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Donna Lee Toro

Philadelphia College of Osteopathic Medicine, drtoro1@comcast.net

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PRAGMATIC LANGUAGE AND SOCIAL SKILLS FUNCTIONING

IN CHILDREN DIAGNOSED WITH ASPERGER'S DISORDER

By Donna Lee Toro

Submitted in Partial Fulfillment of the Requirements of the Degree of

Doctor of Psychology

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DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by ___Donna Lee Toro___ on the _14th

day of __May__, 2008, in partial fulfillment of the requirements for the degree of Doctor

of Psychology, has been examined and is acceptable in both scholarship and literary

quality.

Committee Members' Signatures:

Beverly White, Psy.D., Chairperson

Virginia Salzer, Ph.D.

Jane Dumsha, Ph.D., CHES

Christina Esposito, Psy.D.

Robert A. DiTomasso, Ph.D., ABPP, Chair, Department of Psychology

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Abstract

Sixteen children with a diagnosis of Asperger's Disorder, as defined by the

DSM-IV-TR (2000), were assessed using the following standardized measures:

KBIT-2 (Kaufman & Kaufman, 2003), CASL (Carrow-Woolfolk, 1999), and SSRS

(Gresham & Elliot, 1990). The purpose of the study was to determine whether the

measurement of pragmatic language functioning is reliably associated with social

skill performance in children with Asperger's disorder. Results indicated that the

group mean composite index score of the CASL was in the average range for children

with a standard score of 85 or higher on the KBIT-2. Group average scores for formal

language functioning and pragmatic language functioning each fell in the average

range as measured by the CASL. However, qualitative analysis strongly suggested

that formal language was superior to pragmatic language in the studied sample.

Results measuring social skills functioning were mixed. Parent report for children in

Grades K-6 indicated below average social skills functioning ($M = 77$) and above

average problem behavior ($M = 112$). Similarly, parent report for children for Grades

7-12 indicated below average social skills functioning ($M = 53$) and above average

problem behavior ($M = 135$). Teacher report for children in Grades K-6 indicated

average social skills functioning ($M = 90$). However, teacher report indicated problem

behavior frequency in the above average range for children in Grades K-6 ($M = 112$).

Parent/guardian and teacher ratings of social skills functioning were not significantly

correlated ($r = .05$). Pragmatic Language Test scores were not significantly correlated

with social skills functioning ($r = .26$). Cognitive functioning was not significantly

correlated with social skills functioning ($r = .26$).

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Chapter 1

Introduction

Statement of the Problem

    History.

        The clinical syndrome currently known as Asperger's disorder (*Diagnostic and Statistical Manual of Mental Disorders-IV-TR*, American Psychiatric Association, 2000) was first described by Hans Asperger, a Viennese psychiatrist, in 1944. His term for the disorder was "autistic psychopathy." At approximately the same time, German psychiatrist Leo Kanner was evaluating a similar disorder in young children at Johns Hopkins Hospital which he called "congenital infantile psychosis" (Kanner, 1943). Both of these disorders included symptoms of social communication impairment; however, qualitative differences between the clinical characteristics of patients in each diagnostic category were evident. In general, the children described by Asperger differed from children with congenital infantile psychosis in three ways. First, cognitive and language development were often age appropriate. Second, when these children interacted with others, their style of engagement was odd, as demonstrated by abnormal gaze, pedantic speech, and lack of conversational reciprocity. Finally, these children often demonstrated gross motor clumsiness which interfered with age appropriate play behavior (Asperger, 1944/1991). In contrast, children in the infantile psychosis group were more likely to show impairment in cognitive functioning, were consistently delayed in the

development of language, speech, and/or symbolic play, avoided contact with others,

and frequently sought objects with which they engaged in repetitive, ritualized

behaviors (Kanner, 1943; Wing 1981). Note that both groups demonstrated a strong

preference for sameness in daily routines and responded with irritation, distress,

and/or tantrum behavior when routines were altered. Impulsivity and low frustration

tolerance were common in both groups. The response of the Asperger group was

typically verbal, oppositional in nature, and sometimes involved physical destruction

of objects as well as injury to others (Asperger, 1944/1991). The response of the

Kanner group was characterized by nonverbal repetitive vocalizations and pushing

aside another person as if he were an object (Kanner, 1943). The fact that the primary

characteristics of each disorder are largely retained in the current diagnostic criteria

for Asperger's disorder and Austistic disorder in the *Diagnostic and Statistical*

Manual of Mental Disorders-IV-TR (2000) is both a testament to the observational

skills of Asperger and Kanner, as well as a possible indicator that the major aspects of

this disorder may have a neurological etiology.

In Austria during the 1940s, elementary school children who demonstrated

consistent difficulties with learning and social behavior were transferred to boarding

schools for remedial intervention. Asperger worked with children in this setting for

10 years prior to writing his seminal article proposing the existence of the formal

syndrome of autistic psychopathy (Asperger, 1944/1991). He based his

conceptualization of the disorder on his observations of approximately 200 children

in this setting. His case studies incorporate the defining features of the syndrome and

the slightly eccentric characteristics frequently expressed by affected individuals, all

of whom were male (Asperger, 1944/1991).

Asperger identified impairment in social interaction as the most salient feature

of the disorder. He suggested that social deficits are present at birth and are

observable at 3 months of age. Unlike typically developing children, the child with

Asperger's Disorder does not focus on the eyes of the caregiver in order to engage or

to socially respond. In addition, facial and gestural expressions are not enacted

normally. Specifically, expressions are not used to facilitate social interaction, but

rather reflect a disengaged worried look that may indicate the internal emotional state

of the child at any given moment. These abnormalities have a negative effect on the

child's attachment to his parents and interfere with nonverbal social learning. The

cumulative effect of distorted social learning is profound and is evident by the age of

3 years. These deficits become more apparent when the child enters social contexts

outside the family. For example, Asperger noted that children with autistic

psychopathy were unable to establish age appropriate relationships, follow directions,

or behaviorally conform to the expectations of adults and peers in the context of the

school environment. Asperger observed these difficulties in situ and hypothesized

that the behaviors he saw were attributable to an underlying impairment of social

understanding and poor social skills. Although these children sought interaction with

others less frequently than typical age peers, they were not socially avoidant. Rather,

children with autistic psychopathy were awkward in their initial social approach, and

appeared limited in their ability to respond to the fluid demands of social exchange.

For example, when engaged in conversation, these children would either continuously

or intermittently avert their gaze from their conversational partner. Thus, nonverbal cues emitted by their partner would either be missed or misunderstood. This may partially explain the propensity of affected children to speak at length about their own special interests, often with their own gaze focused on a point beyond the listener's face. Asperger also noted a high frequency of other socially odd behavior, including inadequate voice modulation, sing-song prosody, poor hygiene, and gross motor clumsiness. Asperger indicated that this pattern of social impairments resulted in peer rejection, social isolation, and frustration regarding social contact (Asperger, 1944/1991).

The cognitive abilities of the children described by Asperger (1994/1991) were measured using the Binet Scale of Intelligence (1905). Quantitative data yielded results at every level of functioning. Asperger noted that the predictive validity of these composite IQ scores was likely to be adversely affected by highly variable levels of compliance of the children with the testing procedure. Thus, Asperger focused on the qualitative performance of the children. On a case by case basis, he considered whether there was a pattern between measured level of IQ, qualitative response features, and his observation of the child's academic performance. He found that although the spontaneous verbal responses of children with average to above-average ability were frequently creative, they were also inappropriate and did not answer the question that was posed. Further, the responses had a circuitous quality to them and frequently incorporated autobiographical information. In contrast, Asperger noted that children who were more cognitively limited often provided verbal responses that included neologisms and contained

obscure content. In addition, Asperger noted that, although conceptual mathematics was often an area of high achievement in children with relatively higher levels of cognitive ability, arithmetical computation was often an area of weakness. Asperger's qualitative analysis of arithmetical problem solving in this population indicated that these children frequently developed idiosyncratic, complex, and unreliable computational approaches which led to frequent errors (Asperger, 1944/1991; Wing, 1981).

The juxtaposition of average to above average intelligence with noncompliant and tangential responding was observed to create poor relational dynamics between students and teachers in the academic setting. Interestingly, Asperger's original description included both the behavior of the children and its effect on the beliefs and behavior of the teachers who worked with them. For example, the typical child in Asperger's clinical sample had persistent difficulties in demonstrating appropriate classroom behavior, including attending to the teacher, complying with requests, engaging appropriately with classmates, and performing routine pencil and paper tasks. Teachers, observing the child's advanced knowledge of a special interest area as well as his pedantic style of speech, believed that the child's poor social adjustment was evidence of willful disobedience and attempted, with little success, to elicit more appropriate social conformity. According to Asperger, the failure of this behavioral correction was due to the teachers' incorrect assumption that children with autistic psychopathy acquire social skills through modeling. Asperger's observations indicated that, unlike their typically developing peers, children in this population must receive special instruction in social skills. Further, these children have difficulty

meeting age appropriate academic requirements because of their pervasive insistence to eschew the daily lesson plan in favor of studying information related to a circumscribed and often idiosyncratic content area. Their "study" of a special interest usually reflects strong rote memory skills and may or may not represent comparable depth of comprehension (Asperger, 1944/1991).

Asperger was able to make longitudinal observations of many of the children in his sample. He noted that those who had average to above average cognitive abilities were more likely to transform their special interests into professional occupations. Achievement in a profession was perceived as facilitating an individual's social integration during adulthood. Relationships in adulthood were not considered normal, as Asperger noted that one could not fully compensate for a lifetime of socially distorted relating with others through the use of intellectualization. Therefore, Asperger's prognosis for children with autistic psychopathy was keyed to the child's level of cognitive functioning (Asperger, 1944/1991).

Diagnostic issues: Current status and limitations.

The *DSM* diagnostic system is based on a medical model of categorization that determines the presence of a mental illness based on descriptive, behaviorally based criteria that are specific to each disorder. Nosology in the field of medicine reflects a hierarchy based on scientific research which aims to identify causal explanations of disease. Specifically, Scadding (1996) notes that the diagnostic hierarchy ascends in the following order, according to the culmination of clinical evidence and biological research: (a) reliable patterns of signs and symptoms,

(b) structural abnormalities, (c) pathophysiology, and (d) etiology. Some disorders listed in the *DSM*, such as the general category of "Delirium, Dementia, and Amnestic and Other Cognitive Disorders" are derived through a similar process. In contrast to the medical model, most of the disorders described in the *DSM* remain at the level of "signs and symptoms" and are considered atheoretical regarding etiology (Beutler & Malik, 2002; First, 2005).

In the United States, psychologists and psychiatrists presently use the *DSM-IV-TR* (2000) for clinical diagnosis. *The ICD-10 Classification of Mental and Behavioral Disorders: Clinical Descriptions and Diagnostic Guidelines* (World Health Organization, 1992) is used as a guideline for diagnostic research. The current diagnostic criteria for the subtypes of pervasive developmental disorders (PDD) were derived from clinical field trials designed to evaluate the sensitivity and specificity of symptoms associated with the autistic spectrum disorders (Volkmar et al., 1994). Five clinical sites provided at least 100 subjects each over the course of 1 year. Sixteen additional sites provided at least 20 subjects each over the same period of time. The field trials included: 454 children with a diagnosis of autism (M = 8.99 years, SD = 7.18 years; male to female ratio, 4.49:1); 240 children with a PDD that did not meet criteria for autism, including Rett syndrome, childhood disintegrative disorder, and Asperger's syndrome (M age = 9.68 years, SD = 6.57 years; male to female ratio, 3.71:1); and 283 children with conditions other than PDD which required the clinician to rule out a diagnosis of autism (M age 9.72 years; SD = 8.26 years; male to female ratio, 2.29:1). Forty-eight of the children were assigned a diagnosis of Asperger's syndrome based on *ICD-10* criteria. Interrater reliability was evaluated by

comparing the level of agreement between two clinicians for 131 patients selected

from a variety of sites and included a range of diagnoses. The level of agreement

between clinicians in the differentiation between PDD and non-PDD diagnostic

categories was very good (kappa = .95). The level of agreement between clinicians in

the diagnosis of disorders subsumed under the category of PDD was less reliable and

dependent on the level of experience of the clinician. When clinician raters were both

"experienced," as defined by having evaluated 25 or more cases of autism during the

course of their professional practice, reliability was very good (kappa = .85). When an

experienced clinician was paired with a less experienced rater, interrater reliability

was rated as fair (kappa = 59). Specific calculations for PDD diagnostic subtypes

other than autism were not provided (Volkmar et al., 1994).

Overall, the results of the field trials indicated that the *ICD-10* diagnostic

criteria for PDD disorders yielded the best balance between sensitivity and specificity

(Volkmar et al.,1994). However, the copious list of symptoms described in the *ICD-

10* was considered too extensive for clinical use. Therefore, symptoms with low base

rates were eliminated. The final set of criteria adopted by the APA (1994) committee

for the category of autism yielded an overall sensitivity rating of .80 and a rating

specificity of .87. When less experienced clinicians applied the revised criteria for the

diagnosis of autism, it was found that sensitivity (.82) and specificity (.87) were very

good (Volkmar et al., 1994). The criteria for Asperger's disorder, Rett's disorder, and

childhood disintegrative disorder were incorporated directly from the *ICD-10* (1992)

into the *DSM-IV-TR* (2000). Unfortunately, individual sensitivity and specificity

ratings for these disorders were not provided by the field trial study.

In the *DSM-IV-TR* (2000), Asperger's disorder is described as an autistic spectrum disorder. It is one subtype of the category of pervasive developmental disorders (PDD). Asperger's disorder was first included in the *DSM-IV* (1994) and its diagnostic criteria remain unchanged in the *DSM-IV-TR* (2000). The symptoms of Asperger's disorder include significant impairment in social interaction, narrowly defined and abnormally intense interests and/or stereotypic patterns of behavior, and the presence of normal language and cognitive development prior to 3 years of age. According to the Krapelin rule of diagnostic hierarchy, if criteria are met for both Autistic disorder and Asperger's disorder, the diagnosis of autism is assigned. The application of this rule in the area of PDD has had a significant impact on clinical research and clinical practice.

Mahoney et al. (1998) conducted a study of the ability of clinicians experienced with PDD to reliably apply the *DSM-IV* diagnostic criteria (1994) in the diagnosis of PDD subtypes. Assessment measures included: Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS), Vineland Adaptive Behavior Scales, Autism Behavior Checklist (ABC), and Leiter IQ. Initial findings indicated that when the criteria were applied as written, 20 of 21 children in their sample who had a previous diagnosis of Asperger's disorder were assigned a diagnosis of Autistic disorder instead. Examination of the clinical decision process revealed that the children in this group demonstrated the appropriate number of symptoms within each class of symptoms to qualify for a diagnosis of autism, despite normal cognitive and language development. According to the decision rules of the *DSM*, the categorization of the children as autistic was appropriate. However,

this result appeared to the researchers to create too much heterogeneity in the autism

group. Thus, in an effort to identify a more homogeneous group of children with

Asperger's disorder based on clinical practice norms, Mahoney et al. (1998) altered

the diagnostic criteria in the following way: If a child met criteria for both disorders, a

diagnosis of Asperger's disorder was assigned. Results indicated that when this

decision rule was applied, Asperger's disorder was reliably differentiated from

Autistic disorder. Specifically, for the given sample ($N = 143$) and clinical raters ($N =$

3), if one rater diagnosed a subject with Asperger's disorder, the likelihood of another

rater to assign the same diagnosis to that subject was estimated to be 59%. By

comparison, the conditional probability rating for the reliability of a diagnosis of

Autistic disorder in this sample was 84% and for the diagnosis of atypical autism,

27%.

Further research on the reliability of *DSM-IV* criteria for Asperger's disorder

revealed similar diagnostic difficulties. Using a standard of strict adherence to the

DSM-IV criteria, Mayes, Calhoun, and Crites (2001) assessed 157 children ranging in

age from 19 months to 14 years using several diagnostic measures, including a

standardized parent interview, clinical observation of the child, and teacher report and

school records. Thirty percent ($n = 47$) of the sample had a full scale intelligence

quotient (FSIQ) equal to or greater than 80. Fifteen percent ($n = 24$) met criteria for

normal language development prior to age 3. However, 75% of the sample ($n = 71$)

also had significant impairment in social interaction, and 71% ($n = 50$) of this subset

also demonstrated idiosyncratic language use and stereotypic repetitive behavior.

Every child with an IQ score measured to be in the normal range also had social

communication impairment and repetitive behaviors and/or idiosyncratic language use. Therefore, results indicated that all of the children included in the study met criteria for autism and none met criteria for Asperger's disorder. The authors hypothesize that in clinical practice, Asperger's disorder is frequently assigned to patients who demonstrate symptoms of autism in the mild range of impairment and who also have cognitive abilities in the normal range of functioning. It is also noted that this same group of patients are often labeled as individuals with high functioning autism although this is not a formal diagnostic category in the *DSM-IV-TR* (2000).

Thus, the application of the Kraeplin decision rule increases the frequency of the diagnosis of autism and decreases the frequency of the diagnosis of Asperger's disorder. Qualitatively, this increases the heterogeneity of the group labeled as autistic while also increasing the homogeneity of the group identified as having Asperger's disorder. Logically, one would then expect the diagnosis of Asperger's disorder to be a rare event. However, this is not the case. It would appear that clinicians do not conceptualize and diagnose Asperger's disorder as defined in the *DSM-IV-TR* (2000). In an effort to address this diagnostic problem, Swedish researchers Gillberg and Gillberg (1989), have developed a separate set of diagnostic criteria for Asperger's disorder based on a dimensional approach. The Gillberg group proposes that too much qualitative information is lost when a categorical approach is applied to the diagnosis of the disorder (Leekham, Libby, Wing, Gould, & Gillberg, 2000).

Specifically, Gillberg and Gillberg (1989) created a list of diagnostic criteria based on Asperger's original case studies (1944/1991). Using these dimensional

criteria, they performed a series of investigations including studies of the following

areas: epidemiology (Gillberg & Gillberg, 1989; Kadesjo, Gillberg, & Hagberg,

1999), clinical cases (Cederlund & Gillberg, 2004; Gillberg, 1992; Gillberg, 1991;

Ramberg, Ehlers, Nyden, & Gillberg, 1996), and the development of new diagnostic

instruments based on these research findings (Gillberg, Gillberg, Rastam, & Wentz,

2001; Ehlers, Gillberg, & Wing, 1999). The cumulative result of the Gillberg work

reveals a diagnostic profile which overlaps with the *DSM-IV-TR* (2000) and *ICD-10*

(1993) criteria and then extends it to include a more detailed evaluation of speech and

language functioning as well as gross motor skills. In a direct comparison of

diagnostic specificity, Leekam et al. (2000) applied *ICD-10* (1993) and Gillbergs'

criteria for Asperger's disorder to a group of 200 children and adults who met *ICD-10*

(1993) criteria for autism or pervasive developmental disorder-not otherwise

specified (PDD-NOS). Results indicated that 1% met *ICD-10* (1993) criteria for

Asperger's disorder. By comparison, 45% met the Gillberg criteria. The difference in

diagnostic hit rates for Asperger's disorder was attributed to the detection of language

and gross motor abnormalities. It was noted, however, that a great deal of symptom

overlap between the designated groups remained. A conceptualization of the disorder

based on dimensional characteristics was recommended (Leekam et al., 2000)

Overall, a review of the literature reveals significant variability in the way in

which diagnostic criteria are applied, both in research and clinical settings.

Experimental changes to the diagnostic criteria appear to work towards discerning a

profile that reliably differentiates autism and Asperger's disorder. This process is

consistent with the categorical model used in the construction of the *DSM* and *ICD*,

which seek to create mutually exclusive categories en route to the discovery of structural, physiological, and etiological pathways. The goal is to create treatment protocols for specific disorders based on reliable differences between patient populations. Since extensive research designed to identify categorically distinct definitions between autism and Asperger's disorder does not appear to yield reliable differences at the present time, another approach is needed. Therefore, it is suggested that a more dimensional model may increase clarity regarding differential diagnosis, designation of symptom severity, and treatment planning. Ideally, this model would incorporate descriptions of developmental change in this target population.

Current status of clinical diagnostic process.

Prevalence rates for Asperger's disorder are not presently listed in the *DSM-IV-TR* (2000). However, a wide range of estimates are available in the literature. The variability of these estimates is a result of the inconsistent application of the formal *DSM* criteria for the disorder (Ghaziuddin, Tsai, & Ghaziuddin, 1992). For example, in a population study of all 7-year-old children living in the town of Karlstad, Sweden, Kadesjo, Gillberg, and Haberg (1999) estimated the prevalence of Asperger's disorder to be 5 per 1,000 with a male to female ratio, of 8.5:1. This calculation was based on the definition of Asperger's disorder described by Gillberg (Gillberg, 1991; Gillberg & Gillberg, 1989), which differs from both the *DSM-IV-TR* (2000) and the *ICD-10* (1993). In contrast, in a 10-year review of the epidemiological research on PDD, Tanguay (2000) estimates that the prevalence for autism is 1 per

2,000. He notes that the prevalence rate increases to 1 per 1,000 when atypical autism

and Asperger's disorder are included with autism in the estimate.

The differential diagnosis of Asperger's disorder and autistic disorder is

typically based on the clinician's observation of normal cognitive abilities, the

presence of circumscribed interests, and the parents' retrospective report of normal

language development in the child with Asperger's disorder (Frith, 2004; South,

Orzonoff, & McMahon, 2005). Although Asperger's disorder is considered to be a

part of the autistic spectrum, due to the relatively intact features of intellectual ability

and formal language functioning, the degree of functional impairment associated with

the syndrome is usually considered mild as compared to the disabilities associated

with a diagnosis of autistic disorder (Mayes et al., 2001). However, research designed

to evaluate the validity of the assumption that children with Asperger's disorder can

be reliably differentiated from children with autistic disorder based on cognitive

functioning has been challenged. For example, Ghaziuddin and Mountain-Kimchi

(2004) compared the cognitive profiles of males diagnosed with Asperger's disorder

($N = 22$; $M = 12.4$ years) and males diagnosed with high functioning autism ($N = 12$;

$M = 12.2$ years) using the Wechsler Intelligence Scales. Results indicated that the

group with Asperger's disorder demonstrated significantly higher verbal IQ ($p <$

.001). However, qualitative evaluation of the data revealed that the performance of

each group did not demonstrate a distinctive pattern. Subtest score variability was

high, and there was a substantial degree of overlap between the performance profiles

of the groups. Further, Klin et al. (1995) indicate that the diagnosis of Asperger's

disorder is not incompatible with cognitive functioning in the mentally retarded

range. Thus, the *DSM* criteria regarding cognitive differences between autism and Asperger's disorder is not a feature that, by itself, reliably discriminates between the groups, nor is it a reliable heuristic for assigning level of impairment severity.

In many cases, the ability of the individual child to perform across the contexts of school and family life is seriously overestimated when based on current cognitive functioning and a history of normal early language development (Cederlund & Gillberg, 2004; Frith, 2004; Manjiviona & Prior, 1999; Twachtman-Cullen, 1999). This is likely the result of inadequate assessment of the dimension of social competence. Robertson, Tanguay, L'Ecuyer, Sims, and Waltrip (1999) note that deficits in the ability to communicate effectively with others constitute a significant disability and are found across all categories of PPD. Accordingly, they assert that measurement of social communication performance is a necessary component of an ecologically valid assessment of impairment severity. One major indicator of social communication competence is the ability of the young child to engage in joint attention. Wetherby, Prizant, and Schuler (2000, p. 112) identify four components of joint attention: "orienting and attending to a social partner, coordinating attention between people and objects, sharing affect or emotional states with people, and ultimately being able to draw others' attention to objects or events for the purpose of sharing experiences." They note that children diagnosed with PDD-NOS and/or Asperger's disorder demonstrate relatively better early communication behaviors than children with autistic disorder. Specifically, children with Asperger's disorder are more likely to orient to social affect, alternate their gaze between object and person, and share positive affect. However, children with Asperger's disorder are less likely

to initiate joint attention in order to share experience. Thus, if all four components of joint attention are not within normal limits at an early age, this early indicator should not be dismissed as irrelevant in the presence of age appropriate achievement of cognitive and language milestones. Unfortunately, at the present time, the early developmental milestones which are measured generally fall within normal limits. Therefore, children with Asperger's disorder often receive clinical attention for their symptoms relatively later than children with autism (Miller, 2004).

In a series of studies in Great Britain, Howlin and Asgharian (1999) note that the average age at which parents of children with Asperger's disorder report concern about their child's behavior is 2.5 years, and the average age at which these children are diagnosed with Asperger's disorder is 11 years. Howlin (2003) notes that parents' initial reports of concern typically include the following: general behavior problems (26%), repetitive and stereotyped behaviors/interests (21%), motor difficulties (19%), social abnormalities (19%), and language (12%). By comparison, abnormalities associated with classic autism are usually noted by the age of 18 months and include: language problems (32%), problems or delays in motor development (23.5%), social abnormalities (23.5%), and general behavior difficulties (15%) (Howlin, 2003). The average age at diagnosis for children with autism is 5.5 years (Howlin & Asgharian, 1999). Comparable data is not presently available for the U.S. population.

When children with Asperger's disorder come to the attention of a mental health professional, one major obstacle consistently threatens the determination of a clear diagnostic outcome. Specifically, there is not a "gold standard" for the definition of Asperger's disorder that would provide a source of external validity (Mahoney et

al., 1998). The items which comprise currently available screening instruments and semi structured interview schedules are based on the diagnostic criteria listed in the *DSM-IV-TR* (2000) or *ICD-10* (1993). This is a form of tautological reasoning which may inadvertently serve to limit further clarification of the features of the disorder. Note that although these measures reliably measure the presence or absence of symptoms which describe the disorder, the validity of the construct of Asperger's disorder has not been clearly established as a diagnostic entity that can be reliably distinguished from autistic disorder. It is possible that the large degree of heterogeneity within the category of Asperger's disorder can be accounted for by individual differences; however, the large body of literature dedicated to the investigation of this issue suggests that clinical researchers doubt that this is the case. Both clinical researchers and clinical practitioners would benefit from inter disciplinary collaboration. Thus, thorough assessment of each dimension of Asperger's disorder is strongly recommended, including cross-discipline assessment. This method would result in an individualized, detailed profile for each affected child for each dimension and would not violate the categorical nature of the diagnosis as it is presently defined.

It is possible for the child with symptoms suggestive of Asperger's disorder to be evaluated by clinical professionals in disciplines other than psychology. At the present time, however, it is likely that this same child would receive a different diagnosis, dependent on the professional who performed the evaluation (Bowler & Brook, 1998; Volden, 2004). Specifically, a neuropsychologist may conclude that the child's pattern of performance on a neuropsychological test battery represents a

nonverbal learning disorder (NLD) caused by abnormal development of subcortical

white matter tracts serving the right hemisphere of the brain (J. B. Hale, personal

communication, January 11, 2006; Hale & Fiorello, 2004; Miller, 2004; Rourke,

2000). When evaluated by a speech pathologist, the child's pattern of performance on

tests of language may indicate the presence of semantic-pragmatic language disorder

(SPD) (Adams & Bishop, 1989; Bishop & Adams, 1989; Boucher, 1998; Rapin &

Allen, 1998). Note, however, that Volden's review of the literature (2004) indicates

that most of the tests of pragmatic language currently available demonstrate ceiling

effects for children with strong formal language skills. Therefore, professionals in

speech pathology may only be able to detect cases which are relatively more

impaired.

Evidence in the current clinical literature suggests that the diagnostic profiles

of Asperger's disorder, NLD, and SPD are very similar in quality and result in

comparable social communication deficits. In fact, Klin, Sparrow, Volkmar,

Cicchetti, and Rourke (1995) suggest that these separate disorders may actually

represent a unitary diagnostic entity as seen from different clinical perspectives. For

example, in a case study on differential diagnosis comparing NLD and Asperger's

disorder, Klin (2004) does not assign one diagnosis or the other. Instead, she suggests

that these disorders can co-occur and notes that the neuropsychological profile

associated with NLD can precipitate impairment in social skills functioning

commensurate with Asperger's disorder.

The neuropsychological profile of NLD as described by Rourke (2000) is

indicated by the presence of deficits in visual perception which include a tendency to

focus on discrete parts of the stimulus field rather than the gestalt of the perception. In addition, individuals with NLD do not habituate to novel stimuli as quickly as those who are unimpaired. This distorted perceptual pattern has an adverse effect on social interaction. The child with NLD demonstrates impairment in understanding nonverbal social cues, considering the perspective of the communication partner, and effectively using language beyond its literal meaning. In addition, Klin (2004) notes that over reliance on verbal mediation and the substitution of rote verbal knowledge during conversational exchange may represent a developmental compensatory response to right hemisphere deficits.

Clinical research comparing Asperger's disorder and SPD also reveals overlapping clinical performance profiles. Rapin and Allen (1998) describe SPD as a subtype of developmental language disorder (DLD) that is often found in children with autistic disorder. Individuals who are diagnosed with SPD demonstrate deficits in abstract comprehension and engage in discourse that includes atypical words and phrases that sound scripted. These odd verbal choices may be poorly timed within the context of the conversation, or may be entirely irrelevant to the conversation. In addition, individuals diagnosed with SPD typically speak "at" their listener rather than "with" him or her. Thus, pragmatic language functions are generally impaired. Interestingly, Rapin and Allen (1998) make a distinction between verbal pragmatics and nonverbal pragmatics. They note that some children with a diagnosis of DLD demonstrate intact verbal pragmatics, including appropriate word choice, turn-taking behavior, topic maintenance, initiation and termination, and normal prosody. However, they note that children with a diagnosis of autism demonstrate deficits in

both verbal and nonverbal pragmatics. Nonverbal pragmatic behaviors which are

abnormal in this population include eye gaze, the use of gestures, facial expression,

and body posture, as well as an impaired ability to comprehend these qualities in their

communicative partner. Rapin and Allen (1998) conclude that although SPD is

frequently found in children diagnosed with Asperger's disorder, combining these

diagnoses into one entity is not advised because there is not a complete overlap

between them. Rather, assessment of pragmatic language functioning for individuals

who meet criteria for each diagnostic category is recommended.

Pragmatic language: Theoretical definition.

Three fundamental elements of language that are studied by experts in the

field of linguistics include: (a) syntax: the knowledge and use of grammar; (b)

semantics: the knowledge and use of words, phrases, and sentences; and (c)

pragmatics: the appropriate application of language in the context of social interaction

(Carrow-Woolfolk, 1999; Morris, 1938; Ninio & Snow, 1996). Formal linguists

maintain a distinction between each of these speech forms and investigate them

within the domain of linguistic study. In contrast, functional linguists focus primarily

on the pragmatic aspects of language. The research frame of the functional linguist

incorporates linguistic forms (e.g., syntax and semantics), cognitive dimensions such

as theory of mind (ToM) (Baron-Cohen, 1990; Frith, Happe, & Siddons, 1994;

Shamay-Tsoory, Tomer, Yaniv, & Aharon-Peretz, 2002) and the individual's

knowledge of social rules, social context, and interpersonal relationship factors

(Bates, 1976; Ninio & Snow, 1996). This broad conceptualization is informed by

developmental research that describes normal language development as an integrated process involving changes in cognitive functioning and concomitant changes in verbal and nonverbal communication with others (Tager-Flusberg, 1989). Thus, functional grammar theorists propose that there is a great deal of overlap between the construct of pragmatic language and social communication (Prutting, 1982).

Bates (1976) formally introduced the concept of pragmatic language as a functional construct and delineated three major aspects of pragmatic language use. First, the speaker needs to communicate his intention, usually in the service of achieving a specific goal (e.g., to make a request for an object). Second, the speaker must consider the perspective and knowledge of the listener, including the social relationship between himself and the listener, as well as the social context. Third, effective pragmatic speech requires the ability of both members of a conversation to attend to the topic in a collaborative manner according to the rules of quantity, quality, relevance, and clarity (Grice, 1975). Thus, the meaning of speech forms emerges from the exchange of utterances at the moment when language is used in a particular context between individuals according to sociocultural rules (Prutting, 1982; Twachtman-Cullen, 2000). In addition to these fundamental aspects of pragmatic language, Couper-Kuhlen (2001) emphasizes the speech qualities of intonation and prosody as factors that facilitate clear communication. Specifically, Couper-Kuhlen (2001) proposes that intonation and prosody act as contextualization cues which activate interpretative schemas in the listener and therefore facilitate interpretation of meaning. These pragmatic aspects of speech, combined with interpretation of accompanying gestures and facial expression, also assist the speaker

and listener in the appropriate timing of turn-taking behavior. Thus, the ability of an individual to effectively communicate with others according to the parameters of pragmatic language is considered an index of social competence. It can therefore be measured in the form of discourse analysis (Dore, 1979; Schiffrin, Tannen & Hamilton, 2001), standardized psychometric tests of spoken language (Carrow-Woolfolk, 1999), or in the form of social skills functioning (Gresham & Elliott, 1990).

Two examples of pragmatic language from a functional linguist perspective can begin to illustrate the prosaic and ubiquitous nature of the multiple dimensions of the meaning of language. First, Grundy (2000) notes that when the interpretation of words, phrases, and sentences commonly used in conversational speech is limited to literal interpretation, the meaning is often ambiguous. In order to be effective, communication must include the ability to relay and interpret the intentions of others through the use of context, intonation, and inference. He provides the example, "I'm here now." On a literal level, the speaker is informing the listener of his location. However, the speaker's intonation, his relationship to the listener, and the social context within which this statement is uttered will significantly affect its meaning. Grundy (2000) identifies this specific example as a deictic use of language. Deixis denotes the aspect of language which identifies a referent (e.g., the speaker) and relates this referent to the shared contextual knowledge between speaker and listener. In this example, "I'm here now," if said to one's spouse who has been kept waiting at a restaurant for a special occasion, would serve not only as an announcement of one's presence but also serve the function of communicating an apology, as in, "I'm sorry

I'm late. I know I promised I'd be here at 7:00 o'clock, but I got tied up at work and missed the train. I'm here now."

A second example further illustrates the importance of the speaker's understanding of social rules and social context in achieving effective communication. Ninio and Snow (1996) note that the sentence, "Your left sock is inside-out," is a grammatically correct and semantically valid sentence. However, if uttered aloud by a college student to a guest professor during a didactic training exercise, the comment would be considered socially inappropriate, irrelevant, and evidence of inadequate self-regulation in the student. His comment would be considered a "misfire" (Grundy, 2000), and he would be ignored or ostracized, even if his observation were valid. His rude behavior would represent a failure in social competence.

Pragmatic language and social cognition in normal development.

In normal development, social knowledge is acquired through interaction with others (Vygotsky, 1978). Greenspan and Shanker (2004) note that affect facilitates consolidation of social knowledge through the integration of sensory input with socially shared meanings of others' actions and emotions. For example, a young child perceives the smiling facial expression of his mother, mirrors her positive feelings, and feels safe in his continued activity within that social context. When language emerges, the social interaction process becomes both more complex and challenging to measure. However, the onset of language also makes cognition, behavior, and affect more accessible to psychometric assessment. For example, the quality of

language use has been found to be a predictor of social behavior. Specifically, Lord

and Paul (1997) note that the spontaneous, communicative use of sentences with three

or more words prior to age 5 is a good predictor of cognitive functioning, language

development, and social adaptation during adolescence. Research examining the

onset of pragmatic language functioning indicates that the pragmatic aspects of

language develop at approximately age 4 or 5 (Prutting & Kirchner, 1987). For

example, Ziatas, Durkin, and Pratt (1998; 2003) have observed evidence of the ability

to hypothesize what one's conversational partner is thinking during a social exchange,

formally known as Theory of Mind (ToM), can be measured in children beginning at

this age.

In general, formal and pragmatic language skills develop rapidly throughout

the primary and middle-school years, and this is reflected in comparable growth in

social competence. Therefore, the expression of pragmatic language varies with age,

as well as cognitive ability, social context, and experience (Prutting & Kirtchner,

1987). Note, however, that pragmatic language performance and social competence

do not necessarily correlate with any one of these variables alone. For example,

Bearison and Dorval (2002) recruited an urban sample of 60 children from grades

one, three, and five ($N = 180$) and examined the ability of same-aged, same-gender

dyads to build a board game out of a box of simple materials. The researchers focused

on the pragmatic aspects of the interaction between dyad members as they negotiated

the rules of the game they constructed together. As expected, as age increased, the

number of conditional rules and degree of complexity and abstraction of those rules

also increased. Interestingly, when the authors factored out the effects of age and

evaluated the ability of each member of the dyad to coordinate their own perspective with that of their partner, the quality of the interaction accounted for a significant degree of the variance when measuring level of game complexity. That is, in order to build a game with a set of rules, the members of the dyad needed to negotiate what the rules would be and how they would be implemented. The ability of the pair to create a cohesive set of rules was dependent upon the ability of the members of the dyad to apply the pragmatic aspects of language effectively during the building process. This is one aspect of what Bearison and Dorval describe as "collaborative cognition" and represents one example of the way in which effective use of pragmatic language facilitates shared understanding and coordinated action between people.

When pragmatic language develops normally, the child learns to make appropriate requests at the appropriate time because he is able to understand social rules and expectations. He learns to consider the perspective of his listener when he speaks and is also able to reciprocate by maintaining the conversational topic. Empathic understanding increases with age and experience (Shamay-Tsoory et al., 2002), and emotional bonds are facilitated through mutual understanding. During the high school years, language skills are refined and elaborated. This can be observed in the ability of adolescents to manipulate the abstract and inferential aspects of language in order to convey meaning at a more complex level. This use of language is described by Carrow-Woolfolk (1999) as "supralinguistic semantics." Thus, social reciprocity during adolescence includes both the exchange of information and the understanding and communication of affect at a sophisticated level of dynamic complexity (Shanker, 2004). In this way, individuals are incorporated into a network

of relationships through which social reality is co-created in an ongoing basis

according to shared beliefs based on shared experiences, both verbally articulated and

inferred (Heller, 2001). The overall effect of the normal development of pragmatic

language skills is reflected in the individual's increasing ability to communicate

effectively with peers and adults across contexts and to develop reciprocal

relationships.

Rationale: Asperger's Disorder, Pragmatic Language, Social Skills Functioning

As noted above, the symptoms of Asperger's disorder as defined by the *DSM-

IV-TR* (2000) include significant impairment in social interaction, narrowly defined

and abnormally intense interests and/or stereotypic patterns of behavior, and the

presence of normal language and cognitive development prior to 3 years of age.

Weaknesses in the discriminability of Asperger's disorder from autistic disorder as

well as its considerable overlap with other syndromes such as NLD and SPD suggest

the need for alternative conceptualizations of the disorder. Shanker (2004, p. 691)

asserts that clinical researchers have responded to this issue by shifting their focus to

a more detailed investigation of social impairment in children with autistic spectrum

disorders because these deficits "cut[s] across cognitive and linguistic abilities seen in

autistic spectrum disorders and persist[s] into adulthood."

The present review of the literature supports Shanker's (2004) assertion

regarding the diagnosis of Asperger's disorder. In children with Asperger's disorder,

there appear to be consistent findings suggesting the presence of a fundamental

impairment in receptive and expressive abilities associated with social interaction.

The symptoms associated with these deficits include nonverbal aspects of social

communication, such as abnormal gaze, use of gestures, and prosody. The child with

Asperger's Disorder is able to use language to meet object needs; however, despite

the apparent desire to interact with others, effectiveness in establishing friendships is

consistently impaired. This general deficit in social relatedness is hypothesized to be

related to impairment in pragmatic language functioning. For example, in addition to

deficits in nonverbal social communication skills, the child with Asperger's disorder

is much less effective in taking another's perspective (ToM), including understanding

and expressing affect and intention. The ability to maintain a conversational topic is

also impaired as evidenced by the absence of turn-taking behavior and the tendency

to respond to others with extended monologues regarding his own special interest

area. This pattern of behavior represents impairment in social skills functioning and is

present across social contexts. Further, these impairments appear to be independent of

the child's level of cognitive functioning or the presence of normal language

development prior to age 3.

Research Question

The present study will explore whether a predictable relationship exists between

pragmatic language functioning and social skills functioning in children diagnosed

with Asperger's disorder. These variables will be measured using standardized

assessment instruments, thus providing ease in application and interpretation in both

clinical and school settings.

Specific Hypotheses

1. Group mean performance measured by the Lexical-Semantic Index and the Syntactic Index scores of the CASL will fall in the average to above average range.

    Rationale: These index scores represent formal language functioning. Research indicates that formal language functioning is an area of relative strength in children with Asperger's disorder.

2. Group mean performance as measured by the Pragmatic Index and Supralinguistic Index scores of the CASL will fall in the below average range.

    Rationale: These index scores represent pragmatic language functioning. Research indicates that pragmatic language functioning is an area of relative weakness in children with Asperger's disorder.

3. The composite test score group mean on the CASL is predicted to fall in the average range.

    Rationale: Research indicates that children with Asperger's disorder demonstrate strong formal language skills and relatively weak pragmatic language skills. This would result in a composite score that would average out relative strengths and weaknesses.

4. Intra-individual comparisons between index scores representing formal language and index scores representing pragmatic language will be examined. Statistically significant differences between index score pairs have been calculated by the test author (Carrow-Woolfolk, 1999) and are

provided in the manual of norms. It is predicted that the pattern of

statistically significant test differences will reflect a relative strength in

formal language functioning as compared to pragmatic language

functioning. Formal language functioning will be represented by Lexical-

Semantic and Syntactic tests and pragmatic language functioning will be

represented by Supralinguistic tests and the Pragmatic Language test.

Rationale: The existence of normative data that mitigates alpha error across

multiple comparisons facilitates comparison of participants' performance

on tests measuring formal and pragmatic language abilities.

5. The Social Skill score of the SSRS, as reported by the parent/guardian, will

be below average as compared to the standardized norms provided in the

SSRS manual.

Rationale: The literature indicates that children with Asperger's disorder

demonstrate significant difficulty in initiating and maintaining conversation

with others due to abnormal gaze behavior, impairment in taking the

perspective of others (ToM), and a pronounced tendency to control the

interaction through lecturing "at" the listener about their own circumscribed

interests. This pattern of interaction is likely to cause significant impairment

in the normal development of interpersonal relationships. It is proposed that

the resulting social skill deficits can be observed and measured by the

parent/guardian using the SSRS.

6. The Problem Behavior score of the SSRS, as reported by the

parent/guardian, will be above average as compared to standardized norms

provided in the SSRS manual.

Rationale: The literature indicates that children with Asperger's disorder seek interaction with others. It is proposed that the impaired ability of children with Asperger's disorder to effectively communicate with others and to establish age appropriate relationships with others will result in frustration expressed as behavior problems. It is hypothesized that these problem behaviors can be observed and measured by the child's parent/guardian using the SSRS.

7. The Social Skill score of the SSRS, as reported by the teacher who spends the highest number of classroom hours with the child, will be below average as compared to standardized norms provided in the SSRS manual.

Rationale: As noted above, children with Asperger's disorder are likely to demonstrate significant impairment in the normal development of interpersonal relationships. It is proposed that the resulting social skill deficits can be observed and measured by the child's classroom teacher using the SSRS.

8. The Problem Behavior score of the SSRS, as reported by the teacher who spends the highest number of classroom hours with the child will be above average as compared to standardized norms provided in the SSRS manual.

Rationale: As noted above, it is proposed that the interpersonal difficulties experienced by children with Asperger's disorder are likely to elicit problem behavior. It is hypothesized that this problem behavior can be observed and measured by the child's classroom teacher using the SSRS.

9. A statistical comparison of the Social Skills scores provided by the parent/guardian and teacher will yield a significantly positive relationship as measured by a Pearson product-moment correlation (two-tailed). Externalizing and Internalizing scores of the Problem Behavior score will be calculated.

Rationale: The literature indicates that children with Asperger's disorder demonstrate social skills deficits across settings. It is hypothesized that behavior ratings across settings by different raters will be highly correlated.

10. A two-tailed Pearson product-moment correlation will be calculated comparing the standardized IQ Composite score (KABIT-2) with the standardized Social Skill score (parent/guardian) on the SSRS. The correlation will not be statistically significant.

Rationale: The literature indicates that when a child with Asperger's disorder is assigned a level of severity rating based on his measured level of cognitive functioning, his ability to effectively compensate for his social deficits is usually underestimated. Therefore, it is hypothesized that level of cognitive functioning is not an adequate indicator of level of social skill functioning in children with Asperger's disorder.

11. A one-tailed Pearson product-moment correlation will be calculated comparing the standard score of the Pragmatic Language subtest of the CASL and the standardized Social Skill score (parent/guardian) of the SSRS. It is hypothesized that as the level of Pragmatic Language subtest score decreases, theSocial Skill score will also decrease. This relationship

will be significant at the $p < .05$ level.

Rationale: The literature clearly indicates that children with Asperger's

disorder demonstrate deficits in pragmatic language functioning.

Therefore, it is hypothesized that a child's current level of pragmatic

language functioning is likely to be strongly related to his current level of

social skills functioning.

Chapter 2

Method

Participants

Sixteen male children between the ages of 6 and 14 ($M = 10$) with a diagnosis

of Asperger's disorder and one parent or guardian of each child volunteered to

participate. Diagnostic status was confirmed by the parent or guardian's report of a

current diagnosis of Asperger's disorder by a physician (psychiatrist, $n = 4$;

pediatrician, $n = 1$; neurologist $n = 2$); psychologist ($n = 7$) or developmental

specialist ($n = 2$). In addition, a 20-minute interview with the parent or guardian was

conducted by the researcher at the time of the testing using the Asperger Syndrome

Diagnostic Interview (ASDI) (Gillberg, Gillberg, Rastam, & Wentz, 2001). This

instrument is inclusive of the *DSM-IV-TR* (APA, 2000) diagnostic criteria for

Asperger's disorder and, in addition, provides more detailed qualitative information

about language development and current language functioning. Further, a symptom

checklist, the Krug Asperger Disorder Index (KADI) (Krug & Arik, 2003), was also

completed by the child's teacher (response rate = 50%). All participants met

diagnostic criteria for Asperger's disorder using the parent report and the ASDI. Of

the eight symptom checklists returned by teachers, the estimated probability of the

presence of Asperger's disorder was in the extremely low ($n = 7$) to low ($n = 1$)

range. No subjects were excluded based on KADI results.

The current level of cognitive functioning of child participants was measured

using the Kaufman Brief Intelligence Test, Second Edition (KBIT-2*)* (Kaufman &

Kaufman, 2004). In order to preclude the potentially confounding effect of significant cognitive deficits on the study results, inclusion in the study required participants to obtain an IQ composite score of 85 or higher. All 16 prospective participants received the complete protocol. Thirteen of them met the KBIT-2 inclusion criteria. Results from the participants who did not meet these criteria were excluded from the study.

Therefore, data from 13 participants ranging in age from 6 to 14 were included in the study (mean age = 9.76; mode = 9). All participants met *DSM-IV-TR* (APA, 2000) diagnostic criteria for Asperger's disorder and demonstrated at least an average level of cognitive functioning as measured by the KBIT-2 (Kaufman & Kaufman, 2004).

Recruitment

Advertisement of the study was implemented in two ways. First, a description of the study and informational fliers (Appendix A) were mailed to a total of approximately 150 professionals in the Philadelphia area and its adjacent suburbs. Professions included pediatricians, family practitioners, child psychologists, and school psychologists. Mailing addresses were obtained using the Internet search engine Google. In addition, direct contact was made with the local coordinator of ASCEND, a parent support group for children with Asperger's disorder. The coordinator posted advertising materials on the ASCEND website. All advertising materials were consistent and described the project as "an investigation of speech patterns and social skills behavior in children diagnosed with Asperger's Disorder." It noted the location of the assessment (Philadelphia College of Osteopathic Medicine

[PCOM]), the estimated amount of time needed for assessment (2 to 3 hours), and the general nature of the assessment tools. Parents who responded to recruitment fliers left a phone message for the researcher, who then returned the call and scheduled an appointment for testing. Participants were consistently apprised that the project was approved and monitored by the Institutional Review Board (IRB) at PCOM. Details associated with confidential management of data and the right of every subject to withdraw from participation at any time, without penalty, were described when the testing appointment was scheduled and reviewed at the time of testing.

Tabulation of referral sources for participants included in the study indicated that 38% of the participants learned about the study through the ASCEND website, 30% were referred by a school teacher specializing in the field of Asperger's disorder, and 30% were referred by a pediatrician, psychologist, or psychiatrist.

Interview Materials

Demographic data form.

The demographic data form (Appendix B) was completed by the researcher during an interview with the parent or guardian of the child participant. It yielded information about the age, grade, and gender of the child. Details about the educational background of the child, including current grade level, as well as a history of participation in either a special education or gifted education program, were noted. Specific information related to the diagnosis of Asperger's disorder and current treatment regimen was also collected. Information regarding the presence of autism

and/or Asperger's disorder in the biological relatives of the child was provided by the

parent or guardian.

Asperger Syndrome Diagnostic Interview (ASDI)

The ASDI (Gillberg, Gillberg, Rastam, & Wentz, 2001) is a 20-item interview

schedule designed to facilitate the diagnosis of Asperger's disorder (Appendix C). It

covers the following six areas of functioning: reciprocal social interaction; narrow

interest patterns; imposition of routines, rituals, and interests; speech and language

peculiarities; nonverbal communication problems; and motor clumsiness. These

symptoms are inclusive of all of the symptoms of Asperger's disorder as listed in the

DSM-IV-TR (2000); however, the element of language is addressed in greater detail in

the Gillberg system and does not require "normal language development prior to age

3" for diagnosis of Asperger's disorder. The content of the ASDI is based on

diagnostic criteria as described by Asperger (1944/1991) and researched by Gillberg

et al. (2001). Kappa values for interrater and intrarater reliability are .91 and .92,

respectively. These values are based on a small sample size ($n = 17$). Validity data are

currently unavailable. The caregiver of the child participant was interviewed

regarding each of these areas of functioning in order to corroborate the diagnosis of

Asperger's disorder in the child participant.

Cognitive and Language Testing Materials

Kaufman Brief Intelligence Test, Second Edition (KBIT-2.)

The KBIT-2 (Kaufman & Kaufman, 2004) is a measure of cognitive

functioning for individuals between the ages of 4 and 90. It provides three standard

scores: verbal score, nonverbal score, and IQ composite score. It is an individually

administered test that requires approximately 20 minutes to complete. The KBIT-2 is

intended to be used as a screening instrument and was implemented in the current

study in order to ensure that the IQ Composite of the child participant was > 85.

The test manual for the KBIT-2 (Kaufman & Kaufman, 2004) provides two

measures of reliability: internal consistency and test-retest reliability. Internal

consistency was calculated using the split half method. Values provided for the 4 to

18 age range indicate the following average reliability coefficients: verbal score =

.90; nonverbal score = .86; and IQ composite = .92. Average test-retest reliability

coefficients for this age range are: verbal score = .91; nonverbal score = .83; and IQ

composite = .90. Average time interval between test and retest was reported to be 4

weeks.

Validity measures indicate that the KBIT-2 (Kaufman & Kaufman, 2004) is

an adequate screening measure for cognitive functioning. Values are listed as

correlations between KBIT-2 scores and Wechsler Intelligence Scale for Children,

Fourth Edition (WISC-IV) (Wechsler, 2003) scores in the 6 to 16 age range.

Specifically, the correlation between the Verbal score of the KBIT-2 and the Verbal

Comprehension Index of the WISC-IV is .79. The correlation between the nonverbal

score of the KBIT-2 and the Perceptual Reasoning Index of the WISC-IV is .56.

Finally, the correlation of the IQ composite of the KBIT-2 with the WISC-IV Full

Scale IQ is .77.

Comprehensive Assessment of Spoken Language (CASL).

The CASL (Carrow-Woolfolk, 1999) is a standardized measure of oral language. It is designed for children between the ages of 3 and 21 and provides detailed assessment of the following areas of spoken language: lexical, syntactic, supralinguistic, and pragmatic. A core composite score is also computed. Norms for the CASL are based on national U.S. Census data, and incorporate the following factors: gender, race-ethnicity, region, and mother's education level. The CASL was administered to child participants in order to measure formal and pragmatic language functioning using a standardized psychometric instrument.

Test-retest reliability was evaluated for each of three age ranges. The mean amount of time elapsed between test administrations is reported to be 6 weeks (Carrow-Woolfolk, 1999). Test-retest reliability for ages 5 to 6 years, 11 months, ranges from .77 to .85 for core and supplemental subtests. Test-retest reliability for the core composite in this age group is .92. Test-retest reliability for ages 8 to 10 years,11 months, ranges from .74 to .95 for core and supplemental subtests. Test-retest reliability for the core composite for this age group is .93. Reliability measures for Index scores range from .88 to .96. Test-retest reliability for ages 14 to 16 years, 11 months, ranges from .65 to .95 for core and supplemental subtests. Test-retest reliability for the core composite this age group is .93. Reliability measures for Index scores ranges from .92 to .95.

Stutman (2003) notes that "content validity, construct validity, and criterion related validity are all well-supported." Item content is based on both theoretical constructs and applied research in the field of developmental language development.

Items are designed to minimize demands on working memory and do not require the

examinee to read the item question (Carrow-Woolfolk, 1999). This design permits a

greater emphasis on the assessment of oral language functioning.

The construct validity of the CASL (Carrow-Woolfolk, 1999) incorporates

three variables: (a) normal developmental changes in language functioning over time,

(b) the degree of intercorrelation between subtests, and (c) the factor structure of

language constructs for each age range. Form I assesses ages 3 to 6. Form II assesses

ages 7 to 21. Within each form, administration of specific core and supplemental

subtests clusters are indicated for each age range. The factor structure for each age

range of the CASL is derived from three sources: (a) factor analysis of the normative

data, (b) the Integrative Language Theory of Carrow-Woolfolk (1988), and (c) input

from structural equation modeling techniques.

Criterion related validity for the CASL (Carrow-Woolfolk, 1999) is

demonstrated by correlation of CASL norms with the Test for Auditory

Comprehension of Language-Revised (TACL-R) (Carrow-Woolfolk, 1985), the

Listening Comprehension (LC) and Oral Expression (OE) and Oral Composite (OC)

Scales of the Oral and Written Language Scales (OWLS) (Carrow-Woolfolk, 1995),

the Peabody Picture Vocabulary Test, Third Edition (PPVT-III) (Dunn & Dunn,

1997), the Expressive Vocabulary Test (EVT) (Williams, 1997), and the Kaufman

Brief Intelligence Test (K-BIT) (Kaufman & Kaufman, 1990). See Table 1.

Table 1

Criterion Validity Correlations Comparing CASL and Standardized Language Tests

Test	N	Age Range	Coefficient Alpha Range
TACL-R	35	5-0--5-11	.52 - .76
OWLS	50		
LC		7.0--10.11	.34 - .66
OE		7.0--10.11	.39 - .89
OC		7-0--10-11	.45 - .87
PPVT-III	45	7-0--10-11	.45 - .85
EVT	45	7-0--10-11	.49 - .80
K-BIT	52		
IQ Composite		14-0--17-9	.48 - .81

Note: [a]Carrow-Woolfolk, E. (1999). Reliability and validity. In E. Carrow-Woolfolk, *Comprehensive Assessment of Spoken Language Manual* (pp. 130-137). Circle Pines, MN: American Guidance Service, Inc.

Behavioral Questionnaire Materials

   Developmental and Medical History Form.

   The Developmental and Medical History Form (Barkley, 1997) was

completed by the parent or guardian of each child participant. It provides information

about the conditions related to the pregnancy and delivery of the child under study.

The caregiver also responded to questions about the health and temperament of the

child as an infant. Early developmental milestones were surveyed and a general

review of the child's health history was completed.

   Krug Asperger's Disorder Inventory (KADI).

   The KADI (Krug & Arick, 2003) is a standardized behavioral

assessment measure that provides diagnostic evidence of the presence of symptoms

associated with Asperger's disorder. It is also used to facilitate the development of

Individualized Educational Plans (IEP) for children diagnosed with the disorder. This

measure was included in the current research study in order to corroborate the

diagnosis of Asperger's disorder. It was completed by the teacher with whom the

child spends the most instructional hours per week and was mailed back to the

researcher (response rate = 50%).

   In a review of five third-party rating scales for Asperger's disorder that are

currently available, Campbell (2005) describes the KADI as the instrument with the

strongest psychometric properties. The KADI Manual (Krug & Arick, 2003) indicates

that internal consistency for this instrument is .93. Test-retest reliability is .98 with a

mean time interval of 2 weeks. Both values are derived from calculations using a

sample of respondents with a diagnosis of Asperger's disorder.

Krug and Arick (2003) applied a three-stage approach to the selection of test

items in order to ensure a broad sampling of behaviors representative of Asperger's

disorder. This process created a measure with strong content and construct validity

that incorporates both theoretical knowledge and empirical evidence about the

disorder. In stage one, a set of behavioral descriptors were derived from several

sources including published behavioral checklists designed to measure autistic

behavior and seminal writings describing Asperger's disorder (e.g., Wing, 1981; Klin

& Volkmar, 1995). Next, this set of descriptors was submitted to a panel of experts in

the field of child development and autism. Feedback provided by the expert panel

guided the refinement of the list to a total of 106 items. In the third stage of the

process, these 106 items were provided to a group of clinicians who rated each item

according to how well that item accurately described an individual they knew with a

diagnosis of Asperger's disorder. Finally, the list of descriptors was ranked and

analyzed using the chi-square statistic. Thirty-two items were found to discriminate

between individuals with normal development, Asperger's disorder, and high

functioning autism.

Analysis of the ability of item groups to discriminate between these three

groups indicated a need for a two-step process in completion of the rating form.

Specifically, step one of the rating form requires the rater to respond to items in

Column A. The items in Column A have been selected because they reliably

discriminate between children with Asperger's disorder and typically developing

children, with a specificity index of .98. If the Column A total is greater than or equal to 17, the rater then completes the items in Column B and a standard score is calculated. The sensitivity index for the standard score is .78, indicating that the measure can be used to reliably discriminate children with Asperger's disorder from children with high functioning autism. Krug and Arick (2003) indicate that the items which comprise the standard score of the KADI are inclusive of the *DSM-IV* (APA, 1994) criteria for the diagnosis of Asperger's disorder.

Social Skills Rating System (SSRS).

The SSRS (Gresham & Elliott, 1990) is a behavioral assessment measure that provides a standardized description of social interaction in school-aged children from preschool through 12th grade. It is a screening instrument with alternate forms for student, parent, and teacher. There are two forms of the student self-report based on grade level: grades 3 through 6, and grades 7 through 12. There are three forms each for parents and teachers, also based on grade level: preschool, grades K through 6, and grades 7 through 12. The SSRS measure is estimated to take 15 to 20 minutes to complete and was completed by all parent participants in the study, and all child participants in grade 3 or higher. Teachers with whom the child spends the most number of hours in the classroom were asked to complete the form and mail it back to the researcher (response rate = 50%). This measure was implemented in order to provide a standardized measure of the child's current level of social skills functioning as perceived by self and significant others.

Reliability measures for internal consistency yielded the following results: Social Skills scale (for all forms) .83 to .94; Problem Behavior scale (for parent and

teacher forms) .73-.88; Academic Competence scale (teacher form only) .95

(Gresham & Elliott, 1990). Test retest reliability coefficients over a 4-week interval

for the Social Skills Subscale were described in ranges according to source: .75 to .88

for the teacher form; .77 to .84 for the parent form; and .52 to .66 for the student self-

report form. Similarly, alpha coefficients for the Problem Behaviors subscale were:

.76 to .83 for teacher the form and .48 to .72 for the parent form.

Although each form of the SSRS (Gresham & Elliott, 1990) measures the

constructs of social skills and problem behaviors, the perspective of each rater is

expected to be different. For example, the parent and the teacher of the child who is

being evaluated are each responding to the child's behavior as observed in a different

social context. The parent responds according to his/her observation of the child at

home and the teacher responds according to his/her observation of the child in the

school setting. Thus, interrater reliability is not expected to be high and reflects "less

than a 50% overlap between the forms" (Gresham & Elliott, 1990, p. 112). However,

although correlation coefficients examining the standardization sample of the

elementary level (grades K through 6) ranged from .03 to .41, convergent validity for

14 of 16 comparisons between parent, teacher, and student respondents were

statistically significant. Similarly, convergent validity comparisons for the

standardization sample of the secondary level (grades 7 through 12) indicate a range

from .10 to .30 and the same number of statistically significant comparisons.

Gresham and Elliott (1990) emphasize that the cited correlations for the Social Skills

scale are likely to appear spuriously low because the forms for parent, teacher, and

student do not include the same subscales.

Gresham and Elliott (1990) cite extensive empirical research as evidence for criterion-related and construct validity. The correlation of SSRS results with other similar behavior measures including the Social Behavior Assessment (Stephens, 1978), the Harter Teacher Rating Scale (Harter, 1978), the Piers-Harris Children's Self-Concept Scale (Piers, 1984), and several forms of the Child Behavior Checklist, (Achenbach & Edelbrock, 1983, 1986, 1987) further illustrate the strong conceptual foundation of SSRS.

Procedure

The testing sessions took place at the Center for Brief Therapy, Suite 530, Rowland Hall, PCOM, 4190 City Avenue, Philadelphia, PA 19131. Each participant attended one testing session. Sessions were scheduled during the Center's office hours and at the convenience of the parent or guardian and child participant. The parent or guardian remained at the location of the testing session during the entire 2 to 3 hour evaluation.

The session for each participant began with a review of the informed consent document (Appendix D). Release of Information forms were also reviewed and completed. All parent or guardian participants completed a Release of Information form to permit the researcher to speak with the child participant's teacher for the purpose of assisting the teacher to complete his/her own form packet (Appendix E), and, if the parent desired to send the teacher a written summary of the test results (Appendix F). A second Release of Information form was completed if the parent or guardian wanted the researcher to provide a written summary of the test results to the

child participant's treating physician (Appendix G). The parent or guardian and child

were given an opportunity to ask questions, the documents were signed, and the

parent or guardian received a photocopy of each document. All parents or guardians

were sent a copy of the written summary of the test results following the testing

session. It was explained to the parent or guardian that these results were obtained as

part of a research study and not a comprehensive clinical evaluation. Further, if

requested, a referral to a licensed clinical psychologist for interpretation of test results

would be provided.

Next, the parent or guardian was interviewed by the researcher. The interview

process focused on demographics related to the diagnosis and treatment of Asperger's

disorder, including completion of a brief demographics form and the ASDI (Gillberg,

Gillberg, Rastam, & Wentz, 2001). It is estimated that the informed consent and

interview process took approximately 30 minutes. At the completion of the interview

process, the parent was instructed how to complete a brief developmental history of

the child and the parent form of SSRS (Gresham & Elliott, 1990). The parent

completed these forms in an adjacent room while the researcher tested the child.

Half of the child participants were tested using the following order of test

presentation: KBIT-2 (Kaufman & Kaufman, 2004), CASL (Carrow-Woolfolk,

1999), and if the child was in grade 3 or higher, the SSRS self-report form (Gresham

& Elliott, 1990). In order to control for fatigue, the other half of the children were

tested using a counterbalanced order of test presentation: CASL, KBIT-2, and if the

child was in grade 3 or higher, the SSRS self-report form. Each of these measures

was administered each in its entirety using standardized testing procedures as described in each testing manual.

At the completion of the testing session, the parent or guardian and child participant were offered another opportunity to ask questions. The parent or guardian was then given a parking voucher worth $5 and a check in the amount of $20 in payment for participation in the study. Next, the researcher provided the parent or guardian with a stamped envelope addressed to the researcher at the CBT at PCOM. The envelope contained a cover letter with instructions for the child's teacher and one copy each of the SSRS teacher form, (Gresham & Elliott, 1990), and the KADI (Krug & Arick, 2003). The parent or guardian delivered this form to the teacher who spends the most amount of weekly classroom time with the child and requested that the teacher complete the forms and mail them back to the researcher. Upon receipt of the completed forms, the teacher was sent a check in the amount of $10 in payment for his/her time.

Data Management

Data gathered during the study is kept in a locked file cabinet. All subjects were assigned a unique code. All research documents and test forms except the informed consent were only marked with this code as an identifier. Informed consent forms were maintained in one file, separate from test results, in the locked file cabinet. A master list containing the names and codes of each participant was maintained by the principal investigator, Beverly White, Psy.D., and the student

researcher, Donna L. Toro, M.S. This list was stored on each investigator's computer in a password-protected file.

Behavior rating forms were delivered to the teacher by the parent, and completed forms were returned to the student researcher at the CBT in a self-addressed stamped envelope marked "CONFIDENTIAL." Upon receipt, the subject code was applied to the form, the name was removed, and the form was placed in the locked file.

Chapter 3

Results

Demographics of the Study Sample

Demographic information was gathered from the parent or guardian of the child participant using the Developmental and Medical History Form (Barkley, 1997). Further information about the history of the child participant's psychological, educational, and medical history was gathered during a brief, semi-structured interview conducted by the student researcher using the demographic data form (Appendix B).

All subjects in the sample were male, ranging in age from 6 to 14 ($M = 10$). Average age at the time of diagnosis of Asperger's disorder ($n = 12$) was 7 years. As noted above, all subjects met *DSM-IV-TR* (APA, 2000) criteria for Asperger's disorder. Fifteen percent of the children were reported to have at least one biological relative with a diagnosis of Asperger's disorder and a separate 15% reported having a relative with a diagnosis of autism.

Psychological disorders other than Asperger's disorder were reported to be present in approximately half of the sample. Diagnoses included: attention deficit hyperactivity disorder (ADHD) ($n = 4$), anxiety disorder ($n = 1$), and oppositional defiant disorder ($n = 2$). Forty-six percent of the subjects were described as presently engaged in psychotherapy ($n = 6$). Of this group, 67% were also under the care of a psychiatrist and taking medications on a daily basis, including: Zoloft, Abilify, and

Strattera. Three subjects were reported to be working exclusively with a psychiatrist and were taking one of the following medications daily: Strattera and Adderall.

In the context of the school setting, educational assessment and implementation of instructional accommodations were frequently reported for the children included in the study sample. Specifically, 83% of the child participants had previously completed formal psychological testing performed by a school psychologist. Approximately half of these children consistently received special education services. In addition, one child was reported to participate in both special education and gifted education programs. Further, 15% of the child participants were receiving wrap-around services ($n = 2$). Both of these children were in the first grade.

Data describing gestational and delivery variables for child participants indicated that 67% of the children ($n = 8$) were full term (38 to 40 weeks), with an average birth weight of 8 lbs. 6 oz. Average age of mothers at the time of the child's birth was 30. Two of these full-term births were induced, and each of these children had nuchal cords. One of these was also cyanotic and received oxygen at birth, but did not require an extended hospital stay following delivery. Two other children in the study who were born full-term were delivered by cesarean section. Thirty-three percent of the children ($n = 4$) were born preterm (32 to 37 weeks), with an average birth weight of 5 lbs. 15 oz. Average age of mothers for this group was 30. One of these children was delivered by cesarean section due to toxic preclampsia at 32 weeks gestation. The mother of this child reported that he was cyanotic at birth and required oxygen. Another preterm child, delivered at 33 weeks gestation with the aid of

forceps, was reportedly injured at birth and required an extended hospital stay

following delivery.

Retrospective data describing developmental milestones indicated that

achievement of gross motor skills was within normal limits. Specifically, children in

the study ($n = 12$) were reported to sit up at an average age of 6.5 months, to crawl at

an average age of 7.6 months, and to walk at an average age of 15.25 months.

Interestingly, at the time of the study, 80% of the child participants were described as

demonstrating fine and gross motor problems. In addition, bowel and bladder training

were delayed for the studied sample. Although typically developing children are

reliably trained during the day by age 3, with occasional wetting accidents at night

until age 5, average ages for training were higher for some members of the sample.

Specifically, of the 46% of parents who responded to this question, bowel training

was reported to be achieved at an average of 45.5 months (ranging from 18 months to

66 months), and bladder training was reported to be achieved at an average of 41

months (ranging from 20 months to 54 months). At the time of testing, 38% of the

total sample ($n = 13$) continued to have soiling accidents and 15% were reported to

have wetting accidents.

The onset of spoken language was a major variable of interest in the present

study. Single words are usually first spoken by typically developing children between

the ages of 9 and 12 months, two-word phrases between the ages of 18 and 24

months, and three-word phrases by age 3. The *DSM-IV-TR* (APA, 2000) diagnostic

criteria for Asperger's disorder reflect a broader definition of normalcy in describing

the emergence of spoken language. Specifically, language is determined to be within

normal limits if the child speaks one word before age 2 and uses communicative

phrases by age 3 (p. 81). Retrospective data of spoken language development of the

child participants in the study indicated that the average age at which single words

emerged was 15 months ($n = 10$). Onset of two-word phrases was reported to occur at

an average of 19 months ($n = 10$). When queried about the presence or absence of

language problems in the past or in the present, 54% of the parent or guardian

respondents indicated that the child had no history language problems ($n = 7$), and

38% noted that the child participant currently demonstrated language problems ($n =$

5). One respondent indicated that the child demonstrated language problems in the

past, but not at the present time.

Results of Hypotheses Testing

   Language assessment using the CASL.

   Index scores on the CASL (Carrow-Woolfolk, 1999) are comprised of specific

sets of core and supplementary tests that vary according to the age of the child. This

scoring system is theoretically and empirically derived. The tests that comprise each

index score are considered a representative sampling of each language construct

named by the index score. Index scores for each age group are expressed by a

standard score ($M = 100$; $SD = 15$) and represent the child's level of language

functioning in that language domain according to developmental norms for age based

peers. When a participant did not meet baseline criteria for a test, it was not possible

to calculate the associated index score for that subject.

Hypothesis 1 stated that group mean performance measured by the Lexical-Semantic Index and the Syntactic Index scores of the CASL would fall in the average to above average range. As predicted, results for each index measure fell in the average to above average range for the study sample. See Table 2. All child participants completed each core and supplementary test required for calculation of the Lexical-Semantic Index ($n = 13$). Ninety-two percent completed all core and supplementary tests required for calculation of the Syntactic Index scores ($n = 12$). Descriptive statistics for tests comprising each index score can be found in Table 3.

Hypothesis 2 stated that group mean performance for the Pragmatic test score and the Supralinguistic Index score of the CASL would fall in the below average range. Results did not support this hypothesis. Mean scores fell within the average range for both the Pragmatic and Supralinguistic indices. See Table 2. The CASL is designed to measure pragmatic language functioning at each age level, and each participant received a pragmatic test score. The core and supplementary tests that comprise the Supralinguistic Index score are administered to children ages 7 and above. Thus, 92% of the study participants were administered this set of tests ($n = 12$). Of this group, 75% of the children met baseline criteria for each test in the index grouping, and a Supralinguistic Index score was calculated for these 9 child participants. Descriptive statistics for tests comprising the Supralinguistic Index score and results of the pragmatic Language score can be found in Table 4.

Hypothesis 3 stated that the group mean for the Composite Index score of the CASL would fall in the average range. Results supported this hypothesis. In the

present study, 77% of the child participants met baseline criteria for each test

comprising the Composite Index score ($n = 10$). See Table 2.

Table 2

Descriptive Statistics Measuring Language Functioning Using CASL

Indices	*N*	*M*	*SD*	Range
Lexical-Semantic	13	114	15	91-136
Syntactic	12	111	13	87-140
Pragmatic	13	95	14	72-119
Supralinguistic	9	107	16	87-132
Composite	10	110	13	87-132

Table 3

Descriptive Statistics for CASL Test Scores Comparing Lexical-Semantic and

Syntactic Test Scores

Test	N	M	Range
Lexical-Semantic Index			
Basic Concepts	2	113	104-121
Antonyms	13	116	85-130
Synonyms	11	112	77-136
Sentence Completion	13	111	85-142
Idiomatic Language	4	113	90-127
Syntactic Index			
Syntax Construction	13	98	78-125
Paragraph Comprehension	12	113	97-126
Grammatical Morphemes	11	112	83-133
Sentence Comprehension	4	102	87-118
Grammaticality Judgment	10	107	97-115

Table 4

Descriptive Statistics for CASL Test Scores Comprising the Supralinguistic Index

Score and the Pragmatic Test Score

Test	N	M	Range
Supralinguistic Index			
Nonliteral Language	9	110	90-130
Meaning from Context	5	105	93-116
Inference	10	101	66-130
Ambiguous Sentences	3	111	107-110
Pragmatic Language Score	13	95	72-119

Hypothesis 4 stated that intra-individual comparisons between formal

language test scores and pragmatic language test scores would reveal that formal

language functioning is significantly better in children diagnosed with Asperger's

disorder. Formal language functioning was operationally defined as participants' test

scores on the Lexical Semantic and Syntactic tests of the CASL. Pragmatic language

functioning was operationally defined as participants' scores on the Supralingustic

tests and Pragmatic Language test of the CASL. Statistically significant differences

comparing test scores are provided in the manual of norms (Carrow-Woolfolk, 1999).

These age-based norms were used in calculating the frequency of occurrence of

significant intra-individual comparisons for the present sample. Results indicated that,

in 83% of the cases in which statistically significant intra-individual differences

between formal and pragmatic language functioning were found (n = 12), formal

lan   age functioning was superior to pragmatic language functioning. See Table 5.

Table 5

Intra-individual CASL test comparisons: Formal vs. Pragmatic Language Functioning

Age	Total no. of sig. different comparisons:[a]	Formal > Pragmatic $p < .05$ [a]	Pragmatic > Formal $p < .05$ [a]	No. of tests completed	No. of possible tests
6 yr 3 m	3	3	0	6	6
7 yr 3 m	3	3	0	8	10
7 yr 8 m	7	7	0	8	10
8 yr 7 m	2	2	0	10	10
9 yr 0 m	2	0	2	10	10
9 yr 4 m	2	0	2	10	10
10 yr 1 m	8	7	1	10	10
11 yr 1 m	20	15	5	12	14
11 yr 11 m	5	5	0	14	14
12 yr 6 m	20	20	0	13	14
12 yr 10 m	26	26	0	14	14
13 yr 11 m	14	13	1	12	13

Note: When number of completed tests does not equal number of possible tests, examinee did not meet baseline criteria for one or more component tests of the *CASL*.

[a] Statistically significant intra-individual comparison were determined using table values from the *Comprehensive Assessment of Spoken Language Manual* (Carrow-Woolfolk, 1999).

Social Skills Functioning

The following standard scores from the SSRS (Gresham & Elliott, 1990) were used in the analysis: Social Skill score (Parent/Guardian, Teacher) and Problem Behavior score (Parent/Guardian, Teacher). In addition, ordinal ratings assigned by parent/guardian and teacher for item groupings on the SSRS representing Externalizing and Internalizing behaviors were also compared. Quantitative and qualitative analysis will indicate consistency of assessment across raters and contexts.

Hypothesis 5 stated that the Social Skill score of the SSRS (Gresham & Elliot, 1990), as reported by the parent/guardian, would be below average as compared to the standardized norms provided in the SSRS manual. This hypothesis was supported. Specifically, the average Social Skills standard score provided by respondents for children in the Grades K-6 category (n = 10) was 77 (range 59-101). Similarly, the average Social Skills standard score provided by respondents for children in the Grades 7-12 category (n = 2) was 53 (range 44-61).

Hypothesis 6 states that the Problem Behavior score of the SSRS, as reported by the parent/guardian of the child participant, would be above average as compared to standardized norms provided in the SSRS manual. The hypothesis was supported. Data for this hypothesis indicated that the average Problem Behavior standard score provided by respondents regarding their child's behavior in the Grades K-6 category (n = 10) was 112 (range 90-122). The average standard score provided by parents/guardians in describing their children in the Grades 7-12 category (n = 2) was 135 (range 125-145).

Hypothesis 7 stated that the Social Skill score, as reported by the teacher who

spends the highest number of classroom hours with the child, would be below

average, as compared to standardized norms provided in the SSRS manual. This

hypothesis was not supported. The average Social Skill standard score as reported by

teachers for children in the Grades K-6 category ($n = 6$) was 90 (range 76-120). Note,

however that the frequency of the scores at least one standard deviation below

average was 3. Teachers of children in the Grades 7-12 category did not respond to

the request of parents/guardians to complete the SSRS.

Hypothesis 8 stated that the Problem Behavior score of the SSRS, as reported

by the teacher who spends the highest number of classroom hours with the child,

would be above average as compared to standardized norms provided in the SSRS

manual. The hypothesis was supported. The average Problem Behavior standard score

as reported by teachers for children in the Grades K-6 category ($n = 6$) was 112

(range 90-122). Note, however, that the frequency of scores falling at least one

standard deviation above average was 3. Teachers of children in the Grades 7-12

category did not respond to the request of parents/guardians to complete the SSRS.

Hypothesis 9 stated that a Pearson product-moment correlation (two-tailed)

comparing the Social Skills score as reported by the parent/guardian with the Social

Skills score as reported by the teacher would yield a significant positive relationship.

Results did not support this hypothesis ($r = .05$).

Qualitative comparison between parent/guardian responses and the teacher

responses to items representing externalizing behavior on the SSRS revealed differing

observation ratings for children in the home and school settings. Specifically, 40% of

the parent/guardian responses ($n = 10$) indicated that externalizing behaviors in the home setting were more frequent than average. Ten percent of parents/guardians responded that the incidence of externalizing behaviors was less frequent than average. By comparison, 30% of teachers' responses ($n = 6$) indicated that externalizing behavior in the school setting was observed to be more frequent than average, as compared to same-aged peers. Two thirds of teachers' responses indicated that the frequency of externalizing behavior was in the average range. Note that there were no teacher responses for the children in the Grades 7-12 category.

Forty percent of parent/guardian responses ($n = 10$) indicated that the frequency of internalizing behaviors observed in the home setting was higher than average, as measured by the SSRS. By comparison, 10% of teachers' responses ($n = 6$) reflected the observation of an elevation of internalizing behaviors in the school setting. Note that there were no teacher responses for the children in the Grades 7-12 category.

Children who are reported to exhibit behavioral problems often are observed to demonstrate both externalizing and internalizing behaviors. In the current sample, 23% of the parent/guardian responses ($n = 3$) indicated a higher than average observed incidence of both externalizing and internalizing symptoms in their child. One of these children was in the Grades 7-12 category.

Relation Between Cognitive Functioning and Social Skills Functioning

Hypothesis 10 stated that there would be no statistical relationship between the measured levels of cognitive functioning and social skills functioning.

Specifically, a two-tailed Pearson product-moment correlation was calculated that compared the standardized IQ composite score of the KBIT-2 with the Social Skill score of the SSRS, parent/guardian form. Results for the children in the Grades K-6 category supported this hypothesis (r = .11) (n = 10). Due to the low sample size of children in the Grades 7-12 category (n =2), the correlation could not be calculated.

Relation Between Pragmatic Language Functioning and Social Skills Functioning

Hypothesis 11 stated that there would be a statistically significant positive correlation between pragmatic language functioning and social skills functioning. A one-tailed Pearson product-moment correlation was calculated that compared the standard score for the Pragmatic Language Index of the CASL and the standardized Social Skill score of the SSRS, parent/guardian form, for children in the Grades K-6 category. Results did not support the hypothesis (r = .26) (n = 10). Due to the low sample size of children in the Grades 7-12 category (n = 2), a correlation for this age group could not be calculated.

Chapter 4

Discussion

Summary of the Study Rationale

The current study examined the relationship between pragmatic language functioning and social skills functioning in children diagnosed with Asperger's disorder. The premise of the study stated that formal language skills and pragmatic language skills are differentially developed in children diagnosed with Asperger's disorder, in the presence of cognitive functioning measured to be in the average to above average range. Specifically, there is a relative strength in formal language skills, which likely results in the expectation of age appropriate social behavior by adults and peers in the home and school settings. By contrast, there is a relative weakness in pragmatic language skills, resulting in social behavior that reflects consistent difficulty understanding social cues. Thus, the child with Asperger's disorder demonstrates impairment when initiating interaction with others and when responding to them in the context of social situations. This behavioral pattern is observable by parents and teachers in the form of higher rate of socially problematic behavior in children with Asperger's disorder as compared to same aged peers. The unique contribution of this research project was the application of standardized measures of language functioning and social skills functioning. Psychometric evaluation of these constructs in the current sample of child participants permitted (a) the examination of the relationship between formal and pragmatic language skill

functioning and (b) evaluation of the presence or absence of a systematic relationship

between pragmatic language functioning and social skills functioning.

Language Development and its Relationship to Social Skills Functioning in Children

With Asperger's Disorder

      The diagnostic criteria for Asperger's disorder, as described in the *DSM-IV-*

TR (APA, 2000) include: significant impairment in social interaction, narrowly

defined and abnormally intense interests and/or stereotypic patterns of behavior, and

the presence of normal language and cognitive development prior to 3 years of age.

Specifically, normal language development is defined by the child's expression of

one word by age 2 and communicative phrases by age 3. This behavioral criterion is

relatively easy for parents and clinicians to measure; however, it is important to

recognize that verbal expression is one limited facet of language development. In the

case of children with Asperger's disorder, social interaction skills are consistently

impaired, as evidenced by both abnormal nonverbal behavior and disturbances in the

use of language in the context of social interaction. Nonverbal social interaction is

both a precursor of verbal behavior and a concomitant aspect of pragmatic language

functioning. Although pragmatic language is not equivalent to social competence, it is

considered to be one major contributor to effective social communication. Therefore,

it is probable that a broader evaluation of the precursors of language, including

observation of joint attention between child and caregiver, could provide a more

accurate assessment of developmental status.

In normal development, joint attention between the child and caregiver

functions to assist the child in communicating a specific goal (e.g., to get mother's

attention and gesture the desire for a cookie) and/or to share affective experience with

the caregiver (e.g., to communicate joy at the seeing the caregiver upon waking and

resonating with mother's affective response during the sharing of this feeling).

Examples of abnormal nonverbal behavior in children with Asperger's disorder

include atypical use of eye gaze, facial expression, and gestures, as well as unusual

body posture. These abnormalities are hypothesized to interfere with joint attention

and the development of social communication as it emerges from this dynamic and

complex process. Wetherby, Prizant, and Schuler (2000) note that children with

Asperger's disorder are more likely than children with autistic disorder to orient to

social affect, to alternate their gaze between object and person, and to share positive

affect. However, children with Asperger's disorder are less likely than typically

developing children to initiate joint attention in order to share experiences. Children

with a diagnosis in the autistic spectrum are also more likely to communicate a

specific goal than to share affective experience in the context of joint attention

(Kasari, Sigman, Mundy, & Yirmiya, 1990). In addition, although children with

Asperger's Disorder may express desire for affiliation with others, a consistent lack

of social or emotional reciprocity functions to limit the development of appropriate

social relationships. This deficit in social skills functioning appears to be independent

of the child's level of cognitive functioning and also appears unrelated to the

diagnostic criterion of normal language development prior to age 3 as described by

the *DSM-IV-TR* (APA, 2000). Thus, conceptualization of normal language

development in this population appears to be too narrowly defined to detect language

development abnormalities that are likely to be required for the development of

normal social skills.

The fundamental assumption of the present study was based upon the major

premise underlying functional linguistics. Specifically, formal language skills are

necessary, but not sufficient, in the production of effective communication (Ninio &

Snow, 1996). In essence, all language skills, such as grammar, syntax, and semantics,

can ultimately serve a pragmatic function. In the case of children with Asperger's

disorder, one explanation for the behavioral patterns characteristic of the disorder

may be attributable to an aberration in the transfer and integration of formal language

knowledge to the interpretation and application of nonverbal language cues during

social interaction.

The convergence of the literature examining the diagnostic overlap between

Asperger's disorder, high functioning autism, nonverbal learning disabilities, and

semantic-pragmatic disorder suggests that the social skill deficits associated with

these disorders may share a common neuropsychological profile. Hale and Fiorello

(2004) propose that children with Asperger's disorder demonstrate significant

strength in left hemisphere language function, such as vocabulary, grammar, and

syntax. By contrast, right hemisphere functioning is likely impaired due to structural

deficits in white matter. In children with Asperger's disorder, one way in which this

structural deficit is functionally expressed is in the form of impairment in socially

reciprocal behavior. For example, in this population, the impaired ability to link one's

ideas fluidly in response to another person during conversation can result in a

compensatory strategy characterized by verbose tangential replies during dyadic exchanges. A typical reply may take the form of a pedantic "lecture" about the child's area of circumscribed interest. In addition, prosody is likely to be abnormal (Hale & Fiorello, 2004). Thus, it is plausible to hypothesize that children with Asperger's disorder can demonstrate formal language functioning that falls within normal limits and also exhibit impairment in pragmatic language functioning.

Interpretation of Standardized Measurement of Language Functioning in Studied Sample

In the current study, the group mean of the standard scores measuring formal language functioning was in the average range, as measured by the Lexical-Semantic Index ($M = 114$; $n = 13$) and Syntactic Index ($M = 111$; $n = 12$) of the CASL (Carrow-Woolfolk, 1999). This was consistent with the predicted hypothesis. Age appropriate lexical-semantic skills were measured for each subject and included identification of antonyms and synonyms, completion of unfinished sentences, and comprehension of idiomatic phrases. Similarly, syntactic skills were evaluated by tests measuring sentence and paragraph comprehension, grammatical judgment, and morpheme recognition. All subjects ($n = 13$) met baseline criteria for each age band test comprising the Lexical-Semantic Index and 92% of the sample met baseline criteria for each age band test comprising the Syntactic Index.

However, contrary to the predicted hypothesis, the group means of the standard scores for pragmatic language functioning, as measured by the Supralinguistic Index ($M = 107$; $n = 9$) and the Pragmatic test score ($M = 95$; $n = 13$)

of the CASL, were also measured to be in the average range. It was expected that the

group mean for these scores would fall in the below average range. It is likely that

this finding is an overestimate of the true level of pragmatic language functioning in

the sample because 25% of the child participants did not meet baseline criteria for one

or more tests comprising the Supralinguistic Index. The planned comparison between

the SSRS Social Skills score (Parent/Guardian) and the Pragmatic Language test

score was not significant ($r = .26$). A post hoc Pearson correlation comparing the

SSRS Social Skills score (Parent/Guardian) and the Supralinguistic Index was also

not significant ($r = -.07$). Age appropriate tests of supralinguistic skills included the

measurement of the participants' ability to: comprehend the meaning of spoken

language where the literal meaning does not convey the message (nonliteral

language); derive meaning from oral linguistic context (meaning from context); apply

previously acquired knowledge to derive meaning from utterances (inference); and

comprehend words, phrases, and sentences that have more than one meaning

(ambiguous sentences). The pragmatic test measured participants' knowledge of the

rules of social interaction and the ability to apply these appropriately in examples of

common situations. Interestingly, examination of the pattern of statistically

significant intra-individual test comparisons between formal language tests and

pragmatic language tests revealed a distinct pattern of superior performance on tests

measuring formal language functioning. This further suggests the possibility that

pragmatic language functioning in the current sample was indeed below average.

More research is needed.

Individuals diagnosed with Asperger's disorder have been observed to use their strong formal language skills to verbally compensate for nonverbal weaknesses (Klin, 2004). As predicted, the group mean standard score for the overall composite index score on the CASL fell within the average to above average range ($M = 110$; $n = 10$). Approximately 25% of the sample did not meet baseline criteria necessary for computation of the composite index score. Therefore, this result may overestimate the overall language functioning of the sample.

Although overall language functioning was measured to be in the average range, and academic performance is generally considered to have a strong positive association with language functioning (Groth-Marnat, 2003), approximately 40% of the child participants in the sample reported a history of special education services. Further, at the time of testing, 15% of the children ($n = 2$) were receiving wrap-around services. These results suggest that factors other than formal language competency may have challenged participants' ability to achieve in a regular school setting. One potentially relevant factor that was surveyed in the present study was the existence of a comorbid psychological disorder. Approximately 50% of the children in the current sample were reported to have a comorbid disorder. Disorders included: ADHD ($n = 4$); Anxiety disorder ($n = 1$); and ODD ($n = 2$). As noted previously, 42% of the sample was receiving psychotherapy and two thirds of this subset was also under the care of a psychiatrist and taking medication on a daily basis. A second factor that may have precipitated the need for special education is impairment in social skills functioning.

Interpretation of Standardized Measurement of Social Skills Functioning in the Studied Sample

Social skills were measured using the Parent and Teacher forms of the Social Skills Rating System (SSRS) (Gresham & Elliott, 1990). As predicted, the average group standard score for social skill performance, as reported by the parents/guardians of the child participants, was rated as below average (Grades K-6, $M = 77$, $n = 10$; Grades 7-12, $M = 53$, $n = 2$). By contrast, the average group standard score for social skill performance, as reported by teachers of the child participants, was rated as average (Grades K-6, $M = 90$; $n = 6$). The correlation between parent/guardian and teacher ratings was not statistically significant ($r = .05$). This finding is not surprising, as the literature comparing parent and teacher ratings of behavior associated with attention deficit hyperactivity disorder (ADHD) characteristically demonstrates low concordance rates (Gomez, 2007; Zeiner, 1997). It is likely that this is also the case in the present study, although more research is needed to demonstrate a reliable trend in this pattern in the Asperger population. Also, in the current study, the overall small sample size ($n = 10$), combined with the restricted age range of the data provided by teacher respondents ($n = 6$), contributed to the limited interpretive utility of this correlation.

Deficits in social skills can be expressed in the form of problem behavior. The parent and teacher forms of the SSRS contain a Problem Behavior scale. As predicted, the average standard score for problem behavior, as reported by the parent/guardian of the child participant, was rated above average (Grades K-6, $M = 112$, $n = 10$; Grades 7-12, $M = 135$, $n = 2$). Similarly, the average standard score for

problem behavior, as reported by the teachers of the child participants, was rated above average (Grades K-6, $M = 112$, $n = 6$). Forty percent of parents/guardians ($n = 10$) and 30% of teachers ($n = 6$) observed externalizing behaviors, such as physical aggression, poor control of temper, and arguing with others, in the child participants included in the study. However, there was not a similar level of agreement in raters' observations of internalizing behaviors. Specifically, 40% of the parent/guardian responses indicated the presence of higher than expected internalizing behaviors, such as anxiety, sadness, and loneliness. By comparison, teacher respondents indicated that the frequency of internalizing behaviors was elevated in only 10% of the child participants. This difference is likely due to the ease with which each category of behavior can be observed. In general, externalizing behaviors are easier for raters to observe than internalizing behaviors in any setting. Further, externalizing behaviors can be disruptive across settings, increasing the likelihood that the parent/guardian and teacher will report the occurrence of such behavior. It is probable that internalizing behaviors are comparably less disruptive in a classroom setting, reducing the likelihood that the teacher will observe and report them. By contrast, the parent/guardian is likely have a better opportunity to observe these indicators and thus is able to report these symptoms if they are present. Interestingly, in the current study, 23% of the parents observed a higher than average incidence of both externalizing and internalizing behaviors in their child. This may indicate the presence of a more general difficulty with self-regulation in the studied population.

Implications for Further Research

Normal pragmatic language functioning is conceptualized to be strongly associated with social competence in the current study. Pragmatic language skills facilitate the perception and processing of social cues such as appropriate initiation of conversation and choice of topic, turn-taking behavior, adjustment of conversation to account for age and position of dyadic partner, use of language to express emotion, and selection of relevant information for directions or requests (Carrow-Woolfolk, 1999). However, it is possible that social skills impairment may be attributed to other causes. For example, consider a child with a diagnosis of Asperger's disorder who scores below average on a measure of social skills. Impairment in social skills for this child is likely attributable to cognitive processing deficits caused by white matter insufficiency in the right hemisphere. This is expressed by pragmatic language deficits and verbal overcompensation in the form of tangential verbose responding during conversational exchanges. By comparison, consider a child with social deprivation who may achieve similar scores on the same assessment measure. The cause underlying his pattern of responding may be due to inadequate or inappropriate social modeling and reinforcement. Each child will require different intervention strategies designed according to an understanding of his underlying functional capacity. The application of a general program of social skills training that does not take into account differential processing deficits is likely to result in remediation failures. Research that more clearly describes these processing differences among members of diagnostic categories is warranted. Further, appropriate diagnosis and

treatment of social skills deficits is dependent upon multidimensional assessment of the underlying factors for each individual.

A specific area of research that examines the developmental aspects of social skills would serve to clarify our clinical understanding of social competence in children diagnosed with Asperger's disorder. For example, if the data on joint attention are conceptualized as creating ongoing distortion in the flow of nonverbal social learning information over the child's lifetime, it is likely that impairment in pragmatic language functioning and social skills performance will be observed. However, is this due to impairment at the level of skill acquisition, skill performance, or both? Gresham and Elliott (1990) indicate that assessment of these factors is currently possible and includes behavioral ratings, such as the SSRS, in conjunction with naturalistic observation of the child's behavior. At a more general level, the following questions emerge: What are the optimal ages for measuring behavior relevant to social skills development? How can this be accomplished in a reliable and valid manner? At what point in development will intervention be most effective and create the optimal level of generalizability? Research that answers these questions will significantly advance our understanding of pervasive developmental disorders in general and Asperger's disorder in particular.

Limitations of the Study

The definition of Asperger's disorder is the subject of much debate in the literature. Disagreement regarding diagnostic criteria that identify Asperger's disorder, and reliably discriminate it from other categories in the autistic spectrum,

has a direct impact on the current study. Specifically, if clinicians apply diagnostic

criteria in an inconsistent manner, the potential pool of subjects is more

heterogeneous than expected. There is a high likelihood that this occurred in the case

of the present study. For example, in a study examining the way in which clinicians

apply *DSM-IV* (APA, 1994) criteria to pervasive developmental disorder subtypes,

Mahoney et al. (1998) found that 20 of the 21 children in the sample who had a

previous diagnosis of Asperger's disorder actually met criteria for autistic disorder

instead. In addition, the latter diagnosis was the appropriate designation given the

decision rules in the manual. However, when Mahoney et al. (1998) altered the

diagnostic rule to state, "If the child meets criteria for both disorders, assign

Asperger's disorder," the resulting diagnoses were assigned in a way more consistent

with the subjects' original diagnosis of Asperger's disorder. In addition, the clinical

application of the current *DSM* criteria in making a differential diagnosis between

autistic disorder and Asperger's disorder appears to vary with the experience of the

clinician (Volkmar et al., 1994). Further, some clinicians apply the use of the

diagnostic category high functioning autism to children with mild autistic features

who demonstrate average cognitive functioning (Mayes, Calhoun, & Crites, 2001).

Note that this category is not in the *DSM-IV-TR*, despite the frequency of its use.

Thus, there are many reasons to believe that any given sample of children with

Asperger's Disorder will be quite heterogeneous.

    Prior to participation in the current study, child participants were diagnosed

with Asperger's disorder by a medical or psychological professional. The present

study was designed to mitigate the impact of heterogeneity in the sample by applying

diagnostic screens. Diagnosis was confirmed by the researcher using the Asperger

Syndrome Diagnostic Interview (ASDI) (Gillberg, Gillberg, Rastam, & Wentz, 2001).

All subjects included in the analysis of the data met both *DSM-IV-TR* (APA, 2000)

criteria and ASDI criteria. Behavioral ratings were requested from teachers using the

Krug Asperger's Disorder Index (KADI) (Krug & Arick, 2003). Despite the

application of these measures, the homogeneity of sample is limited a priori by the

degree of validity of the *DSM* criteria for the disorder.

Several other factors may have affected the quality and quantity of the data

collected. These include the application of excessively conservative screening

criterion permitting participation in the study, demographic characteristics of

participant volunteers, and characteristics of the instruments selected for the study.

First, the nature of the inclusion criteria for the study may have served to limit the

range of behaviors measured in the present study. Specifically, application of the

KBIT-2 in screening participants for significant cognitive limitations prevented

children with mental retardation (MR) from entering the study. However, children

who are cognitively compromised sometimes meet criteria for Asperger's disorder,

and of those children who meet both MR and Asperger's disorder criteria, the

incidence of pragmatic language dysfunction is likely to be much higher than

measured in the current study. Thus, the cognitive functioning criterion for inclusion

in the study may have truncated the range of a major variable of interest in the current

research project.

Secondly, the child participants who were volunteered by a parent/guardian

for participation in the study may be systematically different than children with

Asperger's disorder who do not participate in the study. Of particular interest was the fact that all of the children participants were male and White. Although the estimated gender ratio for Asperger's disorder is 8:1, with a higher incidence in males, it is unclear why no female children were volunteered by their parents to participate. Possible explanations for the lack of girls in this study include small sample size, low base rate of diagnosis of females with Asperger's disorder, and a higher rate of problem behaviors in boys with the disorder, precipitating action by the parent to seek assessment and treatment. In addition, despite the fact that this study was performed in a major city that has a wide multicultural population, all participants were White. This may be an artifact of the recruitment procedures. Specifically, many of the participants learned about the study through a website for parents of children with Asperger's disorder. There may be cultural differences in access to and use of website information when parents seek information and assistance for their children with special needs. Alternatively, some of the children were referred to the study by other participants. Depending on the cultural integration of the classroom cohorts associated with this type of referral to the study, dissemination of information about the option to participate in the study may have been differentially available to individuals of other cultures. In addition, it is possible that individuals from other cultures were aware of the study, but cultural differences in the perceived meaning of participating in research studies inhibited individuals from other cultures from volunteering. Such participation may be considered more favorably by members of some cultures than by members of others.

The demographic data collected in this study indicated that, of the children who did participate, 50% also met criteria for another psychological disorder. This may have added to the heterogeneity of the characteristics of the sample under study. It is also possible that psychological comorbidity is representative of this population. However, the small sample size prevented statistical evaluation of this impact.

The targeted age range for the present study was 6 to 15; however, only three participants were in the adolescent age range (12 years and above). It is likely that parents are less able to influence children in this age range to participate in a research study, although there could be alternative reasons for the limited response from this age group. Patterns in the dataset for this age group suggest that cognitive and psychosocial developmental issues associated with the transition to adolescence warrants research that examines the impact of cognitive and psychosocial developmental changes in a more comprehensive way. For example, intra-individual comparisons on the CASL indicated that formal language was significantly better than pragmatic language at a proportionally higher rate for children 12 years and older, as compared to the younger members of the sample. Children with intact cognitive abilities are capable of significant increases in the quantity and depth of knowledge accumulated during this period of their education. It is possible that the wider disparity between formal and pragmatic language performance in this age group reflects intact neurocognitive functioning for the accumulation of information, as described by Hale and Fiorello (2004); however, pragmatic language development continues to lag behind to a significant degree due to underlying right hemispheric deficits. Given the shift in psychosocial demands during early adolescence, further

research designed to measure the specific impact of pragmatic language functioning

and social skills performance in this age group warrants special exploration. It is

possible that the impact of pragmatic language and social skills deficits will create

patterns of compensatory behaviors that manifest differently during the adolescent

phase of development in individuals diagnosed with Asperger's disorder.

Finally, the application of the standardized measures used in the current study

had advantages and disadvantages. The psychological tests which were used to

measure social skills and language functioning each were supported by representative

normative samples. In addition, each was designed to account for developmental

changes over time. Specifically, social skills were measured by the SSRS, which has

two versions, Grades K-6 and Grades 7-12. Developmental changes in language skills

are measured by the CASL by linking age ranges with specific subtests. Thus, each

area of language functioning was measured in a developmentally appropriate way.

The disadvantage of using the *CASL* was that test administration was significantly

longer than described in the test manual and fatigue may have attenuated the accuracy

of the results. Consultation with a speech pathologist or pediatric psychologist with a

specialty in language assessment may be indicated in order to select an appropriate

subset of CASL tests in planning further research with this instrument.

The response rate for teachers who are asked to complete a behavioral rating

questionnaire about a student is typically low as compared to parent response rates for

the same instrument. Compliance was encouraged in the current study by the offer of

payment for the teacher's time; however, response rate for teachers was still lower

than expected. One possible explanation was that the title of one of the instruments,

the KADI, included the term Asperger's disorder. It is possible that teachers

experienced hesitancy in completing a measure that may suggest that one of their

students had this disorder. Their level of awareness about the child's previous

diagnosis of the disorder was not known, so it is not clear whether the teacher's

concern might have been that the child would be diagnosed with a developmental

disorder based on their response. Alternatively, completion of both the KADI and the

SSRS may have been perceived as too time consuming given daily work demands. In

designing future studies using these types of measures, it is recommended that

diagnostic labels be removed from behavioral rating scales and that the student

researcher gain direct access to the teacher in order to facilitate the answering of

questions and completion of the instruments while on site at the child's school, if

possible.

References

Achenbach, T. M. (1994). *Child Behavior Checklist*. Burlington, VT: University

Medical Education Associates.

Adams, C., & Bishop, D. V. M. (1989). Conversational characteristics of children

with semantic-pragmatic disorder. I: Exchange structure, turntaking, repairs,

and cohesion. *British Journal of Disorders of Communication, 24,* 211-239.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of*

mental disorders (text revision). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of*

mental disorders (4th ed.). Washington, DC: Author.

Asperger, H. (1991). "Autistic Psychopathy" in childhood (U. Frith, Trans.). In

U.Frith (Ed.). *Autism and Asperger Syndrome* (pp. 37-92). New York:

Cambridge University Press. (Original work published 1944).

Barkley, R.A. (1997). *Defiant children: A clinician's manual for assessment and*

parent training. New York: Guilford Press.

Baron-Cohen, S. (1990). Autism: A specific cognitive disorder of "mind-blindness."

International Review of Psychiatry, 2, 81-90.

Bearison, D. J., & Dorval, B. (2002). *Collaborative cognition.* Westport, CT: Ablex

Publishing.

Bishop, D. V. M., & Adams, C. (1989). Conversational characteristics of children

with semantic-pragmatic disorder. II: What features lead to a judgment of

inappropriacy? *British Journal of Disorders of Communication, 24,* 241-263.

Boucher, J. (1998). SPD as a distinct diagnostic entity: logical considerations and

    directions for future research. *International Journal of Language and*

    Communication Disorders, 33(1), 71-81.

Bowler, D. M., & Brook, S. L. (1998). SPD and autistic spectrum disorder.

    International Journal of Language and Communication Disorders, 33(1), 91-

    108.

Campbell, J.M. (2005). Diagnostic assessment of Asperger's Disorder: A review of

    five third-party rating scales. *Journal of Autism and Developmental*

    Disorders, 35(1), 24-35.

Carrow-Woolfolk, E. (1985). *Test for Auditory Comprehension of Language:*

    Examiner's manual (Rev. ed.). Allen, TX: DLM Teaching Resources.

Carrow-Woolfolk, E. (1995). *Oral and written language scales: Listening*

    comprehension and oral expression. Circle Pine, MN: American Guidance

    Service.

Carrow-Woolfolk, E. (1999). *Comprehensive Assessment of Spoken Language*

    manual. Circle Pines, MN: AGS Publishing.

Cederlund, M. & Gillberg, C. (2004). One hundred males with Asperger Syndrome:

    A clinical study of background and associated factors. *Developmental*

    Medicine and Child Neurology, 4(10), *652-660.*

Dore, J. A. (1979). Conversational acts and the acquisition of language. In E. Ochs &

    B. Schieffelin (Eds.). *Developmental pragmatics* (pp. 339-361). New York:

    Academic Press.

Dunn, L. M., & Dunn, L. M. (1997). *Peabody Picture Vocabulary Test—Third*

   Edition. Circle Pines, MN: American Guidance Service.

Ehlers, S., Gillberg, C., & Wing, L. (1999). A screening questionnaire for Asperger

   Syndrome and other high-functioning autism spectrum disorders in school age

   children. *Journal of Autism and Developmental Disorders, 29*(2), 129-141.

First, M. B. (2005). Mutually exclusive versus co-occurring diagnostic categories:

   The challenge of diagnostic comorbidity. *Psychopathology, 38, 206-210.*

Frith, U. (2004). Emanuel Miller lecture: Confusions and controversies about

   Asperger Syndrome. *Journal of Child Psychology and Psychiatry, 45*(4),

   572-686.

Frith, U., Happe, F., & Siddons, F. (1994). Autism and theory of mind in everyday

   life. *Social Development, 3*(2), 109 -124.

Garth-Marnat, G. (2003). *Handbook of psychological assessment* (4th ed.) (pp. 162-

   163). Hoboken, NJ: John Wiley & Sons.

Ghaziuddin, M., & Mountain-Kimchi, K. (2004). Defining the intellectual profile of

   Asperger Syndrome: Comparison with High-Functioning Autism. *Journal*

   Autism and Developmental Disorders, 34(3), 279-284.

Ghaziuddin, M., Tsai, L., & Ghaziuddin, N. (1992). A comparison of the diagnostic

   criteria for Asperger syndrome. *Journal of Autism and Developmental*

   Disorders,22(4), 643-649.

Gillberg, C. (1991). Clinical and neurobiological aspects of Asperger syndrome in six

   family studies. In U. Frith (Ed.). *Autism and Asperger syndrome.* New York:

   Cambridge University Press.

Gillberg, C. (1992). The Emanuel Miller Memorial Lecture 1991: Autism and

    autistic-like conditions: Subclasses among disorders of empathy. *Journal of*

    Child Psychology and Psychiatry, 33(5), 813-842.

Gillberg, C., & Gillberg, C. (1989). Asperger's Syndrome: Some epidemiological

    considerations: A research note. *Journal of Child Psychology and Psychiatry,*

    30(4), 631-638.

Gillberg, C., Gillberg, C., Rastam, M., & Wentz, E. (2001). The Asperger Syndrome

    (and high-functioning autism) Diagnostic Interview (ASDI): A preliminary

    study of a new structured clinical interview. *Autism, 5*(1), 57-66.

Greenspan, S. I., & Shanker, S. (2004). *The first idea: How symbols, language and*

    intelligence evolved from our primate ancestors to modern humans. New

    York: Da Capo/Perseus.

Greshem, F. M., & Elliot, S. N. (1990). *Social skills rating system.* Circle Pines, MN:

    American Guidance Service, Inc.

Grice, H. P. (1975). Logic and conversation. In P. Cole & J. L. Morgan (Eds.). *Syntax*

    and semantics: Vol. 3. Speech acts (pp. 41-58). New York: Academic Press.

Grundy, P. (2000). *Doing pragmatics* (2nd ed.). New York: Oxford University Press.

Hale, J. B., & Fiorello,C. (2004). *School neuropsychology: A practitioner's*

    handbook (pp. 254-257). New York: Guilford Press.

Heller, M. (2001). Discourse and interaction. In D. Schiffrin, D. Tannen, & H. E.

    Hamilton (Eds.). *The handbook of discourse analysis* (pp. 250-264).

    Malden, MA: Blackwell Publishing.

Howlin, P. (2003). Outcome in high-functioning adults with autism with and without

   language delays: Implications for the differentiation between autism and

   Asperger syndrome. *Journal of Autism and Developmental Disorders, 33*(1),

   3-13.

Kadesjo, B., Gillberg, C., & Hagberg, B. (1999). Brief report: Autism and Asperger

   syndrome in seven-year-old children: A total population study. *Journal of*

   Autism and Developmental Disorders, 29(4), 327-331.

Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1990). Affective sharing in the

   context of joint attention. *Journal of Autism and Developmental Disorders,*

   20, 87-100.

Kaufman, A. S., & Kaufman, N. L. (1990). *Kaufman Brief Intelligence Test.* Circle

   Pines, MN: American Guidance Service.

Kaufman, A. S., & Kaufman, N. L. (2004). *KBIT-2: Kaufman Brief Intelligence Test*

   (2nd ed.). Circle Pines, MN: AGS Publishing.

Klin, A., Sparrow, S. S., Volkmar, F. R., Cicchetti, D. V., & Rourke, B. P. (1995).

   Asperger syndrome. In B. P. Rourke (Ed.). *Syndrome of nonverbal learning*

   disabilities: Neurodevelopmental manifestations (pp. 93-118). New York:

   Guilford Press.

Klin, A., & Mottron, L. (2004). Challenging case: When Asperger's syndrome and a

   nonverbal learning disability look alike. *Journal of Developmental and*

   Behavioral Pediatrics, 25 (Suppl. 3), 59-64.

Krug, D., & Arick, J. R. (2003). *Krug Asperger's Disorder Index.* Austin, TX: PRO-

   ED.

Leekam, S., Libby, S., Wing, L., Gould, J., & Gillberg, C. (2000). Comparison of

    ICD-10 and Gillberg's criteria for Asperger Syndrome. *Autism, 4*(1), 11-28.

Lord, C., & Paul, R. (1997). Language and communication in autism. In D. Cohen &

    F. Volkmar (Eds.). *Handbook of autism and pervasive developmental

    disorders* (2nd ed.), (pp. 195-225). New York: John Wiley & Sons.

Mahoney, W. J., Szatmari, P., MacLean, J. E., Bryson, S. E., Bartolucci, G., Walter,

    S. D. et al. (1998). Reliability and accuracy of differentiating pervasive

    developmental subtypes. *Journal of the American Academy of Child and

    Adolescent Psychiatry, 37*(3), 278-285.

Manjiviona, J., & Prior, M. (1999). Neuropsychological profiles of children with

    asperger syndrome and autism. *Autism, 3*(4), 327-356.

Malik, M. L. & Beutler, L. E. (2002). The emergence of dissatisfaction with the *DSM*.

    In L. E. Beutler, & M. L. Malik (Eds.). *Rethinking the DSM: A psychological

    perspective* (pp. 3-15). Washington DC: American Psychological Association.

Mayes, S. D., Calhoun, S. L., & Crites, D. L. (2001). Does *DSM-IV* Asperger's

    Disorder exist? *Journal of Abnormal Psychology, 29*(3), 263-272.

Miller, K. (2004). Challenging case: When Asperger's syndrome and a nonverbal

    learning disability look alike. *Journal of Developmental and Behavioral

    Pediatrics, 25*(Suppl. 3), 59-64.

Ninio, A., & Snow, C. E. (1996). *Pragmatic development*. Boulder, CO: Westview

    Press.

Prutting, C. A. (1982). Pragmatics as social competence. *Journal of Speech and

    Hearing Disorders, 47*, 123-134.

Prutting, C. A., & Kirchner, D. M. (1987). A clinical appraisal of the pragmatic

aspects of language. *Journal of Speech and Hearing Disorders, 52,* 105-119.

Ramberg, C., Ehlers, S., Nyden, A., Johansson, M., & Gillberg, C. (1996). Language

and pragmatic functions in school-age children on the autism spectrum.

European Journal of Disorders of Communication, 31, 387-414.

Rapin, I., & Allen, D. A. (1998). The semantic-pragmatic disorder: Classification

issues. *International Journal of Language and Communication Disorders,*

33(1), 82-87.

Rourke, B. P. (2000). Neuropsychological and psychosocial subtyping: A review of

investigations within the University of Windsor laboratory. *Canadian*

Psychology, 41(1), 34-57.

Scadding, J. G. (1996). Essentialism and nominalism in medicine: Logic of diagnosis

in disease terminology. *Lancet, 348,* 594-596.

Schiffrin, D., Tannen, D., & Hamilton, H. E. (Eds.) (2001). *The handbook of*

discourse analysis. Malden, MA: Blackwell Publishing.

Shamay-Tsoory, S. G., Tomer, R., Yaniv, S. & Aharon-Peretz, J. (2002). Empathy

deficits in Asperger syndrome: A cognitive profile. *Neurocase, 8,* 245-252.

Shanker, S. (2004). The roots of mindblindness. *Theory & Psychology, 14*(5), 685-

703.

South, M., Ozonoff, S., & McMahon, W. M. (2005). Repetitive behavior profiles in

Asperger syndrome and high-functioning autism. *Journal of Autism and*

Developmental Disorders, 35(2), 145-158.

Stutman, G. (2003). *Review: Comprehensive Assessment of Spoken Language*. In B.

Plake, J. C. Impara, & R. A. Spies (Eds.). *The fifteenth mental measurements*

yearbook. Buros Institute, NB: University of Nebraska Press.

Tager-Flusberg, H. (1989). A psycholinguistic perspective on language development

in the autistic child. In G. Dawson (Ed.). *Autism: Nature, diagnosis, and*

treatment (pp. 92-118). New York: Guilford Press.

Twachtman-Cullen, D. (2000). More able children with autism spectrum disorders:

Sociocommunitcative challenges and guidelines for enhancing abilities. In A.

M. Wetherby & B. M. Prizant (Eds.). *Autism spectrum disorders: A*

transactional developmental perspective (pp. 225-249). Baltimore, MD:

Brookes Publishing Co.

Volden, J. (2004). Nonverbal learning disability: A tutorial for speech-language

pathologists. *American Journal of Speech-Language Pathology, 13*(2), 128-

142.

Volkmar, F. R., Klin, A., Siegel, B., Szatmari, P., Lord, C., Campbell, M. et al.

(1994). Field trial for autistic disorder in *DSM-IV. American Journal of*

Psychiatry, 151, 1361-1367.

Vygotsky, L.S. (1978). *Mind and society: The development of higher psychological*

processes. Cambridge, MA: Harvard University Press.

Wechsler, D. (2003). *Wechsler Intelligence Scale for Children--Fourth Edition*. San

Antonio, TX: Psychological Corporation.

Wetherby, A. M., Prizant, B., & Schuler, A. L. (2000). Understanding the nature of

    communication and language impairments. In A. M. Wetherby & B. M.

    Prizant (Eds.). *Autism spectrum disorders: A transactional developmental*

    perspective (pp. 109-141). Baltimore, MD: Brookes Publishing Co.

Williams, K. T. (1997). *Expressive Vocabulary Test.* Circle Pines, MN: American

    Guidance Service.

Wing, L. (1981). Asperger's syndrome: A clinical account. *Psychological Medicine,*

    11, 115-129.

World Health Organization. (1992). *The ICD-10 classification of mental and*

    behavioral disorders: Clinical descriptions and diagnostic guidelines.

    Geneva: Author.

Ziatas, K., Durkin, K., & Pratt, C. (1998). Belief term development in children with

    autism, Asperger syndrome, specific language impairment, and normal

    development: Links to theory of mind development. *Journal of Child*

    *Psychology and Psychiatry, 39(*5), 755-763.

Ziatas, K., Durkin, K., & Pratt, C. (2003). Differences in assertive speech acts

    produced by children with autism, Asperger syndrome, specific language

    impairment, and normal development. *Development and Psychopathology, 15,*

    73-94.

APPENDIX A

PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

CLINICAL RESEARCH STUDY

ASPERGER'S DISORDER

WHO:
Children ages 6-15 who have been diagnosed with Asperger's Disorder and one parent or guardian.

WHERE:
The Center for Brief Therapy
Philadelphia College of Osteopathic Medicine
4190 City Avenue, Philadelphia

WHAT:
One meeting (2 hours). Includes a brief interview and paper and pencil testing.

WHY:
This study will describe how children with Asperger's Disorder use language and how these children interact with others at home and at school.

HOW WILL MY CHILD BENEFIT?
A free report of test results will be given to the parent/guardian of the child. This information can add valuable information to the child's school-based Individualized Education Plan (IEP).

A check in the amount of $20 and a parking voucher worth $5 will also be given to the parent/guardian.

CALL FOR AN APPOINTMENT TODAY! Leave a voicemail message at 215.964.3873. Your call will be returned promptly.

NOTE: This project is monitored by the Institutional Review Board of PCOM and all information gathered is coded, confidential, and will be published in the form of group data. This project is in partial fulfillment of the student researcher's doctoral degree in clinical psychology and has been approved by PCOM.

APPENDIX B

Philadelphia College of Osteopathic Medicine

Demographic Information

Name of Child: _____   Research ID#:_____

Testing Date: _____   Examiner: _____

Info source: O Parent   O   Guardian

Name: _____   Contact phone #: _____

Child's Date of Birth _____   Sex: M F   Grade_____

Handedness: O R   O L   English as first/primary language? O Y O N

Vision: O normal   O normal with glasses   O child has glasses today

Hearing: O normal   O normal with hearing aid   O child has aid today

Age at diagnosis   _____

Source of diagnosis:

O psychologist   O psychiatrist   O pediatrician   O neurologist

O neuropsychologist   O Other (specify): _____

Type of testing:

O cognitive   estimated date: _____

O personality   estimated date: _____

O neuropsychological estimated date: _____

Special education   Y/N

O past   O wrap-around/school assistant   +/- outcome

O present   O wrap-around/school assistant   +/- outcome

Gifted education   Y/N

O past +/- outcome

O present   +/- outcome

Other psychological diagnoses:

Medical diagnoses:

Current treatment regimen:

O psychotherapy   O medication (name of med) _____

O none   O other_____

Other biological family members diagnosed with Asperger's Disorder? Y/N

     If Yes, who? _____

Other biological family members diagnosed with Autism? Y/N

     If Yes, who? _____

APPENDIX C

The Asperger Syndrome Diagnostic Interview (ASDI)

(Gillberg, Gillberg, Rastam, & Wentz, 2001)

Identification # _____ **DOB** ____ **Informant** _____
Interviewer _____ **Date of Interview** ____

Instructions to Interviewer: This interview is intended for clinicians well acquainted with Asperger syndrome and other disorders in the autism spectrum, even though there is no requirement for "expertise." The interview is investigator-based, i.e. the rater is expected to score each item only after determining that he/she has elicited sufficient information for a qualified rating to be made. This means that all the 20 areas listed need to be probed in some detail. Examples of behaviors should be provided by the informant before a rating is assigned. The questions should, if at all possible, be read to the informant as they are written, but may occasionally be slightly reworded in order to assure that the relevant area of functioning has been adequately covered.

Scores: 0 = does not apply   1 = applies to some degree or very much

Area 1: severe impairments in reciprocal social interaction (extreme egocentricity)

1. Does he/she exhibit considerable difficulties interacting with peers?   0 1
   If so, in what way?
2. Does he/she exhibit a low degree of concern or a seeming lack of
   interest in making friends or interacting with others?   0 1
   If so, please specify:
3. Does he/she have problems in appreciating social cues, i.e. does he/she
   fail to note changes in the social conversation/interaction or take
   account of such changes in his/her ongoing interaction with other
   people?   0 1
   If so, please describe:
4. Does he/she exhibit socially or emotionally inappropriate
   behaviors?   0 1
   If so, in what way/s?
(Two or more scores of 1 = criterion met)

Area 2: all absorbing narrow interest pattern(s)

5. Is there a pattern of interest or a specific interst which takes up
   so much of his/her time that time for other activities is clearly restricted?   0 1
   If there is, please comment:
6. Is there a repetitive quality to his/her interest patterns or specific
   interest?   0 1
   If so, please specify:
7. Are his/her interest patterns based more on rote memory than on
   true meaning?   0 1
(One or more scores of 1 = criterion met)

Area 3: imposition of routines, rituals, and interests
8. Does he/she try to introduce and impose routines, rituals, or interests
    on himself/herself in such a way as to produce problems for himself?   0   1
        If so, in what way?
9. Does he/she try to introduce and impose routines, rituals, or interests
    on himself/herself in such a way as to produce problems for others?   0   1
(One or more scores of 1 = criterion met)

Area 4: speech and language peculiarities
10. Was his/her language development delayed?   0   1
        If so, please comment:
11.Is his/her language 'superficially perfect' regardless of whether or
    not there are comprehension problems or other speech and language
    problems?   0   1
        If so, please comment:
12. Is his/her language formal, pedantic, or 'overly adult'?   0   1
        If so, please describe:
13.Is there any characteristic about his/her voice (pitch, volume, quality,
    intonation, word stress, 'prosody' etc.) which you find peculiar or
    unusual?   0   1
        If so, in what way?
14.Are there any comprehension problems (including misinterpretations,
    of literal/implied meanings)?   0   1
        If so, what kind of problems?
(Three or more scores of 1 = criterion met)

Area 5: non-verbal communication problems
15. Does he/she make limited use of gestures?   0   1
        If so, please comment:
16. Is his/her body language awkward, gauche, clumsy, strange, or unusual?   0   1
        If so, please comment:
17. Are his/her facial expressions limited to a rather small repertoire?   0   1
        If so, please describe:
18. Is his/her general expression (including facial) sometimes inappropriate?   0   1
        If so, please describe:
19. Is his/her gaze stiff, strange, peculiar, abnormal, or odd?   0   1
        If so, please characterize:
(One or more scores of 1 = criterion met)

Area 6: motor clumsiness
20.Has he/she been noted to perform poorly on neurodevelopmental
    examinations either in the past or in connection with the present interview?   0   1
        If so, please comment:

APPENDIX D

(On departmental letterhead)

<u>INFORMED CONSENT FORM</u>
TITLE OF STUDY

Pragmatic Language and Social Skills Functioning in Children Diagnosed with Asperger's Disorder

PURPOSE

The purpose of this research is to find out if it is possible, using paper and pencil tests, to measure the connection between the child's ability to use language and his or her ability to interact with others appropriately at home and at school.

You are being asked to permit your child to be in this research study because there may be a unique connection between the way that children with Asperger's Disorder use language and the way they behave in social settings. If so, information about this connection could help clinical and school psychologists to more clearly describe the strengths and weaknesses of children in this population. This type of information could be used to provide better treatment plans and educational guidance plans for children with Asperger's Disorder.

If your child does not have a diagnosis of Asperger's Disorder, or has had a head injury which included a loss of consciousness, he or she can not be in this study.

INVESTIGATOR(S)
<u>Principle Investigator:</u>
Name: Beverly White, Psy.D.

Department: Department of Psychology, Philadelphia College of Osteopathic
              Medicine

Address: 4190 City Avenue, Rowland Hall, Philadelphia, PA 19131

Phone: 215.871.6497

<u>Responsible Investigator</u>
Name: Donna L. Yaure, M.S.

Department: Department of Psychology, Philadelphia College of Osteopathic
              Medicine

Address: 4190 City Avenue, Rowland Hall, Philadelphia, PA 19131

Phone: 215.871.6385

The tests you are being asked to volunteer for are part of a research project.

If you have any questions about this research, you can call Dr. Beverly White at (215) 871-6497.

If you have any questions or problems <u>during</u> the study, you can ask Dr. Beverly White, who will be available during the entire study. If you want to know more about Dr. White's background, or the rights of research subjects, you can call the PCOM Compliance Specialist at (215) 871-6782.

<u>DESCRIPTION OF THE PROCEDURES</u>

If you decide to be in this study, you will be asked to:

1) Complete 2 paper and pencil questionnaires about your child in the waiting room.
    a. A 10 minute developmental and medical history questionnaire about your child.
    b. A 20 minute Social Skills questionnaire about your child.
2) While you are in the waiting room, I will administer the following tests to your child:
    a. A 20 minute test of well-learned information and problem-solving.
    b. A 50 minute test of language. I will ask questions and your child will answer these questions verbally or point to pictures to answer the questions.
    c. If he is in Grade 3 or higher, you child will complete a 10 minute questionnaire about his social interactions with others.
3) Participate in an interview lasting approximately 20 minutes. You will be asked about your child's diagnosis and treatment of Asperger's Disorder.
4) You will be given 2 behavioral checklists that will be completed by the teacher with whom your child spends the most number of hours per week. These will be mailed back to the researcher. This information will be included with your child's records in a locked file.

The study will take 2 hours for each session. There will be 1 session over the course of 1 day for a total of 2 hours of your time.

<u>POTENTIAL BENEFITS</u>

You may not benefit from being in this study. Other people in the future may benefit from what the researchers learn from the study.

RISKS AND DISCOMFORTS

Some children have difficulty complying with the demands of an individualized testing session during and extended period of time. If this is the case with your child, rest breaks will be offered, as needed, in order to ensure his comfort throughout the testing session. If the child becomes frustrated or simply chooses not to engage in the testing process after it has begun, he may ask the researcher to stop testing at any time with no penalty.

ALTERNATIVES

The other choice is to not be in this study and to attend the public dissertation defense of the student researcher in order to learn about the outcome of the study on the group of individuals who did choose to participate.

PAYMENT

You will receive $20 and be given a parking voucher worth $5 for being in this study.

CONFIDENTIALITY

All information and medical records relating to your participation will be kept in a locked file. Only the doctors, members of the Institutional Review Board and the US Food and Drug Administration will be able to look at these records. If the results of this study are published, no names or other identifying information will be used.

REASONS YOU MAY BE TAKEN OUT OF THE STUDY WITHOUT YOUR CONSENT

If health conditions occur that would make staying in the study possibly dangerous to you, or if other conditions occur that would damage you or your health, Dr. Christina Esposito or her associates may take you out of this study.

In addition, the entire study may be stopped if dangerous risks or side effects occur in other people.

NEW FINDINGS

If any new information develops that may affect your willingness to stay in this study, you will be told about it.

INJURY

If you are injured as a result of this research study, you will be provided with immediate necessary medical care.

However, you will <u>not</u> be reimbursed for medical care or receive other payment. PCOM will <u>not</u> be responsible for any of your bills, including any routine medical care under this program or reimbursement for side effects that may occur as a result of this program.

If you believe you have suffered injury or illness in the course of this research, you should notify the PCOM Research Compliance Specialist at (215) 871-6782. A review by a committee will be arranged to determine if your injury or illness is a result of you being in this research. You should also contact Dr. Goldstein if you think you have not been told enough about the risks, benefits, or other options, or that you are being pressured to stay in this study against your wishes.

VOLUNTARY PARTICIPATION

You may refuse to be in this study. You voluntarily consent to be in this study with the understanding of the known possible effects or hazards that might occur while you are in this study. Not all the possible effects are known.

You or your child may stop the testing session at any time.

If you drop out of this study, there will be no penalty or loss of benefits to which you are entitled.

I have had adequate time to read this form and I understand its contents. I have been given a copy for my personal records.

I permit my child to be in this research study.

I agree to be in this study.

I agree to permit the use of information provided by my child's teacher as described above.

Signature of Parent/Guardian: _____

Date: _____   Time: _____ AM/PM

I assent to participation in this research study.

Signature of Child Participant: _____

Date: _____   Time: _____   AM/PM

Signature of Witness: _____

Date: _____   Time: _____ AM/PM

Signature of Investigator or Designee: _____
        (circle one)

Date: _____   Time: _____ AM/PM

APPENDIX E

Philadelphia College of Osteopathic Medicine

Release of Information

Donna L. Yaure, M.S., is hereby authorized to speak to my child's teacher,

_____
Teacher's Name

_____
School Name

_____
Address

_____
City   State   ZIP

_____
School Phone

regarding completion of the following forms: Social Skills Rating Scale, Teacher

Form and the Krug Asperger's Disorder Index. The purpose of this contact will be to

assist the teacher in completing the forms and to facilitate data collection for the

dissertation project. Permission to contact the teacher will be limited to 90 days

following the date of completion of this release form.

_____   _____
Parent/Guardian   Date

_____   _____
Child   Date

_____   _____
Donna L. Yaure, M.S.   Date

APPENDIX F

**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

**CLINICAL RESEARCH RESULTS
ASPERGER'S DISORDER PROJECT**

--CONFIDENTIAL—

Name of Child: _____ DOB: _____ Age: _____ Sex: __ Grade: __
Date of Evaluation: _____ Examiner: _____

RESULTS

Cognitive Testing

The *Kaufman Brief Intelligence Test-Second Edition (KBIT-2)* is a standardized measure of cognitive functioning. These test results reflect your child's performance as compared to age-based normative data.

	Standard Score	Confidence Interval	Percentile Rank	Performance Level
Composite IQ:				
Verbal IQ:				
Nonverbal IQ:				

Language Testing

The *Comprehensive Assessment of Spoken Language (CASL)* is a standardized measure of oral language functioning. These test results reflect your child's performance as compared to age-based normative data.

	Standard Score	Confidence Interval	Percentile Rank	Performance Level
Composite score:				
Lexical Index:				
Lexical/Semantic subtests:				
Antonyms				
Synonyms				
Sentence Completion				
Idiomatic Language				

	Standard Score	Confidence Interval	Percentile Rank	Performance Level

Syntactic Index:
Syntactic subtests:
Syntax Construction
Paragraph Comprehension
Grammatical Morphemes
Sentence Comprehension
Grammaticality Judgment

Supralinguistic Index:
Nonliteral Language
Meaning from Context
Inference
Ambiguous Sentences

Pragmatic subtest
Pragmatic Judgment

Receptive Index:
Expressive Index:

NOTE: These test results were obtained during data collection for a clinical research study and should not be used for diagnostic purposes. These results were not obtained during a standard clinical evaluation. Adequate interpretation of these test results needs to be performed by a doctoral level, licensed psychologist with experience in psychometric testing and evaluation, or a licensed specialist in pediatric speech and language development. If you choose to seek further interpretation of these test results, a referral will be provided to you upon request.