are the most commonly used assessment for use in children (Routh, 1986; Barkley, 1981, 1988; Ross & Ross, 1982). Both the Teacher's Rating Scale and the Parent's Rating Scale have been shown to discriminate AD-HD children from nonhyperactive children, and both are sensitive to drug therapies (Barkley, 1988; Edelbrock & Rancurello, 1985). These scales are designed for school-age children. The ADD-H Comprehensive Teacher Rating Scale (ACTeRS) was developed using 1347 children in kindergarten through grade five (Ullmann, Sleator & Sprague, 1984). The Scale, designed to be completed by classroom teachers, has 24 items and is scored on a 5-point scale with separate norms for boys and girls. The ACTeRS has been found to be useful in both diagnosing ADD-H and in monitoring treatment effects. No significant developmental differences across grade levels were found on any of the four factors of attention, hyperactivity, social skills and oppositional behaviors (Ullmann et al. 1984). The Children's Behavior Rating Scale (Neeper & Lahey, 1986) is a 71 item teacher rating scale designed to
assess emotional and behavioral problems in children ages 5 to 15 years. It is scored on a 5 point scale. Factor analytic studies revealed seven factors shown to have test-retest reliability. The inattention/disorganization factor has been found to resemble the attention deficit factor on both the Conners and the Revised Behavior Problem Checklist. The Behar Preschool Behavior Questionnaire (Behar, 1977; Behar & Stringfield, 1974) was designed for preschool children (ages 3-6 years) with items that make up a Hyperactive/Distractible factor. The Behar Preschool Behavior Questionnaire (PBQ) is a 30 item scale modification of the Rutter Children’s Behavior Questionnaire. It is to be used by preschool teachers to rate children in relation to peers. As previously noted, significant differences have been found between normal and disturbed children on the total PBQ score and on each of the three subscales (Behar, 1977).

Rubin and Clark (1983) correlated teachers' ratings on the PBQ for 123 preschool children with observations of in-class social and cognitive play behaviors, sociometric status and social problem solving skills. The authors found that to a moderate degree, behavior mirrored PBQ scores. They concluded that the PBQ is a useful instrument in identifying children with social problems. In another study Rubin and his colleagues (1987), found that the factor structure of the PBQ was replicated when used with
children in grade one. Also there were statistically moderate correlations between teacher ratings of problem behaviors and first grade children's observed behaviors, their sociometric status and problem solving skills. The authors suggested combining observations of the child with rating scale results (such as those from the PBQ) when determining which children are in need of intervention. Hoge, Meginbir, Khan and Weatherall (1985) also found significant relationships between teacher scores on the PBQ and observed behavior. These studies indicated the usefulness of the PBQ in determining problem preschool-age children, especially when combined with direct observations of the children's behavior.

In the belief that early identification and intervention may help prevent later problems that may be more difficult to change, Campbell and her colleagues at the University of Pittsburgh have completed several studies on attention deficit in preschool-age children. (Campbell, et. al 1982). They assessed 68 (46 parent-referred and 22 control) children ages 2-3 years old. The PBQ, Werry-Weiss-Peters Activity Scale (Routh, Schroeder & O'Tuama, 1974), 15 minute free play observations and structured task performance were utilized in studying hyperactivity in these young children. Results indicated that symptoms of attention deficit disorder and related problems can be identified in 2 to 3-year-old children.
In a follow-up study one year later, with 54 children (35 problem and 19 controls), (Campbell, et. al. 1986b) they readministered the same measures. The children did not show significant changes over time in non-compliance, aggressive play or expressions of negative affect. They also found at one year follow-up that the PBQ scores remained fairly consistent and continued to discriminate the 35 hyperactive children from the control children (Campbell et al. 1984). Campbell and Breaux (1983) found that mothers were able to successfully identify problem behaviors in their young children using the PBQ and Werry-Weiss-Peters Activity Scale. These mothers were consistent in their ratings as evidenced by the correlations between the PBQ factor scores and the Activity Scale. Even though the PBQ was intended for use by preschool teachers, the authors concluded that the PBQ may be a useful tool when completed by mothers. In a longitudinal study, 46 parent referred problem preschoolers and 22 controls were assessed using several parent report and observational measures (Campbell, et al. 1986). These children were followed at age 4 (n=54) and again at age 6 (n=55). The measures included the PBQ, Werry-Weiss-Peters Activity Scale, the SNAP Questionnaire (at age 6) and the Achenbach Child Behavior Checklist. Results indicated problem behaviors identified early in childhood were likely to persist with increasing age.
Anderson (1983) screened 462 children ages 3 to 5 years enrolled in Head Start classes using the PBQ. Children were classified according to specific problem types (aggressive, anxious, or hyperactive). Those who scored high in each of the problem groups scored significantly higher on its corresponding Behar subscale than did children in the other groups. The Behar was able to identify 31.6% of the children who were in need of further evaluation or treatment. No significant age differences were found on any of the scales.

The Child Behavior Checklist (Achenbach & Edelbrock, 1983) is one of the most rigorously developed and standardized scales for assessing common dimensions of childhood psychopathology (Barkley, 1988). The Child Behavior Checklist (CBCL) has 20 items on the Social Competence Scale and 118 items on the Behavior Problems Scale. Norms are available for boys and girls ages 4-5, 6-11 and 12-16 years old. There are also parallel forms for parents and teachers. The CBCL has been shown to significantly discriminate ADD/H children from normal and other psychiatric groups of children (Barkley, 1988; Edelbrock & Rancurello, 1985). Recently, the CBCL has been extended downward for 2-3 year old children. It is comprised of 99 items, 59 of which have counterparts on the CBCL for ages 4-16 years (Achenbach, 1988). The scoring profile was derived from factor analyses of
checklists completed by parents of 398 2-3 year old children (Achenbach, Edelbrock & Howell, 1987). The CBCL/2-3 is scored on a 3 point scale, based on the child's behavior within the past two months: 2 - very true or often true; 1 - somewhat or sometimes true; 0 - not true. Six scales resulted from the factor analyses: Social Withdrawal, Depression, Sleep Problems, Somatic Problems, Aggression, and Destructive Behavior. One-week and one-year test-retest showed relative stability in scores. Children who had been referred for mental health services scored higher on all scales. The lack of significant r's with cognitive measures suggests that the CBCL/2-3 taps behavioral and emotional problems that are independent of developmental variance (Achenbach, Edelbrock & Howell, 1987).

Another way to assess hyperactivity in children is the Standardized Playroom Observation procedure, where specific child behaviors are recorded by observers. This technique was developed by Routh and his colleagues (Routh, Schroeder & O'Tuama, 1974; Routh & Schroeder, 1976) for children as young as 2 1/2 years old. A small playroom is divided into 4 equal quadrants using black tape on the floor. Each quadrant has a table and chair in the center with the same set of toys on each table. The child is observed both during restrictive and free play. Observers measure activity level by recording such
behaviors as quadrant entries, toy touches and toy changes. Routh and Schroeder (1976) found that children who were referred for evaluation of hyperactivity (both normal intelligence and mentally retarded) differed from controls on the measures of locomotor activity, with these children having higher scores. The children acted more like 3-4 year olds yet mean age was 6 1/2 years. Routh, Walton and Padan-Belkin (1978) using the Standardized Playroom Observation procedure with modifications of room furnishings (rugs on the floor instead of table and chairs and infant and toddler toys) examined activity level in children as young as 10 months. Mothers were also present in the playroom. A developmental trend was again noted in activity level, with levels rising from 9 months to a peak at 18-23 months, then decreasing at 24-29 months and again increasing until age 5 years. The presence of the mother evidently affected the activity level in these young children producing a greater activity level when the mother was present.

Using the playroom procedure developed by Routh and his colleagues, Milich, Loney and Landau (1982) found support for the hyperactivity dimension. Ninety boys with a mean age of 9 years 10 months who were consecutive outpatient referrals, all of normal or borderline intelligence (Full Scale IQ at least 70 on the WISC-R) were included in the study. The Conner's Scales were
completed on each child and playroom observations were obtained (free play and restricted academic). The data analyses found support for the convergent and discriminant validity of the hyperactivity factor. The hyperactivity factor accounted for variation in both the mother and teacher ratings of hyperactivity and inattention and did not make a contribution to ratings of conduct problems (Milich, Loney & Landau, 1982). Loney and Milich (1982) correlated the IOWA Conners subscales with observed measures of free play and restricted academic situations. During free play, boys rated high on the inattentive/overactivity factor had more quadrant changes, more out of seat behaviors and higher ankle acometer readings. Motoric behavior discriminated between hyperactive and aggressive boys. The IOWA Conners provides a means for studying exclusively hyperactive boys from aggressive and from mixed disorder. Girls, preschoolers, teenagers and children with IQ's below 70 or with unequivocal brain damage, sensory loss or psychoses were excluded from the study. Cunningham and Barkley (1979) observed 20 normal and 20 hyperactive boys ages 6 to 12 years in both free-play and structured task situations with their mothers. Hyperactive boys were found to be more active, less likely to remain on task and less compliant than non-hyperactive peers. Roberts, Ray and Roberts (1984) used a playroom observation procedure
to assess activity level and attention span in free play, restricted play and restricted academic settings. Twenty-five hyperactive boys were included in the study. Behavioral differences between hyperactive and non-hyperactive boys became more pronounced as the degree of environmental structure increased. Results thus indicate that the playroom observational procedure can be used to differentiate hyperactive from non-hyperactive boys especially as constraints are placed on what the child is allowed to do.

THE PRESCHOOL BEHAVIOR QUESTIONNAIRE

The Preschool Behavior Questionnaire (PBQ) is one of a limited number of assessment instruments developed for use in preschool age children (ages 3-6 years) in screening for behavior problems. Thirty items which are behaviorally oriented are scored on a 3 point scale. The standardization sample included 598 children ages 3-6 years (496 normal and 102 emotionally or behaviorally disturbed). Children with mental retardation, autism or other handicaps were excluded. Factor analyses revealed 3 factors accounting for 53.9% of the variance (Behar, 1977). These factors are: Hostile-Aggressive, which includes such behaviors as fighting, destroying property and bullying; Anxious-Fearful, referring to fearfulness, tearfulness and crying behaviors; and Hyperactive-Distractible, factor relating to poor attention span,
inattention, fidgety behavior and restlessness. Items on the PBQ are scored on a 3 point scale: 0, 1, 2; doesn't apply, sometimes applies and certainly applies. A total score is derived as well as three factor based scores. The higher the score, the more problems a child is experiencing. Significant differences between the normal and disturbed populations were found on the total PBQ scores and on each subscale. A mean total score of 21.3 for the disturbed and 8.0 for the normal population was found.

Fowler and Park (1979) questioned the validity of three separate factors of the PBQ. In a study of 701 kindergarten children (349 girls and 352 boys) support was found for only the Hostile-Aggressive and Anxious-Fearful factors. The authors noted that the Hyperactive-Distractible factor loaded on the Hostile-Aggressive factor with a strong correlation between the two (.64). The authors thus suggest that the Hostile-Aggressive and Hyperactive-Distractible factors are measuring similar things for classroom teachers.

Hoge, Meginbir, Khan and Weatherall (1985) found support for the construct validity of the Hostile-Aggressive and Anxious-Fearful factors but not the Hyperactive-Distractible factor. The study compared teacher PBQ ratings of 45 children 3 years 7 months to 4 years 8 months with an observation schedule designed to
parallel the PBQ and observer rated PBQ. Hoge et al. (1985) note that the PBQ may function differently with deviant than with normal children.

Support for Behar's three factors has been demonstrated in recent studies by Rubin and his colleagues. Rubin and Clark (1983) correlated PBQ scores with observed play behaviors, problem solving skills and sociometric status of 123 4 year old children. Children rated high on the Hostile-Aggressive and Hyperactive-Distractible scales were both more aggressive and less popular with peers. The Hyperactive-Distractible children were also found to be more immature and to use less adaptive play styles. Thus the PBQ was found useful for identifying children with social problems. Rubin, Moller, and Emptage (1987) found 3 factors nearly identical to the original factors in their study of 157 first grade children. There were some slight differences between the items that make up each factor, but the same 3 factors emerged. Free play observations were also found to be related to PBQ scores. Rheinscheld (1989) also found support for a three-factor solution to the PBQ in his study with developmentally delayed children 3-6 years. Although disagreement exists regarding the separateness of the Hyperactivity factor, the PBQ has been demonstrated to be useful in identifying young children with behavioral problems.
ASSESSMENT OF AD-HD IN DEVELOPMENTALLY DELAYED CHILDREN

Recent research on Attention Deficit-Hyperactivity Disorder tends to exclude developmental delays in the definition of AD-HD. Many assume that developmentally delayed children display deficits in attending similar to non-developmentally delayed children with AD-HD, that are due to their general cognitive delays. In fact, the DSM-III-R (APA, 1987) definition of AD-HD as well as that postulated by Barkley (1988) exclude those having IQ less than 70 in diagnosing AD-HD. Gittleman (1988) notes two concerns with the exclusionary criteria in DSM III's definition of ADDH. Her first concern is the failure to allow for the diagnosis of ADDH in the entire range of intellectual development by excluding those with severe and profound retardation. Second is the failure to exclude children with pervasive developmental disorders (infantile autism) which allows for the ADDH diagnosis to be applied to many of these children. Whalen (1989) states that many children considered mentally retarded, autistic or otherwise brain damaged show impulsivity, poor concentration and/or excessive motor activity and that these problems differ from those observed in children of average intelligence. Crosby and Blatt (1968) note that a positive correlation between intelligence and sustained attention to task has been assumed by early researchers and that impaired attention is a general trait of the
mentally retarded. Zeaman and House (1979) in updating their theory on attention suggest that attention may vary with level of cognitive functioning. Zeaman and House have focused on selective attention in discrimination learning. This may be different than in hyperactivity where hyperactive children do not attend for sustained periods. DSM III-R (APA, 1987) does note that the diagnosis of AD-HD may be made in the mentally retarded when the relevant symptoms are excessive for the child's mental age (p. 52). It therefore appears that the diagnosis of AD-HD may in fact be appropriate for some mentally retarded children. Taylor (1988) also notes that the intellectually retarded, those with pervasive developmental disorder and those with overt neurological diseases have usually been excluded from most studies on hyperactivity. The status of hyperkinesis in the moderately and severely intellectually retarded is different from that of normal children. Hyperkinesis in retarded children is often associated with stereotyped and repetitive behaviors which are not usually seen in any of the pervasively hyperactive children of normal intelligence (Taylor, 1988). Taylor states that The World Health Organization in their International Classification of Disease, 9th Edition (ICD-9) described a Hyperkinetic Syndrome that is characterized by a short attention span and in younger children an extreme overactivity that is
not attributable to any other condition (Taylor, 1986).

The British tend to exclude hyperactive-aggressive children from a diagnosis of hyperactive, but rather include these children in a diagnosis of conduct disorder. This makes the prevalence rate of hyperactivity in the United Kingdom much lower than that of the United States, less than 1% in the United Kingdom as compared to 5-6% in the United States (Shaywitz and Shaywitz, 1988).

Phillips and Williams (1977) in a study of 100 mentally retarded children found no relationship between hyperactivity, mental retardation or brain damage, concluding that hyperactivity is not necessarily a part of the definition of mental retardation. Ross and Ross (1982) suggest that even though DSM III-R excludes mental retardation from the diagnosis of AD-HD, mentally retarded children can be hyperactive. In these children, hyperactivity is the secondary rather than primary condition. Gittleman (1988) suggests rather than give a diagnosis of ADDH, to describe mentally retarded children as having mental retardation with behavioral complications. In addition to children with developmental delays generally being excluded from the definition of AD-HD, most scales assessing behavioral/attentional problems also excluded developmentally delayed children in their research.
The Aberrant Behavior Checklist (Aman, Singh, Stewart & Field, 1985 a, b) was developed to measure drug and treatment effects on moderately to profoundly mentally retarded persons in institutions. Internal consistency and test-retest reliability have been found to be quite good. Factor analyses from two samples (418 and 509) yielded a five factor scale with 58 items. These scales are: Irritability, agitation and crying; lethargy and social withdrawal; stereotypic behavior; hyperactivity and noncompliance; and inappropriate speech. Individuals thought to be better adjusted were found to have lower scores on the Aberrant Behavior Checklist, lending support to its validity. The Aberrant Behavior Checklist has also been found to correlate negatively with measures of adaptive behavior.

Rheinscheld (1989) used the PBQ in a factor analytic study with developmentally delayed 3-6 year old boys. Results of his study revealed three factors almost identical to the original three factors by Behar in 1977. The Behavior Problem Checklist (BPC) was used in a study with mentally retarded adolescents (Matson, Epstein & Cullinan, 1984). The BPC was found to be a useful measure in diagnosing psychopathology in mentally retarded public school children. As noted earlier, Kimball (1987) found that the PBQ Hyperactivity/Distractable factor was able to
discriminate hyperactivity in both developmentally delayed and normal preschool age children.

The apparent paucity of measures for diagnosing hyperactivity and behavior problems in general in the developmentally delayed leads to the present study. It was the author's intent to compare observed levels of play in developmentally delayed preschool children to scores from rating scales designed to measure behavior problems, including hyperactivity.
Chapter III

METHODOLOGY

Subjects

Preschool children ranging in age from approximately 4 to 6 years old served as subjects for this study. All the children had been identified as having developmental delays and were enrolled in the local Community Center Board for Developmental Disabilities preschool program.

Letters and consent forms were sent home to the parents of all ambulatory children in the preschool program requesting their permission to participate in this study. Parents and teachers were informed that this study was intended to examine the activity level in developmentally delayed preschoolers and that the study was part of the examiner's doctoral dissertation. Children with sensory, physical or other significant impairments (other than cognitive) were excluded from the study. Nineteen children enrolled in the preschool program met the above stated criteria. Fifteen parents returned the signed consent forms; two parents refused to allow their children to participate in the study and two parents neither returned the consent forms, nor responded to any follow up by the examiner. This resulted in a
sample size of 15 children with chronological ages ranging from 3 years 11 months to 6 years 4 months. Once consent forms were returned, school records were obtained to determine diagnosis and current functioning level. Psychological evaluations were completed at the time of entry into the program, and if the child was enrolled for at least three years, the psychological assessment would have been updated in accordance with federal guidelines. As many of the psychological assessments were not current within the academic year, the Early Learning Accomplishment Profile (E-LAP) by Glover, Preminger and Sanford, (1978) was used to determine current functioning level. The cognitive section of the E-LAP was used to ascertain current developmental age; the language section was used to determine communication levels. The E-LAP is used by the classroom teachers in the development of each child's Individual Education Plan (IEP). The E-LAP is completed at the time of the IEP and updated at the end of the school year, and therefore is a current estimate of each child's functioning level.

The ages of the children participating in this study ranged from 3 years 11 months to 6 years 4 months and the average for the sample is 5 years 5.5 months (see Table 1). The developmental age equivalent of the children based on the E-LAP ranged from 9 months to 3 years with an average for the sample of 2 years 1.5 months (see Table 2).
### Table 1

**DISTRIBUTION OF CHRONOLOGICAL AGE AND SEX**

<table>
<thead>
<tr>
<th>Age</th>
<th>Male (n=9; 60%)</th>
<th>Female (n=6; 40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 2

**DISTRIBUTION OF AGE EQUIVALENT SCORES BY SEX**

(in months)

<table>
<thead>
<tr>
<th>Developmental Age</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 12 months</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>13-18 months</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19-24 months</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>25-30 months</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>31-36 months</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
General developmental delays was the primary diagnosis for over half of the children in the sample. Other diagnoses included Down Syndrome, Autism, Cerebral palsy, chromosome translocation and seizure disorder. Refer to Table 3 for a distribution of diagnosis by sex.

Table 3
DISTRIBUTION BY DIAGNOSIS AND SEX

<table>
<thead>
<tr>
<th>Diagnoses</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down Syndrome-Trisomy 21</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>General Developmental Delays</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Autism</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Cerebral Palsy</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Left Hemiparesis/seizure disorder</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Chromosome 5 &amp; 8 translocation</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Measures:

The Behar Preschool Behavior Questionnaire (PBQ) was completed by the classroom staff in accordance with the directions on the checklist. The PBQ requires that the teacher be familiar with the students for at least 6 weeks. It was administered during summer school and as a result, the regular classroom teachers were not working, although the teachers aides were working. Therefore, the PBQ was completed with the teachers aides as they had known the students for the required 6 weeks (over 9 months for the majority of the students in this study). The mean score for this sample for the Hyperactive/Distractive (H/D) scale is 3.8 as compared to 4.7 for the deviant group and 2.2 for the normal group in Behar's standardization sample. The items contributing to the H/D factor (restlessness, fidgety, poor concentration and inattentiveness) are among the key behaviors included in the DSM III-R (1987) definition of Attention Deficit-Hyperactivity Disorder and thus was chosen to be one of the dependent variables in this study.

The Nisonger Child Behavior Rating Form

The Nisonger Child Behavior Rating Form (Nisonger CBRF) was also completed by the classroom teacher aides. It is a 71 item scale designed to assess behavior and emotional problems in developmentally delayed persons. The scale is an abbreviated version of the Child Behavior
Checklist (Achenbach and Edelbrock, 1983) but modified for use in developmentally delayed children. The CBCL has been rigorously studied and found to be both valid and reliable in assessing behavior problems in children. The Nisonger Child Behavior Rating Form is scored on a four point scale: 0, 1, 2, 3 (not true; somewhat or sometimes true; very or often true; and completely or always true). The CBRF was originally modified from the CBCL by Kolko (1988) for rating behavioral and emotional symptoms exhibited by children in psychiatric inpatient settings. Items included on the CBRF were those that were likely to occur in an inpatient setting. This resulted in 55 problem behaviors. Five factors were derived including Hyperactivity/Inattention. The Nisonger CBRF included 16 additional items that are thought to form two new factors; stereotypy and self injury. The Nisonger CBRF was re-administered at least 4 weeks after the first administration to 14 of the 15 children to obtain test-retest reliability. One child moved out of the school district and the rater was therefore unable to complete the second administration with him.

Playroom Observation

The standardized free play procedure of Routh and Schroeder (1976) and modified by Routh, Walton and Padan-Belkin (1978) was utilized. The playroom was marked into four equal quadrants with masking tape on the floor. The
room was approximately 8 feet by 11 feet in size. The door was along one of the 8 foot walls. Along the 11 foot wall opposite the door was an observation window. This window was covered with a dark film such as that used on cars to block out the sun. The children were unable to see through the window. This was the observation window used to video tape the children during the play sessions. One toy was placed in each of the corners. Each child was to have been observed for 15 minutes of play, although the actual times varied from 12 minutes to 18 minutes, the shorter time generally being due to the child protesting remaining in the playroom. These varying lengths for the play sessions resulted in the playroom procedure being non-standardized. Sessions were terminated if a child indicated he or she wanted to leave the room by pointing or standing at the door and not moving back toward the toys after being given verbal prompts by the examiner or if the child verbally asked to leave and did not respond to verbal prompts to stay in the room. The one extended session was due to a child who started to play with the toys after about 13 minutes in the playroom; the examiner made the decision to allow the child to play until it was time to go home as it was almost the end of the day. Time was analyzed as rate per minute due to the varying lengths of play sessions.
The following behaviors were observed during the play session: (a) quadrant changes - the number of times the child crossed the tape separating each quadrant; (b) toy changes - touching one toy after initially touching another toy; (c) toy touches - how many times a child touched a particular toy until a different toy was selected and (d) time spent in conventional play with a toy (Routh, Walton & Padan-Belkin, 1978). Toys used included: 20 wooden blocks, Rock-A-Stack 5 tall stacking rings, Little Tikes 1st Car toy car and 12 inch Raggedy Andy doll. These toys were selected in part as they were similar to those used in the study by Routh, Walton and Padan-Belkin 1978. The authors found developmental differences for the Rock-A-Stack toy with younger children spending more time with this toy. Non significant sex differences were found for the toy car and the doll. Boys tended to spend a larger proportion of time in contact with the car where girls did so with the doll. Parker (1981) in an analysis of the stimulus value of toys for young developmentally delayed boys found a high stimulus value for cars and trucks with the boys ages 3-6 years old. Blocks had a lower stimulus value and the dolls had quite a low stimulus value for the boys. The low stimulus value may in part be due to the fact that the children in Parker's study were boys whereas Routh et al.,(1978) included both boys and girls. These few
studies indicate that the toys selected for this study are developmentally appropriate for both the chronological age and developmental age of the children in this study. Conventional play refers to using the toy for the purpose for which the toy was designed. For the toys provided this included: (a) blocks - building/knocking down a structure; counting or sorting the blocks or arranging the blocks in any sort of design; (b) car - pushing/rolling the car on the floor; (c) doll - any make-believe in which the doll is treated as a person including holding or carrying the doll; and (d) stacking rings - taking off/putting on the rings.

The children were escorted to the room by the examiner from their classrooms. Initially, the examiner attempted to have the children remain in the playroom alone, while the examiner videotaped the children through the observation window. The children were told by the examiner that they could play with any of the toys that they wanted and that the examiner would be next door. This was attempted with five children. The children either refused to stay in the room by themselves or sat quietly looking afraid. As the sessions were being videotaped through a one-way mirror, the examiner had someone else operate the video camera to enable her to sit in the room with the children. The instructions given to the children upon entry of the playroom were: "You may
play with any of these toys that you want. I will be right here but I have work which I need to do." The examiner sat on a chair next to the door reading or writing on papers. If a child tried to gain the examiner's attention, the examiner tried to ignore the child if possible; if not the examiner tried to redirect the child back to the toys and the examiner also told the child that she was busy. At the end of the session, each child was allowed to choose a sticker for their participation, although this was not contingent upon the child's behavior. Several of the children were escorted to the playroom more than once in an attempt to obtain one 15 minute play session. The examiner felt that it was more important to have repeated trials in the playroom with the children, rather than to have several children with no data. Almost all the children had repeated experiences in the playroom. Five of the children had more than one session in the playroom, as for their first trial they were in the playroom alone without the examiner. Six children had repeated trials as they either refused to stay in the playroom, or they sat on the floor for the whole time period without engaging in any interactions with the toys. These repeated trials in the playroom represent a deviation from the standardized procedure developed by Routh et al. (1976) and later modified by Routh et. al (1978). Even though the
procedure was non standardized, all the children did eventually receive the same treatment in the playroom, although at different times. The examiner was in the playroom for all sessions for which data were used. The examiner and one of the staff School Psychologists served as the observers/reviewers for the play session. All play sessions were observed by both observers who independently recorded the play sessions to determine inter-rater reliability of the data being collected. The four scores being reported by the observers were analyzed separately and the percentage agreement was computed by dividing the smaller of the two scores obtained for each measure by the larger and multiplying by 100 (Hartmann, 1977). Continuous behaviors were recorded. The percentage agreement reliability scores obtained were 94% for Toy Touches; 90% for Quadrant Changes; 88% for Toy Changes; and 88% for Conventional Play. All these scores indicate that the two observers, though not in complete agreement, were fairly close in what they observed. Pearson correlations were also computed for these scores: 0.99 for Toy Touches; 0.99 for Quadrant Changes; 0.83 for Toy Changes and 0.98 for Conventional Play. Both these sets of data (percent agreement and correlations) indicate acceptable reliability for all four behaviors being measured.
**Data Analysis** (Refer to Chapter 4 for specific details)

**Question 1.** The data were analyzed to determine the relationship between the Nisonger Child Behavior Rating Form and the playroom variables using a Pearson correlation matrix.

**Question 2.** Scores were analyzed using a Spearman correlation procedure to determine if the children scoring high on the Nisonger Child Behavior Rating Form H/I factor were the same children scoring high on the Behar Preschool Behavior Questionnaire H/D factor.

**Question 3.** A multiple linear regression was conducted to determine the effects of developmental age on the dependent variables: Nisonger Child Behavior Rating Form H/I factor, PBQ H/D factor and the four playroom variables: play quadrant changes, play toy touches, toy changes and conventional play with a toy.

**Question 4.** Pearson's $r$ was used to analyze test-retest reliability of the Nisonger Child Behavior Rating Form.

**Question 5.** Partial correlations were used to find the relationship between the dependent variables: Nisonger H/I scale, PBQ H/D scale, and the play observation variables when controlling for the effects of developmental age.
CHAPTER IV
RESULTS

This study examined the performance of developmentally delayed preschool aged children on a number of objective measures of behaviors including activity level. This chapter will summarize the mean scores for the sample and present the Spearman correlations among all the dependent variables, chronological age and developmental age. Further, the results of a regression analysis will be presented for the following dependent variables: Hyperactive/Inattention factor scores from the two administrations (test-retest on the Nisonger CBRF), the Hyperactive/Distractible factor scores from the Behar and the four playroom observation variables: toy touches, quadrant changes, toy changes and conventional play. Also, the partial correlations for the dependent variables controlling for developmental age will be presented. The means are presented in Table 4.
<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>MEAN</th>
<th>RANGE</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA (months)</td>
<td>63.5</td>
<td>47-76</td>
<td>9.51</td>
</tr>
<tr>
<td>Developmental Age (months)</td>
<td>24.7</td>
<td>9-36</td>
<td>7.51</td>
</tr>
<tr>
<td>Receptive Language (months)</td>
<td>22.0</td>
<td>6-48</td>
<td>10.89</td>
</tr>
<tr>
<td>Expressive Language (months)</td>
<td>22.5</td>
<td>5-48</td>
<td>11.21</td>
</tr>
<tr>
<td>NCBRF/Hyperactive-Inatten</td>
<td>16.6</td>
<td>3-27</td>
<td>6.83</td>
</tr>
<tr>
<td>NCBRF/Hyperactive-Inatten-2</td>
<td>13.2</td>
<td>0-24</td>
<td>7.59</td>
</tr>
<tr>
<td>Behar/Hyperactive-Distracti</td>
<td>3.8</td>
<td>0-8</td>
<td>2.55</td>
</tr>
<tr>
<td>Toy touches/minute</td>
<td>4.1</td>
<td>0-16</td>
<td>5.02</td>
</tr>
<tr>
<td>Quadrant changes/minute</td>
<td>1.1</td>
<td>0-5.6</td>
<td>1.48</td>
</tr>
<tr>
<td>Toy changes/minute</td>
<td>0.3</td>
<td>0-1</td>
<td>0.31</td>
</tr>
<tr>
<td>Conventional play</td>
<td>0.4</td>
<td>0-1</td>
<td>0.35</td>
</tr>
</tbody>
</table>

NCBRF/Hyperactive-Inatten = Nisonger Child Behavior Rating Form Hyperactive-Inattention factor (H/I)
NCBRF/Hyperactive-Inatten-2 = retest of Nisonger CBRF H/I factor
Behar/Hyperactive-Distracti = Behar Preschool Behavior Questionnaire Hyperactive-Distractible factor
The first research question stated that the ratings on the Nisonger Child Behavior Rating Form (CBRF) Hyperactivity/Inattention scale would correlate significantly with the playroom observation ratings of behavior. The Spearman correlation rank order coefficient was used due to the skewedness of the data. When the data were plotted on graphs, the data was random with several outliers rather than being normal. As Table 5 indicates, there was a moderate negative relationship between the second administration of the CBRF H/I factor and the playroom variable toy changes (-0.563, p=.04). There was no relationship between the CBRF H/I factor and the other playroom variables. This could possibly be accounted for by the fact that none of the children were significantly hyperactive to cause any relationship ("floor effect"). In fact, none of the children in this study had a diagnosis of Attention Deficit-Hyperactivity Disorder.
TABLE 5
SPEARMAN CORRELATION COEFFICIENTS BETWEEN DEPENDENT VARIABLES

<table>
<thead>
<tr>
<th></th>
<th>CA</th>
<th>DEVAGE</th>
<th>H/I</th>
<th>H/I2</th>
<th>H/D</th>
<th>TOUCHES</th>
<th>CHANGE</th>
<th>QUAD</th>
<th>PLAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>1.00</td>
<td>-0.141</td>
<td>0.122</td>
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<td>0.090</td>
<td>0.090</td>
<td>0.319</td>
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<tr>
<td>DEVAGE</td>
<td></td>
<td>0.61</td>
<td>0.66</td>
<td>0.80</td>
<td>0.74</td>
<td>0.75</td>
<td>0.26</td>
<td>0.57</td>
<td>0.39</td>
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<tr>
<td>H/I</td>
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<td>0.006</td>
<td>-0.010</td>
<td>-0.639</td>
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<tr>
<td>H/I2</td>
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<td></td>
<td></td>
<td>0.90</td>
<td>0.93</td>
<td>0.98</td>
<td>0.97</td>
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<td>H/D</td>
<td></td>
<td></td>
<td></td>
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<td>0.79</td>
<td>0.33</td>
<td>0.88</td>
<td>0.85</td>
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</tr>
<tr>
<td>TOUCHES</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>-0.026</td>
<td>-0.316</td>
<td>0.205</td>
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<tr>
<td>CHANGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.92</td>
<td>0.48</td>
<td>0.76</td>
</tr>
<tr>
<td>QUAD</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>-0.368</td>
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</tbody>
</table>

H/I= Nisonger CBRF Hyperactivity-Inattentive factor
h/I2= retest of the CBRF Nisonger H/I factor
H/D= Behar Hyperactive-Distractible factor
TOUCHES= Playroom toy touches
CHANGE= Playroom toy changes
Quad= Play quadrant changes
Play= Conventional play in playroom

Note: The second figure for each variable pair indicates the alpha probability level for that correlation.
The second research question stated that the ratings on the Nisonger Child Behavior Rating Form (CBRF) Hyperactivity/Inattention scale would correlate significantly with the Behar H/D factor and to a lesser degree with the other factors on the scale. In fact, the scores on both administrations of the Nisonger on the H/I factor and the Behar H/D factor were strongly correlated 0.85, \( p = .0001 \) and 0.72, \( p = .003 \), respectively. Those children who scored high on the CBRF H/I factor were also high on the Behar H/D factor, suggesting that both factors are measuring similar things, at least when completed by classroom staff. The CBRF H/I factor was also strongly related (0.75, \( p = .001 \)) with the retest CBRF H/I factor demonstrating stability over time on this factor. The CBRF H/I (0.784, \( p = .005 \)) and H/I 2 (0.598, \( p = .02 \)) were also found to be related to the Total Disturbed score on the Behar (0.78, \( p = .0005 \) and 0.60, \( p = .02 \) respectively) and to the Hostile/Aggressive score (0.588, \( p = .02 \) and 0.487, \( p = .07 \) respectively) on the Behar (0.59, \( p = .02 \) and 0.49, \( p = .07 \) respectively). This suggests that the CBRF H/I factor might be measuring some of the same behaviors that the Behar H/A factor is measuring. There was no relationship between the CBRF H/I and H/I 2 factor scores and the Behar Anxious/Fearful scores. (See Table 6).
# TABLE 6

**SPEARMAN CORRELATION COEFFICIENTS FOR THE NISONGER HYPERACTIVITY/INATTENTION AND BEHAR FACTORS**

<table>
<thead>
<tr>
<th></th>
<th>H/I</th>
<th>H/I2</th>
<th>TOTAL</th>
<th>H/A</th>
<th>A/F</th>
<th>H/D</th>
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</thead>
<tbody>
<tr>
<td>H/I</td>
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<td>.0001</td>
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<td>.000</td>
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<td>.037</td>
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</table>

- **H/I** = Nisonger CBRF Hyperactivity-Inattention factor
- **H/I2** = retest of the Nisonger CBRF H/I factor
- **Total** = Behar Total Behavior Disturbed score
- **H/A** = Behar Hostile-Aggressive factor
- **A/F** = Behar Anxious-Fearful factor
- **H/D** = Behar Hyperactive-Distractible factor

Note: The second figure for each variable pair indicates the alpha probability level for that correlation.
The Nisonger H/I factor and the Behar H/D factor were compared with teacher ratings of children's activity level (Kimball, 1977) using a point biserial correlation. The teachers rated the children on a five point scale indicating the extent to which a child exhibited the behaviors included in DSM-III's (APA, 1980) criteria for ADD. This rating was completed approximately two months after the completion of the first administration of the Nisonger CBRF and the PBQ. The Nisonger H/I was found to be moderately related (.52, p=0.05) with the teacher's ratings, whereas there was no significant relationship between teacher's ratings and the Behar H/D scores (.37, p > 0.05). This lack of relationship may be accounted for by the fact that the PBQ only has four items that make up the H/D scale. Two items relate to motoric activity and two to attention. The Nisonger CBRF has many more items, including items that are more specific to the developmentally delayed. The third research question asked if there would be a significant negative correlation between developmental age and any of the dependent variables: The CBRF H/I factor, the Behar H/D factor, play toy touches, toy changes, quadrant changes and conventional play. Developmental age was found to be moderately related, negatively, to the playroom quadrant change variable (-0.649, p=.01). That is, those children with a lower developmental age had a higher quadrant
change score, they tended to move about the room more than did the other children. Developmental age was also found to be related to receptive and expressive language scores (0.81, p=.0003 and 0.68, p=.0065 respectively).

To determine any effects of the model of chronological or developmental age on the dependent variables, multiple regression analysis were performed. This analysis was performed to determine if developmental age and chronological age accounted for any of the variability in the dependent variables: CBRF H/I factor, CBRF H/I2 factor, PBQ H/D factor, quadrant changes, toy touches, toy changes, and conventional play. From the ANOVA tables, it can be determined only in the case of play quadrant changes, did the model developmental age and chronological age account for significant amount of variability. Developmental age and chronological age accounted for 61% of the variability in play quadrant changes. From the ANOVA table, it can be noted both of the factors (developmental age and chronological age) are significant (p=0.013 and 0.011 respectively). Table 7 presents the ANOVA summary for the dependent variable play quadrant changes. The negative relationship found between developmental age and play quadrant changes indicates that the child with a lower developmental age made more quadrant changes indicating greater motor activity.
### TABLE 7

**ANOVA TABLE FOR PLAY QUADRANT CHANGES**

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F VALUE</th>
<th>PROB&gt;F</th>
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<td>MODEL</td>
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<td>16.8003</td>
<td>8.4001</td>
<td>7.697</td>
<td>0.0095</td>
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<td>ERROR</td>
<td>10</td>
<td>10.9135</td>
<td>1.0913</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C TOTAL</td>
<td>12</td>
<td>27.7138</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>ROOT MSE</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td><strong>DEP MEAN</strong></td>
<td></td>
<td>1.199231</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C.V.</strong></td>
<td></td>
<td>87.11237</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>VARIABLE DF</th>
<th>PARAMETER ESTIMATE</th>
<th>STD ERROR</th>
<th>T FOR HO: PARAMETER=0</th>
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</thead>
<tbody>
<tr>
<td>INTERCEP 1</td>
<td>10.84305043</td>
<td>2.51431</td>
<td>4.313</td>
</tr>
<tr>
<td>DEVAGE 1</td>
<td>-0.13922074</td>
<td>0.04612</td>
<td>-3.018</td>
</tr>
<tr>
<td>CA 1</td>
<td>-0.09552722</td>
<td>0.03069</td>
<td>-3.112</td>
</tr>
</tbody>
</table>

**PARAMETER ESTIMATES**

**Model** = explains variability in play quadrant changes.

The #2 is for the two items in the model, developmental age and chronological age.

**Parameter estimates** = estimate of the effects of Dev age and CA on the dependent variable, play quadrant changes.

**Intercept** = Reference point for the slope. The value of the dependent variable if Dev Age and CA are set to zero.

The parameter estimate can be used to compute individual play quadrant changes score 

\[ (10.84 + (\text{Dev Age} \times -0.139) + (\text{CA} \times -0.095) \].


There were no relationship between chronological age and developmental age on the following dependent variables: CBRF H/I factor, CBRF H/I2 factor, PBQ H/D factor, toy touches, toy changes and conventional. The ANOVA tables for these dependent variables are presented in Appendix H.

The last research question asked if the CBRF H/I factor, the Behar H/D factor and the playroom observation variables would remain significantly correlated when the effects of developmental age is partialled out. As Table 14 indicates, when developmental age is controlled for, the CBRF H/I and H/I 2 factors remain significantly related with the Behar H/D factor. There is no significant relationship between the CBRF H/I factor, the Behar H/D factor and the playroom variables.
### TABLE 8
PARTIAL CORRELATION COEFFICIENTS CONTROLLING FOR DEVELOPMENTAL AGE

<table>
<thead>
<tr>
<th></th>
<th>H/I</th>
<th>H/I2</th>
<th>H/D</th>
<th>TOUCHES</th>
<th>CHANGE</th>
<th>QUAD</th>
<th>PLAY</th>
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</thead>
<tbody>
<tr>
<td>H/I</td>
<td>1.00</td>
<td>0.901</td>
<td>0.877</td>
<td>0.038</td>
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<tr>
<td></td>
<td><em>p</em> .</td>
<td>.001</td>
<td>.002</td>
<td>.46</td>
<td>.19</td>
<td>.20</td>
<td>.48</td>
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<tr>
<td>H/I2</td>
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<td>0.253</td>
<td>-0.368</td>
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<tr>
<td></td>
<td><em>p</em> .</td>
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<td>.18</td>
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<td></td>
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<td>.30</td>
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<td></td>
<td><em>p</em> .</td>
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<td>.20</td>
<td>.02</td>
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<tr>
<td></td>
<td><em>p</em> .</td>
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<td>.40</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>QUAD</td>
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<td></td>
<td>-0.099</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>p</em> .</td>
<td></td>
<td>.40</td>
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</tr>
</tbody>
</table>

H/I=Nisonger CBRF Hyperactivity-Inattention factor
H/I2=retest of Nisonger CBRF H/I factor
H/D=Behar Hyperactivity-Distractible factor
Touches=playroom toy touches
Change=playroom toy changes
Quad=playroom quadrant changes
Play=conventional play
The children were video taped in the playroom over approximately a 5-week period. As discussed earlier, initially the children were in the playroom alone while the examiner attempted to video tape the children through the one way mirror. This procedure was discontinued after being tried with 5 children as the children did not want to be left in the room alone. Only two children would even allow the door to be shut while they were in the room alone. Two children refused to go into the room and one child would only enter the room if the door remained opened. It was thus decided that the examiner would sit in the room with the children during the play session while another person operated the video camera through the observation window. The children were then willing to enter the playroom and allow the door to be shut. With several of the children repeated attempts had to be made to have them go to the playroom and for some to do more than just sit in the room for the 15 minute session.
Below is a detailed description (by child) of the play sessions.

1. Female, CA: 5 years 5 months; Dev Age: 27 months. The first time she entered the playroom, she did so alone without the examiner. #1 sat in a corner of the room and did not engage with any of the toys. Two additional play sessions were attempted with the examiner in the room. During both of the sessions, #1 engaged in some play with the toys. The second extra session was necessitated due to a malfunction in the video tape.

2. Male, CA: 5 years 8 months; Dev Age 25 months. Two sessions in the playroom were required. The first play session, #2 willingly came to the playroom with the examiner although once in the playroom, he repeatedly asked to leave the playroom. During the second session in the playroom, #2 engaged in limited play with the toys.

3. Male, CA: 4 years 9 months; Dev Age: 30 months. Only one session took place in the playroom. The subject came willingly with the examiner to the playroom.

4. Male, CA: 6 years 1 month; Dev Age: 9 months. Only one session took place in the playroom. This subject came willingly with the examiner to the playroom.

5. Male, CA: 4 years 2 months; Dev Age: 36 months. It took six attempts before data could be collected. The first time #5 came to the playroom, he refused to enter the room or stay in the room by himself. When he saw the
video camera, #5 said "no pictures" and requested to go back to his room. He refused to go with the examiner on two additional occasions stating that it was someone else's turn. On two more occasions #5 went to the playroom; the first time he said he did not want to go, although he came with the examiner when his teacher said he had to. He cried upon entering the room and refused to engage in play with any of the toys. The last occasion that #5 came to the playroom, he came willingly with the examiner. In fact he was quite talkative and readily engaged in play with the toys in the playroom.

6. Female, CA: 4 years 1 month; Dev Age 27 months. #6 was escorted to the playroom 5 times by the examiner, each time coming willingly. On the first occasion, #6 sat in the middle of the room for approximately 13 minutes before playing with any of the toys. The examiner allowed #6 to stay in the playroom until it was time to go home (about 5 more minutes) even though this was more than the 15 minute prescribed play session. On all of the other occasions in the playroom, #6 just sat in the middle of the room playing with her hair, clothing or shoes. The additional sessions were attempted in order to try to obtain a standard 15 - minute play session.

7. Female, CA: 6 years 2 months; Dev Age 27 months. The first occasion in the playroom, #7 came willingly with the examiner and was in the playroom by herself while the
examiner attempted to video tape her through the observation window. #7 was quite animated in her behavior (singing, pretending to play the guitar, dancing) although play with toys was minimal. The examiner took #7 to the playroom for another session with the examiner in the room so that all the play sessions would be with the examiner in the room. On this second trial, #7 demonstrated many of the same behaviors, although there was an increase in play behaviors with the toys over the first session where she was alone in the playroom.

8. Female, CA: 5 years 5 months; Dev Age: 27 months. #8 was escorted to the playroom two times. The first time, #8 was alone in the playroom. She would not allow the door to be shut and sat in a corner holding the Raggedy Andy doll and looked quite fearful. On the next trial in the playroom, with the examiner in the room, #8 smiled and engaged in play with the toys when she was told by the examiner that she could play with any of the toys.

9. Female, CA: 5 years 8 months; Dev Age 34 months. The examiner tried observing #9 in the playroom on four different occasions. On all sessions, she came willingly with the examiner to the playroom. Once in the room #9 would cry stating that she wanted to leave or that she wanted to go home or go back to her classroom. She refused all attempts to play with the toys. She cried
until escorted back to her classroom. Therefore no usable was obtained.

10. Male, CA: 5 years 6 months; Dev Age 10 months. He refused to enter the room on the three occasions when escorted by the examiner. He cried upon approach to the room.

11. Male, CA: 3 years 11 months; Dev Age 20 months. The first time in the playroom was without the examiner in the room and he lay on the floor throughout the session. He did not protest being in the room alone or the door being shut. The second trial was with the examiner in the playroom. This time, he responded to the statement that he could play with any of the toys he wanted to while the examiner worked.

12. Male, CA: 6 years 4 months; Dev Age: 21 months. The first session in the playroom (examiner present) #12 kept trying to leave the room. The second occasion, he stayed in the playroom throughout the session and played following the examiners directions that he may play with any of the toys.

13. Male, CA: 5 years 6 months; Dev Age: 24 months. Three trials in the playroom were required. The first time the video camera malfunctioned and as a result there were no data. This was unfortunate as #13 did engage in play behaviors for the 15 minute play session. The second session, he refused to play with the toys. The third
session, #13 again played with the toys following the examiner's directions.

14. Male, CA: 6 years 1 month; Dev Age: 30 months. Only one session took place in the play room. He played for the 15 minute session following the examiner's directions.

15. Female, CA: 4 years 8 months; Dev Age: 24 months. Two trials in the playroom took place. The first time #15 cried and did not want to remain in the room. During the second session, she stayed in the room only if the door remained open. With the door to the playroom open, #15 engaged in play with the toys. The examiner sat on the floor in the doorway.
This study investigated developmentally delayed preschoolers on selected measures of activity and observed behaviors. The focus of this dissertation was whether the observed behaviors could indicate variations in hyperactivity ratings in developmentally delayed preschoolers, and whether the behavior rating scales correlated with the playroom observation procedure. Previous research has found that the playroom observation procedure could discriminate children referred for the evaluation of hyperactivity from matched controls (Routh & Schroeder, 1976). They also found that activity level tended to decrease with age. Routh et al. (1978) found that when the mother was present in the playroom, activity level increased to a peak at 18-23 months, then decreased at 24-29 months and increased again to age 5 years. Conventional play was also found to increase with age. Kimball (1987) found that the playroom variables were able to successfully discriminate ADD in developmentally delayed preschool boys. As indicated in the review of the literature, several rating scales have been used to
successfully discriminate AD-HD in young children. Rheinscheld (1989) found that the Behar Preschool Behavior Questionnaire was useful in identifying behavioral problems, including hyperactivity, in preschool age developmentally delayed children.

The results presented in chapter four are somewhat consistent with the above findings, noting a negative relationship between developmental age, which was used as an estimate of cognitive functioning, and activity level in the form of playroom quadrant changes. Lower functioning children tended to have more quadrant changes indicating increased motor activity. These quadrant changes were also generally associated with running around the room, rather than changing quadrants to retrieve another toy. The first research question, examining the relationship between the Nisonger CBRF and the playroom behaviors was not supported. There were no significant correlations between the Nisonger CBRF H/I factor and any of the four playroom variables; toy touches, toy changes, quadrant changes and conventional play. There was also no significant relationship between the Behar H/D factor and the playroom variables. Ratings completed by the teachers on the PBQ and the Nisonger CBRF were based on classroom activity. The playroom introduced a different activity environment (one child and one activity) with different demands (toys as compared with learning tasks).
playroom placed one child with one activity in a small room. The child was to play alone with the toys while the examiner was busy doing paperwork. Interactions between the child and the examiner were discouraged. In contrast, in the classroom, there are approximately eight children with three teachers. The teachers work with the children in small groups or individually completing learning tasks. The classroom provides many opportunities for both peer and adult interactions. Therefore, the scales completed in the classroom may not carry over to other settings. Also many of the children had been in class with the same teacher for at least one school year. It is possible that the teachers were used to the children's behavior and did not see the behavior as bothersome. Milich et al. (1982) found the toy change variable to be a measure of attention shifts and not significantly related to motoric hyperactivity. This lack of any significant relationship between the rating scale's hyperactivity factors and the playroom variables may also be due to the fact that none of the children in the study were clinically hyperactive, nor did they demonstrate significant deficits in attending to cause any relationships. In fact, none of the children in this study had a diagnosis of Attention Deficit-Hyperactivity Disorder. This suggests that hyperactivity and attention deficit disorder may be two different phenomena and can occur together or not, in the same
individual. This also points to the fact that hyperactivity in children is multidimensional rather than a single entity. Routh and Schroeder (1978) also note that many children who are called hyperactive do not demonstrate excessive motor activity when in the playroom. The same teachers who completed the Nisonger and the Behar completed a five point rating scale indicating the extent to which a child exhibited the behaviors included in DSM-III's (APA, 1980) criteria for ADD. There was no significant relationship between the Behar H/D scale and the teacher rating on the DSM-III definition of ADD. The mean H/D score for this study was 3.8 which is lower than the mean for the deviant group in Behar's standardization sample (4.7), although it is higher than the mean score for the normal group (2.2). It appears that the children in this study, as a group, could not be considered as deviant on the Behar H/D factor. A moderate relationship was noted between the Nisonger CBRF H/I scale and the DSM III definition rating by the teachers. This relationship between the Nisonger CBRF H/I factor scores and the teachers' ratings suggests that the same children who were rated high on the Nisonger CBRF H/I scale also were described by the teachers as being hyperactive according to DSM-III criteria. As discussed earlier, one possible reason for the lack of relationship between the PBQ and the teachers' DSM III ratings of hyperactivity is the
limited number of questions regarding hyperactivity on the PBQ. Of the four questions on the PBQ H/D scale, two relate to motor activity and two to inattention. This compares to twelve questions on the Nisonger CBRF H/I scale, with at least four specific to motor activity and at least five specific to inattention. The Nisonger CBRF has also been developed specifically for the developmentally delayed whereas the PBQ was developed for use with nondelayed children.

The second research question examined the relationship between the Nisonger CBRF H/I scale and the Behar H/D scale. There was a strong correlation between these two scales, indicating that they are in fact measuring the same thing when completed by classroom teachers on young developmentally delayed children. This strong relationship would be expected when examining the individual items on the PBQ and the Nisonger CBRF, the four items that make up the PBQ H/D scale are included on the Nisonger CBRF, although the wording of the items are slightly different. The Nisonger CBRF also includes many of the items that make up the other two scales on the PBQ, the Anxious/Fearful and Hostile/Aggressive scales.

The third research question predicting a negative relationship between developmental age and any of the measures of activity was mildly supported. Only play quadrant changes was found to be significantly related,
negatively, with developmental age. That is, children with a lower developmental age tended to have a greater number of quadrant entries, a greater amount of locomotor activity. The children in this study with the highest quadrant changes tended to have the lowest rate of toy touches, shortest length of time in conventional play and were the lowest functioning. This movement around the playroom may be due to curiosity by the young child who has not yet learned controls. Quadrant changes is therefore, a measure of developmental age rather than of hyperactivity. No such trend was noted with the behavior rating scales. The lower functioning child tended to act like a younger child, consistent with Routh and Schroeder's (1976) findings of a decrease in activity level with increasing age. This is somewhat different from the results Kimball (1987) found in his study of preschool age boys. He found that play-toy touches as well as play-quadrant changes were significantly related to developmental age. Toy touches were thought to be a measure of developmental level rather than of an attention deficit disorder (Kimball, 1987). In his developmentally delayed sample, the boys with ADD, displayed a higher number of toy touches than did the children without ADD, indicating a higher level of activity in the playroom. However, this is opposite to what he found for the nondelayed groups of children. The
nondelayed boys with ADD tended to have more toy changes, indicating they tended to switch impulsively from toy to toy while playing (Kimball, 1987). Kimball's study included preschool boys with normal intelligence and with developmental delays and as a result had a different range of developmental age equivalents, with the children in his study generally being cognitively higher functioning than the children in this study (27-45 months with a mean of approximately 35.7 months for the developmentally delayed children). This study had a developmental age equivalent range of 9 - 36 months with a mean of 25.5 months. It appears then, that the playroom observation procedure is not an effective procedure in discriminating overactivity in very young children.

The fourth research question examined the test-retest reliability of the Nisonger CBRF over time. The Nisonger CBRF was administered a second time at least one month after the initial administration. A strong correlation was found, indicating stability over time with the Nisonger CBRF.

CONCLUSIONS

This study was designed to investigate the usefulness of several objective measures of activity in diagnosing variations in activity level in developmentally delayed preschool children. The results revealed that the
Nisoner CBRF H/I scale is related to the Behar H/D and that they both measure the same thing in developmentally delayed children when completed by classroom teachers. None of the playroom variables were found to be related to the hyperactivity variables on the rating scales. This lack of relationship between the playroom observation variables and the rating scales indicates that young developmentally delayed children behave differently in different environments in response to different stimuli. Thus, the playroom procedure is useful when examining how these young children respond in different situations. Quadrant change was found to be related to developmental age; those children with a higher developmental age tended to have fewer quadrant changes. This relationship suggests that with these young developmentally delayed children, developmental age is important to consider when evaluating the child for the presence of increased activity levels. Since none of the children had a clinical diagnosis of hyperactivity, (as most of the children in the study were too young to have received such a diagnosis) and that the mean group score on the Behar H/D factor was lower than the mean for her deviant sample, the lack of relationship between the playroom variables and the rating scales, may be more of a function that none of the children were overactive enough to produce any real differences. Another consideration
regarding the playroom procedure used in this study, is that it was not standardized as developed by Routh and his colleagues. The majority of the children in this study had more than one session in the playroom, and several sessions were terminated prior to the prescribed 15 minutes due to protests by the children. The children eventually received an uniform experience in the playroom, although this experience occurred at different times. It is unknown what effect the repeated trials in the playroom had on the children's behavior. In future studies, it would be important to have the playroom procedure be more standardized to eliminate any effect of multiple experiences in the playroom. This could be accomplished by having a predetermined number of trials in the playroom prior to the observational data being recorded.

It is possible then, that the children's behavior is a function of the setting, especially when considering that the teachers' DSM III ratings of hyperactivity were not significantly related to their ratings of the children on the behavior rating scales, and that the rating scales did not correlate with the playroom variables. Roberts et al. (1982) found that differences between hyperactive and nonhyperactive boys became more pronounced as the degree of structure in the environment increased. The playroom was unstructured, except for the direction that the children could play with any of the toys they wanted. The
classroom presents more demands upon the children with several settings in the classroom being more structured than the playroom. Another way to account for differences in structure between settings would be to vary the structure in the playroom to include restricted play, independent classroom type learning tasks as well as free play. It therefore seems that it may be best to use a variety of measures when looking at activity level, as it is possible that the activity level for these children are situation specific as it is with non delayed hyperactive children. Even so, it is best to avoid labelling young children, in order to avoid the risk that the label is used negatively, which might bring about excluding children from available programs. When screening for AD-HD, it is necessary to ensure that the benefits outweigh any possible risks to the label. Such referrals should be made only when programming to remediate the behavior problem can be provided.

As noted elsewhere in this dissertation, (Kimball, 1987) found that the Behar H/D factor and the playroom observation procedure could in fact discriminate the presence of ADD in developmentally delayed preschool boys. Therefore, it seems important to look at modifications to the present study to determine with this population if the playroom procedure can be used effectively when evaluating a young developmentally delayed child for the
presence of AD-HD. The first consideration, would be to classify the children as to AD-HD or not AD-HD, to be able to include delayed children who are thought be AD-HD. Then at a young developmental level, such as in this study, it could be determined whether the playroom procedure detects the presence of the disorder in children who are thought to be AD-HD. The quadrant change measure was found to be related to developmental age; as activity level has been found to increase up to approximately two years old (the mean developmental age of the sample) before decreasing, it would be important to expand the developmental age of the children in the study, by including children who have milder delays than did the children in the study. Expanding the developmental level of the study would also facilitate the use of conventional play as a measure, as there is little if any conventional play in children below one and one half years. Routh et al. (1978) found conventional play to be almost nonexistent in children 10-17 months old, then rose steadily. Also, it would be interesting to see if nondelayed children matched to the developmental age of the sample in this young age group display the same characteristics as the delayed children. Then if a diagnosis of AD-HD can be made, efforts could be aimed at program efforts to remediate the AD-HD. With these
modifications, future research could possibly indicate the best methods to use in diagnosing AD-HD in young developmentally delayed children.
APPENDIX A

PERMISSION LETTER FOR CHILDREN’S PARTICIPATION
AND CONSENT FORM
Dear Parents:

I am conducting a research project that involves the study of children's behavior during play. Information gathered in this study will be useful to psychologists in the diagnosis and treatment of children with attention and activity problems. Children ages 3-6 years are being recruited for this study and I ask that you consider allowing your child to participate. This study is part of my doctoral dissertation in Psychology at the Ohio State University.

Your child's participation in the study will involve a 15 minute toy play session where your child will be observed. I will also be completing two behavior checklists with your child's classroom teacher. All information gathered on your child will be confidential.

Please take a moment to read the attached consent form. Should you decide to allow your child to participate, please sign the consent form and return it to the school as soon as possible. If you have any questions, please feel to call Dr. David Hammer at 614-292-9920 (Ohio State University) or myself, Karen Habo Schottenstein at 303-674-9715.

In order that I may review your child's school files to obtain information on his/her developmental level, I also need your signed consent. Please sign at the designated space on the bottom of this letter giving me consent to have access to your child's school file, and return it with the attached consent form for participation in the study.

Thank you for your time and cooperation.

Karen Habo Schottenstein
Karen Habo Schottenstein, M.S.
Doctoral Candidate

Dr. David Hammer, Ph.D.
Faculty, O.S.U.

I give Karen Mabo Schottenstein permission to review my son/daughter's school files.

Parent/Guardian
May 15, 1990

Human Subjects Review Committee
Ohio State University Research Center
1314 Kinnear Road, Room 205
Columbus, Ohio 43212

Res: Protocol 9080076, Karen Habo Schottenstein

Dear Committee Members:

The Jefferson County Community Center for Developmental Disabilities, Inc. hereby gives permission for Mrs. Karen Habo Schottenstein to do her dissertation within our facility, the Margaret Walters School. Her contact person will be Ron Harquez, Principal.

Sincerely,

Arthur W. Huglin
Executive Director

Annex

Ron Harquez

A non-profit corporation providing services for persons with developmental disabilities.
THE OHIO STATE UNIVERSITY

CONSENT FOR PARTICIPATION IN
SOCIAL AND BEHAVIORAL RESEARCH

I consent to participating in (or my child's participation in) research entitled:


__________ David Hamner, Ph.D. or his/her authorized representative has explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child).

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ___________________ Signed: __________________

Signed: __________________

(Principal Investigator or his/her Authorized Representative)

Signed: __________________

(Person Authorized to Consent for Participant - If Required)

Witness: __________________

Karen Mabo Schettinain

Graduate Student

HS-027 (Rev. 3/87) —(To be used only in connection with social and behavioral research.)
APPENDIX B

THE PRESCHOOL BEHAVIOR QUESTIONNAIRE
PLEASE NOTE

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APPENDIX C

BEHAVIORAL CRITERIA FOR PLAYROOM OBSERVATION MEASURES
Structured Play Observations

Behavioral Criterion:

1) Quadrant change:

A quadrant change is defined as each time the child crosses the line separating quadrants with both feet.

2) Toy touches:

A toy touch is defined as how many times a child touches a particular toy until another toy is selected. Only contact between the child's hand and toy(s) will be counted. Contact with other body parts will be ignored.

3) Toy change:

A toy change is defined as the child initially touching one toy after touching another toy. If a child picks up two toys he/she would receive two toy change scores.

4) Conventional play:

Conventional play is the amount of time the child spends in conventional play with a toy:

   a) Blocks: building/knocking down a structure, counting or sorting the blocks or arranging the blocks in any sort of design.

   b) Doll: any make-believe in which the doll is treated as a person including holding or carrying the doll.

   c) Car: pushing/rolling the car on the floor.

   d) Stacking rings: taking off/putting on the rings.
APPENDIX D

THE NISONGER CHILD BEHAVIOR RATING FORM
PLEASE NOTE

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APPENDIX E

VISUAL DESCRIPTION OF TOYS
Car - Little Tikes First Car

Stacking rings - Fisher-Price Rock-A-Stack with 5 colored rings
Doll - 12 inch Raggedy Andy Doll

Blocks - twenty red rectangle and blue square wooden blocks
Appendix F

SKETCH OF THE PLAYROOM
The playroom - 8 feet by 11 feet room with a door and an observation window which is about eye height from the floor.

X = Examiner
--- = Tape on floor dividing room into 4 quadrants
APPENDIX G

TEACHER RATING FORM FOR DEGREE OF DSM III ADDH CHARACTERISTICS DISPLAYED BY CHILDREN
This child could be characterized as always being "on the go". The child excessively runs about or climbs on things and has difficulty sitting still and fidgets excessively. This child is also easily distracted, often does not seem to listen, and often fails to finish things he or she starts. Finally, the child often acts before thinking and shifts excessively from one activity to another, requires a lot of supervision, and has difficulty awaiting turn in games or group situations.

Does this describe _______________. Circle the number that best describes the above child.

1 2 3 4 5
Not at all describes this child  Mildly describes this child  Somewhat describes this child  Moderately describes this child  Very definitely describes this child
APPENDIX H

ANOVA TABLES FOR DEPENDENT VARIABLES
### ANOVA Table for CBRF H/I Factor

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- **Root MSE**: 7.87885
- **R-Square**: 0.0372
- **Dep Mean**: 13.3076
- **C.V.**: 59.2052

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| PARAMETER ESTIMATES |

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| ROOT MSE   | 4.81975 | R-SQUARE | 0.0659 |
| DEP MEAN   | 3.49    |          |        |
| C.V.       | 138.101 |          |        |

### PARAMETER ESTIMATES

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- **ROOT MSE**: 0.3078
- **R-SQUARE**: 0.2379
- **DEP MEAN**: 0.2784
- **C.V.**: 110.51

### PARAMETER ESTIMATES

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| ROOT MSE | 0.3228 | R-SQUARE | 0.1259 |
| DEP MEAN | 0.0160 |          |
| C.V.     | 94.534 |          |

### PARAMETER ESTIMATES

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