

Younger Siblings of Children with Autism: Cognitive, Language, and Social
Skills

Alexa M. Schwartz

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ABSTRACT

Autism has a known genetic linkage shown by increased prevalence of the syndrome in probands. Research has shows that those who do not necessarily fit the clinical diagnosis of autism may display sub-threshold traits, referred to as the broader phenotype of autism. This study looks at younger siblings of children with autism two times over the course of 1.5 years, with entry in the study at 12-23 months. This group is compared to a control group of siblings of typically developing children. 68 children participated in this study (42 male, 27 female) in two groups Sibs-ASD (n=41) and Sibs-TD (n=28). Groups are compared in language, cognitive, social performance and early predictive factors of later diagnosis. Results show that the Sibs-ASD show deficits at Time 1 in cognitive skill and social development, and have worse diagnostic outcomes than Sibs-TD. Within the sibs-ASD group females scored higher than males in the areas of language and cognitive ability. Early predictors of eventual autism spectrum diagnosis were found in lower performance on directing and requesting behaviors, expressive language and social skills.

INTRODUCTION

Autism is a developmental disorder that is defined by abnormal communication and social functioning, as well as the presence of restricted and repetitive behavior. A child must display these symptoms by three years of age to be diagnosed as having autism (World Health Organization, 1992). Autism is primarily diagnosed using ICD-10 (World Health Organization, 1992) or DSM-IV (American Psychiatric Association, 2000) criteria and is often described as a spectrum disorder. This means that those diagnosed with autism may vary significantly in terms of symptoms displayed and severity of those symptoms. The spectrum of people with autistic disorders includes individuals with different levels of language ability and different levels of intelligence. Asperger's Syndrome and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) are included on the autism spectrum. Autism Spectrum Disorders affect between 1/166 (Smalley, Asarnow, & Spence, 1988) and 1/150 of the population (CDC, 2007) with a 3:1 male to female ratio of incidence (Hill & Frith, 2003).

Much research has been done in attempt to find the cause of autism; however, no clear answers have been found to date. There is a known genetic component shown by higher concordance rates of monozygotic twins (MZ) compared to dizygotic (DZ) twins (Dawson et al., 2002; Le Couteur, Bailey, Rutter, & Gottesman, 1989; Folstein & Rutter, 1977). MZ twins have concordance rates of autism ranging from 36-95%, but DZ concordance rates have been found to be significantly lower (Boutin et al., 1997). However, because the concordance rate of monozygotic twins is not 100%, we know that autism is not solely a genetic disorder. Non-twin siblings of children with autism also have a higher risk of being diagnosed with autism than exists in the general population. In

their review, Smalley, Asarnow, and Spence (1988) found the recurrence risk of autism in siblings to be approximately 3%-8%, with the prevalence in the general population 50 to 100 times less.

The increased recurrence risk of autism in siblings has led to the design of longitudinal studies examining younger siblings of children with autism starting at ages before autism can be diagnosed (Cassel et al., 2007; Gamliel, Yirmiya, & Sigman, 2007; Georgiades et al., 2007; Presmanes, Walden, Stone, & Yoder, 2007; Sullivan et al., 2007; Toth, Dawson, Meltzoff, Greenson, & Fein 2007; Yamiya, Gamliel, Shaked, & Sigman, 2006; Yirmiya & Ozonoff, 2007). This form of study allows researchers to collect prospective data for later analysis of early symptoms after a child has been diagnosed.

From these longitudinal studies we know that younger siblings of children with autism show characteristics that differentiate them from younger siblings of typically developing children. Younger siblings of children with autism typically had worse receptive and expressive language skills at 24 and 36 months of age than siblings of typically developing children (Toth et al., 2007; Yirmiya et al., 2007). Gamliel, Yirmiya, & Sigman (2007) found that cognitive skills of siblings of children with autism were significantly lower than those of siblings of typically developing children at 24 and 36 months, but that differences disappeared by 54 months. Toth et al. (2007) also found that IQ scores were lower for siblings of children with autism. Social skills of younger siblings with autism may also be lower than social skills of younger siblings of typically developing children (Toth et al., 2007).

Siblings and other relatives of children with autism often display the characteristics of autism to a lesser degree throughout life. A child who displays sub-

clinical levels of social and language impairment or restricted, repetitive behaviors is considered to have the “broader autism phenotype.” Many siblings and relatives of children with autism are considered to exhibit this broader autism phenotype, even though they have not been diagnosed with autism (Constantino & Todd, 2005; Pickles et al., 2000). Even within a single family in which two children are diagnosed with autism, whether or not they are twins, the siblings often display varying degrees of severity and different relative strengths and weaknesses (Le Couteur et al., 1996; Spiker et al. 1994;). Siblings who do not meet the full clinical criteria autism but are part of the broader phenotype typically display social and communicative impairments, but not repetitive behaviors in isolation (Bailey, Palferman, Heavey, & Le Couteur, 1998).

Research shows that some parents of children with autism may also display aspects of the broader autism phenotype. Parents of children with autism may display general or specific cognitive, mental, and/or social impairments. Boutin et al. (1997) found a 17% rate of parental cognitive impairments (i.e. learning disabilities, language delay, or autism) in parents of children with autism. Degree of parental social impairment has been shown to be correlated with offspring social impairment. If a child has two parents who score in the top 25% on the standardized Social Responsiveness Scale, an indication that the parents are socially impaired, the child is more likely to have social impairments that are severe enough to warrant a clinical diagnosis of autism (Constantino & Todd, 2005) than a child whose parents are not socially impaired. Research looking at the prevalence of psychiatric disorders in parents of children with autism has found some significant patterns. Family history, case-control, and large scale register-based studies have all examined which parental mental disorders correlate with

offspring autism spectrum diagnosis. Parental diagnosis of obsessive compulsive disorder, schizophrenia, and depression have all been linked to higher rates of autism in offspring (Bailey, Palferman, Heavey, & Le Couteur, 1998; Bolton, Pickles, Murphy, & Rutter, 1998; Larsson et al., 2005; Lauritsen, Pedersen, & Mortensen, 2005).

Although much research has been done on the families of autism probands-- the clinically affected child in the family--familial risk factors, and the display of the broader phenotype in relatives, there are many limitations to the extant research. Differences in procedure and type of study make comparing studies difficult. Furthermore, the current understanding of autism is still constantly evolving. It is a complex disorder that manifests itself in a variety of ways and to varying degrees of severity. Because of this, it is difficult to isolate risk factors and to conclude that a correlation found between parents and children is unique to autism as a whole or just one of the aspects (social, communicative, cognitive) that all interplay in an autism diagnosis. Even with the broadening of the definition of autism, it is still a disorder that strikes a relatively small percentage of the population. This makes finding the large samples needed for a reliable study difficult. This becomes even more of an issue when you try to look at the even smaller population of twin pairs and siblings with autism. Finally, because autism spectrum disorders are so complex and vary from one child to the next, finding appropriate control groups is difficult. Typically developing groups as well as groups with mental retardation, Down's syndrome, or developmental delays have previously been used. Along with the issue of choosing control groups comes the issue of isolating cause and effect. For example, if a study showed that a group of parents of children with autism had lower verbal skills than a group of parents of typically developing children, it

would be difficult to tell if this risk was unique to autism or might also be seen in parents of children with other disorders.

This study will attempt to look at the development of broader phenotypic characteristics in younger siblings of children with autism. Previous research has typically looked at siblings of children with autism at a single time point or relied on information collected from parents about developmental histories. Further, most of these studies have looked at children over eight years old. This study attempts to give insight into the development of siblings by collecting longitudinal data in a lab setting over the course of two years. Younger siblings entered the study between the ages of 12 and 23 months. By measuring children at such a young age, prior to when autism is typically diagnosed, we were able to see if children with family histories of autism look different from typically developing children and, if so, when these differences first become apparent and what exactly these differences may be.

Looking at children at risk for autism and broader phenotypic characteristics at a young age is important for their future outcomes. Previous research in autism and a variety of other developmental disorders has clearly shown the benefits and importance of early intervention. Identifying early warning signs of future weaknesses in social and language skills will allow for early intervention, and hopefully better outcomes. By using a variety of different measures in a lab setting, we will be able to understand specific deficiencies and symptoms of children with family histories of autism. The prospective design used will allow for more accurate data than that collected from retrospective parent interviews or home videos used in previous studies.

The purpose of this study is to examine whether younger siblings of children with autism look different, as a group, from siblings of typically developing children and whether children with family history of autism have worse outcomes than children without a family history of autism. Additionally, based on prior research showing gender differences in the incidence of autism, we aim to examine whether males with a family history of autism are at higher risk for a future diagnosis of autism or show more symptoms of the broader autism phenotype. This study will specifically look to test the following four hypotheses: Hypothesis 1: As a group, children with family histories of autism spectrum disorders (i.e., younger siblings of children with autism spectrum disorders) will have weaker social and language skills than children without a family history of autism (i.e., younger siblings of typically developing children) at the first and last times they are observed in the study; Hypothesis 2: Children with a family history of autism will have worse outcomes and will be more likely to be diagnosed with a developmental disorder; Hypothesis 3: A stronger family history of autism (i.e., more first degree relatives with autism spectrum disorders) would render younger siblings more likely to show social and language delays at the first and last times they are observed in the study; Hypothesis 4: Certain types of symptoms in first degree relatives will be more associated with impairments in younger siblings relative to other types of symptoms. Additionally, data were examined for gender effects and factors that were predictive of eventual outcomes.

METHODS

Participants

This study used a subset of data from an ongoing longitudinal study conducted by Wendy Stone, Ph.D. following younger siblings of children both with and without an autism spectrum disorder over the course of 1.5 years at five time points. Participants were recruited into two groups: younger siblings of children with autism spectrum disorders (Sibs-ASD) and a control group of younger siblings of typically developing children (Sibs-TD). Inclusion criteria for children in the Sibs-ASD group were as follows: 1) An older sibling with a diagnosis of autism or PDD-NOS as determined by DSM-IV-TR, ADI-R or ADOS-G criteria; 2) Absence of severe motor or sensory impairments; 3) Absence of identified metabolic, genetic, or progressive neurological disorders. Inclusion criteria for the Sibs-TD group were as follows: 1) An older sibling with typical development; 2) Mental age score (MA) no more than 25% below their chronological age; 3) No family history of autism or mental retardation in their first degree relatives; 4) Absence of severe motor or sensory impairments; 5) Absence of identified metabolic, genetic, or progressive neurological disorders. Children were enrolled in the study and completed their first session between the ages of 12-23 months (mean age = 16 months). Following enrollment participants came back to the lab every 4 months for a total of 5 sessions. This study included only participants who had completed both their first and fourth sessions to allow outcome analyses; in a few cases, if the child had reached the fifth session, diagnostic outcome data was used from that

session. Participants returned for their fourth session between the ages of 23-37 months (mean age = 29 months)

The resulting sample consisted of 69 participants (42 male, 27 female) split into two groups, Sibs-ASD (n=41) and Sibs-TD (n=28). The sample was 86% Caucasian, 3% African American, 3% Hispanic, and 8% multi-racial, with over 72% of mothers having completed 4 or more years of college. The two groups did not differ on race, maternal education or chronological age at time 1 or 4.

At the initial evaluation all children were evaluated with the Screening Tool for Autism in Two-Year-Olds (STAT) (Stone et al., 2000), Childhood Autism Rating Scale (CARS) (Schopler, Reichler & Renner, 1986), Social Behavior Checklist (SBC) (Stone & Lemanek, 1990), MacArthur Communicative Development Inventory (MCDI) (Fenson et al. 1993), Mullen Scales of Early Learning (MSEL) (Mullen, 1995) and Detection of Autism by Infant Sociability Interview (DAISI) (Wimpory, Hobson, Williams, & Nash, 2000). Parents were asked to complete the Family History Form and Family Information Form. At the fourth session, data was collected for Sibs-ASD on the STAT, MSEL, CARS, MCDI and Autism Diagnostic Scale-Generic (ADOS-G) (Lord et al., 2000), and for Sibs-TD on the STAT and MCDI. Parents were asked to update the Family Information Form. Diagnostic decisions were made by licensed psychologists who were experienced in the diagnosis of young children with autism.

Measures

Parent Collected:

Detection of Autism by Infant Sociability Interview (DAISI; Wimpory, Hobson, Williams, & Nash, 2000). The DAISI is a semi-structured interview collected from parents. The interview gathers retrospective information about the infant's sociability before the age of two. The items assess different types of social interactions, both dyadic and triadic. Research has shown that when parents are administered the DAISI when their child is between the ages of two and four and has not yet been diagnosed with autism, scores differentiate the children into a subgroup with autism and a subgroup with developmental delays (Wimpory et al., 2000). In this study, the DAISI was collected from parents of both the Sibs-ASD and Sibs-TD groups at the first session.

MacArthur Communicative Development Inventory (MCDI; Fenson et al. 1993): The MCDI is a measure of childhood vocabulary. This measure consists of a checklist filled out by parents. The parent indicates both specific words that their child understands and words that their child says on the checklist. Levels of internal consistency for the MCDI have been reported to be adequate. (Fenson et al., 1993). This measure will be administered to both groups at times 1 and 4.

Social Behavior Checklist (SBC; Stone & Lemanek, 1990): The SBC is a parental report measure of social behaviors. This measure is an expanded version of the Preschool Social Behavior Checklist (Stone & Lemanek, 1990). The social behaviors measured are independent of the child's language level. Items are presented as statements and parents are asked to rate how true each particular statement is for their child on a 3-point scale where 0-almost never, 1-sometimes, 2-almost always. Scores

range from 0-60 with higher scores indicating more desirable social adaptive behavior. This measure was administered to both groups at the first session.

Family Information Form: At their initial evaluation, parents completed a form that included questions about parental occupation and educational history. This information was used to calculate socioeconomic status according to Hollingshead's Four Factor Index of Social Status (Hollingshead, 1975). This variable was used to describe samples, and not for analysis purposes.

Family History Form: This measure was a semi-structured interview. The interviewer asked the parent for a family history on their immediate family, brothers and sisters (youngest to oldest), parents, grandparents and cousins. Parents were asked to describe any developmental or social difficulties these family members had as a child or if they have received special services in school, and as adults, did these family members have mental or emotional health problems such as depression, anxiety, OCD, schizophrenia, or Tourette's Syndrome. Answers were coded into seven categories: Autism Spectrum Disorder, Speech and Language Disorder, Other Developmental Disorder-Excluding Language, Obsessive-Compulsive Disorder, Other Mental Health Disorders, Unconfirmed Social Issues, and Typical. Please see appendix for description of categories and list of non-examples and a sample family history form.

Observational Measures:

Mullen Scales of Early Learning (MSEL; Mullen, 1995): The MSEL is an observational measure collected when the child is in the lab. The MSEL measures cognitive function with four cognitive scales and a gross motor scale. Only the four cognitive scales (i.e., visual reception, fine motor, receptive language, expressive

language) were administered. The MSEL was developed for use with children from birth to 68 months. Test-retest reliability for the MSEL ranged from .71 to .79, and inter-scoring reliability ranged from .98 - .99 across the scales (Mullen, 1995). The correlation between the MSEL composite and the Bayley Mental Development Index was .70, and correlations were found between specific cognitive scales and established tests of language development (Mullen, 1995). The MSEL was administered to both Sibs-ASD and Sibs-TD at time 1 and Sibs-ASD at time 4.

Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1986): The CARS is a 15-item observational scale that is used as a diagnostic measure for autism. CARS items assess behaviors relating to people, resistance to change, communication, and body use. Each behavior is rated on a 4-point scale (including midpoints) according to its degree of abnormality and scores across the 15 items are summed to obtain a total score. Total scores above 30 suggest the presence of autism. Test-retest reliability for the total score is .88. (Schopler et al., 1986). The CARS has been found to be superior to other diagnostic instruments for autism in its discriminant validity (Teal & Wiebe, 1986) and other psychometric properties (Morgan, 1988). The total CARS score was used in the present project. The CARS was administered to Sibs-ASD and Sibs-TD at time 1 and Sibs-ASD at time 4.

Autism Diagnostic Scale-Generic (ADOS-G; Lord et al., 2000): The ADOS-G is a semi-structured observational assessment of play, social interaction, and communicative skills that was designed as a diagnostic tool for identifying the presence of autism. It is organized into four modules each meant to be used with individuals functioning at different developmental levels, ranging from nonverbal children to highly

fluent adults. Each module provides a set of behavioral ratings and an algorithm that is used to diagnose autism and PDD-NOS/ autism spectrum disorder. Across all modules, inter-observer agreement for the algorithm score was .92, and the test-retest correlation was .82 (Lord et al., 2000). Agreement about diagnostic classification (autism vs. PDD-NOS vs. non-spectrum) ranged from 81%-93% (Lord et al., 2000). Modules 1 and 2 are used for this study. The ADOS-G will be administered to Sibs-ASD at visit 4.

Screening Tool for Autism in Two-year-olds (STAT; Stone et al., 2000; 2004).

The STAT is an observational measure used to differentiate young children at risk for autism spectrum disorders from non-autistic children with language or developmental delays. Items on the STAT were developed on the basis of their ability to differentiate between children with autism and controls developmentally-matched on mental age and/or developmental delay and language delay. The STAT consists of 12 items in the areas of play, imitation, and communication. The STAT is administered in a game-like manner and is usually completed in less than 20 minutes. The child and examiner sit near each other on the floor for the various tasks. Previous research with the STAT has demonstrated strong screening properties as well as test-retest reliability, inter-observer agreement, and concurrent validity with diagnostic measures. Originally designed as a screening measure for children from 24 months through 35 months, the STAT has also been found to provide an excellent context for measuring social and communication behaviors and skills in children younger than 24 months.

See Table 1 for Schedule of Measures

RESULTS

For between group comparisons at Time 1, the performance of the Sibs-ASD and Sibs-TD was assessed using the MSEL, STAT, DAISI, MCDI, CARS and SBC. Between group comparisons at Time 4 were only made on the STAT and MCDI, because these were the only measures collected for Sibs-TD at Time 4. For within group comparisons of the Sibs-ASD group at Time 1, the MSEL, STAT, DAISI, MCDI, CARS and SBC were used. The same measures were used for within group comparisons of the Sibs-ASD group at Time 4 with the addition of the ADOS-G. T-tests were used for these analyses.

Hypothesis 1 was that children with family histories of ASD would have lower performance on measures of cognitive, language, and social communicative measures at times 1 and 4. At Time 1, significant group differences were found for the MSEL, CARS, and DAISI. On the MSEL, group differences were found for the Visual Reception subtest score, $t(67) = -3.16, p=0.002$, and for the overall MSEL Early Learning Composite (ELC) score, $t(67) = -1.99; p = .05$, with Sibs-ASD scoring significantly lower than Sibs-TD. On the CARS, Sibs-ASD scored significantly lower than Sibs-TD, $t(67) = 2.93; p=0.005$, suggesting that Sibs-ASD show more abnormal behaviors at Time 1. While group means both show CARS scores below the autism cutoff of 30 (Sibs-ASD = 19.01, SD = 5.01; Sibs-TD = 16.196, SD = .98), two children in the Sibs-ASD group scored above 30, while no children in the Sibs-TD group scored above a 19. Sibs-ASD also scored significantly lower on the DAISI than Sibs-TD $t(67) = -2.35; p=0.023$, indicating that children in the Sibs-ASD group show less desirable patterns of social interaction that

children in the Sibs-TD group. There were no significant group differences on the STAT, MCDI, or SBC (see Table 3).

At Time 4, there were no significant group differences on the STAT or the MCDI (the only measures available for both groups), indicating that Sibs-ASD did not have lower receptive or expressive vocabulary or more impaired social-communication skills than Sibs-TD at a mean age of 29 months.

Hypothesis 2 was that children with a family history of autism will have worse outcomes than children without a family history of autism, and will be more likely to be diagnosed with a developmental disorder. Chi-square was used to compare groups on diagnosis at Time 4. Results revealed that the two groups did differ by diagnostic outcome at Time 4, $\chi^2(4, N = 68) = 11.25, p=0.024$, with 32.5% of Sibs-ASD receiving some diagnosis (N=13) (Autism, PDD-NOS, language delays, and developmental delays) and 0% of Sibs-TD receiving any diagnosis (see Table 3).

Hypothesis 3 was that a stronger family history of autism (i.e., more first degree relatives with autism spectrum disorders) would render younger siblings more likely to show social and language delays at time 1 and 4. This hypothesis was unable to be tested due to the fact that only one Sib-ASD had more than one sibling with autism and no children had a parent with autism. Therefore, we looked at severity of family history in terms of proband diagnosis. Within the Sib-ASD group, children whose older siblings had a diagnosis of PDD-NOS or Asperger's Disorder (N = 14) were compared with those whose siblings had a diagnosis of autism (N = 26) to see if proband diagnosis was associated with the child's performance on the MSEL, STAT, MCDI, SBC, DAISI, and CARS at times 1 and 4. No group differences were found at Time 1 (see table 4). At

Time 4, significant group differences were found on the MSEL Fine Motor subtest scale, showing that, on average, siblings of children with autism scored lower than siblings of children with PDD-NOS or Asperger's Disorder, $t(36)=-2.91, p=0.006$. T-tests comparing sibling STAT scores showed no significant group differences (see table 5). For the Sibs-ASD group a chi-square examining the relation between proband diagnosis and the younger sibling's eventual diagnostic outcome did not yield significant results.

Hypothesis 4 was that certain types of symptoms in first degree relatives will be associated with impairments in Sibs-ASD. This hypothesis was tested using the subset of Sibs-ASD with family history data available. Of the 69 participants, 51 participants (31 male, 20 female) had family history data collected. First chi-squares were used to examine whether any family history diagnoses (excluding ASD) were more prevalent in Sibs-ASD compared to Sibs-TD. 14 Sibs-ASD and 7 Sibs-TD had a family history of some developmental or psychiatric disorder (see table 7). No significant results were found. Next, separate chi-squares were tested for each diagnostic category. Results approached significance for speech and language disorders, $\chi^2(3, N=51) = 7.75, p = 0.052$, with more Sibs-ASD showing a family history of speech and language disorders than Sibs-TD. There was no difference in the proportion of children in the Sibs-ASD and Sibs-TD group with family members with developmental delays, OCD, mental health conditions, or undiagnosed social problems.

Next we looked at the Sibs-ASD group to see if family history of specific diagnostic categories was associated with delayed cognitive status at Time 1 and/or diagnostic status (Autism Spectrum or not) at Time 4. No family members reported

having a history of Obsessive-Compulsive Disorder in first-degree relatives, so this category was eliminated. Logistic regressions did not show any significant results. This may have been due to the very small sample sizes in each of the six family history categories (see table 7).

Gender Effects:

Although not part of our original research hypotheses, we looked for gender differences on measures for the overall sample, and within the Sibs-ASD group. When looking at the overall sample, females scored higher than males on the MSEL ELC $t(68) = -2.08, p=0.041$ and the total number of STAT play items passed $t(68) = -2.64, p=0.10$ at Time 1. No gender differences were seen at Time 1 for any other MSEL or STAT scores or for SBC, DAISI, MCDI or CARS. At Time 4, females still scored higher on STAT plat items, $t(68)=-1.59, p=0.003$. Females also had better expressive language as measured by the MCDI, $t(61)=-2.22, p=.030$.

The Sibs-ASD group was examined for within-group gender differences at Times 1 and 4. At Time 1, females scored higher than males on the MSEL Expressive Language subtest score, $t(39) = -2.19; p=0.035$, and the MSEL ELC, $t(39) = -2.14; p=0.039$. No group differences were found for other MSEL scores, the STAT, SBC, MCDI, CARS or DAISI. The group differences on the MSEL ELC, but not Expressive Language subtest, remained at Time 4, $t(37) = -2.57; p=0.014$. At Time 4, females also scored higher than males on the MSEL Receptive Language subtest score, $t(37) = -2.89; p=0.006$ and on the MCDI expressive language measure, $t(39) = -2.05; p=0.047$. Females showed better performance on the overall STAT score at Time 4, $t(39) = 2.10; p$

=0.042, and on the number of play items passed, $t(39) = -3.48, p=0.001$. No group differences were seen for the other MSEL subtests, STAT sub-scores, MCDI receptive language measure, DAISI or CARS (see tables 8.1 and 8.2)

Male Sibs-ASD (N = 24) were compared to male Sibs-TD (N = 18) at Time 1 on all measures. Male Sibs-ASD scored lower on the MSEL Visual Reception subtest score, $t(40) = -3.45, p=0.001$, and on the MSEL ELC, $t(40) = -2.54, p=0.015$, on the CARS, $t(40) = 2.63, p=0.012$, and the DAISI, $t(29) = -2.25, p=0.032$. Differences remained on the MSEL Visual Reception, MSEL ELC, and CARS even when the seven males in the Sibs-ASD group who were later diagnosed with autism were removed (see table 9). There were no group differences were seen between male sibs-ASD and Sibs-TD at time 4 for the measures available (STAT and MCDI). Female Sibs-ASD (N = 17) were also compared to female Sibs-TD (N = 10) at Time 1 on the MSEL, STAT, MCDI, CARS, and DAISI. No group differences were seen on these measures at time 1. Additionally, at time 4 no group differences were seen between female Sibs-ASD and female Sibs-TD on the MCDI and STAT.

Early Predictors of Diagnostic Status:

Finally, we were interested in seeing if the subset of Sibs-ASD who were eventually diagnosed with Autism Spectrum Disorders (Autism or PDD-NOS) (N = 7) differed from the remainder of the group that was not diagnosed with an autism spectrum disorder (N=34). While the ASD sample was small, some interesting results were found, especially at Time 1. At Time 1, those children eventually diagnosed with ASD scored significantly lower on the MSEL Expressive Language subtest score, $t(39) = -1.676, p=0.49$. On the STAT, this subset scored lower on requesting behaviors $t(39) = 2.77,$

$p=0.026$, and directing attention behaviors, $t(39)=-2.58$; $p=0.014$, and on the total STAT score, $t(24.52)=4.71$, $p=0.009$. Additionally, they scored lower on the DAISI, $t(6.80)=-3.03$; $p=0.20$ There were no group differences at Time 1 on the remaining MSEL and STAT scores, the CARS, SBC, MCDI or DAISI (see table 10).

As expected, children eventually diagnosed with autism scored lower on all available measures at Time 4: CARS, $t(37)=4.99$, $p=0.000$, MSEL Visual Reception, $t(37)=-2.05$, $p=0.048$, MSEL Fine Motor, $t(37)=-2.59$, $p=0.014$, MSEL Receptive Language, $t(37)=-3.53$, $p=0.001$, MSEL Expressive Language, $t(37)=-3.08$, $p=0.004$, MSEL ELC, $t(37)=-3.69$, $p=0.001$, STAT Play Items, $t(39)=-2.55$, $p=0.015$, STAT Requesting Items, $t(39)=-3.53$, $p=0.001$, STAT Directing Attention Items, $t(39)=-3.97$, $p=0.000$, STAT Imitation Items, $t(39)=-2.328$, $p=0.025$, STAT Total Score, $t(39)=4.623$, $p=0.000$, and MCDI Expressive Language $t(39)=-3.14$, $p=0.003$. MCDI receptive language scores did not show significant group differences (see table 11).

General Discussion

This study set out to determine whether younger siblings of children with autism perform differently than younger siblings of typically developing children on measures of language, cognitive and social development, and whether their development differs according to their family history of psychiatric and developmental problems. For the subset of children who had completed the study, we examined diagnostic outcomes of the Sibs-ASD and Sibs-TD groups in relation to Time 1 data to test for early deficits that correlate with and could be predictive of future diagnostic outcome. Additionally, we looked at both the Sibs-ASD and Sibs-TD groups for gender differences within and between groups.

The results of the study do show that younger siblings of children with autism show some deficits at Time 1 (mean age = 16 months). These deficits were most apparent in the areas of cognitive skill and social development. We did not collect most measures at Time 4 for siblings of typically developing children, so we do not yet know if younger siblings of children with autism catch up to their peers. However, as hypothesized, children with a family history of autism do fare worse than their peers in terms of diagnostic outcome. Of the group of siblings of children with autism- the at-risk group - 5% were diagnosed with autism and 15% with either PDD-NOS or Asperger's Disorder, for a total of 20% of children diagnosed with some autism spectrum disorder. These numbers are higher than previously reported, and may be due to the broadening definition of the autism spectrum or referral bias. Interestingly, this at-risk group was also more likely than the control group to be diagnosed with other developmental disorders *not* on the autism spectrum, namely language delays which affected 15% (5 children). This may be a sign of the broader autism phenotype. Language is a major area of weakness for children on the autism spectrum. In a study by Bailey, Palferman, Heavey, & Le Couteur (1998) language delays were found to be an area of weakness for siblings of children with autism at older ages.

We also found that the proband (older sibling) diagnosis is a factor in the eventual outcome and functioning of the younger sibling. Severity of the proband's diagnosis (autism vs. PDD-NOS or Asperger's,) was associated with worse performance on the MSEL in the area of fine motor development. This finding is difficult to interpret, however, similar findings were found by Sutera et al, (2007). Sutera et al., (2007) found that better motor skills of children diagnosed with autism two years of age was correlated

with moving off the spectrum at age 4. More research verifying these results will be needed to see if fine motor development is indeed an area of trouble for children with autism and siblings of children with autism and, if so, why this deficit may exist.

Gender differences in performance on cognitive, language, and social-communicative measures were examined. Gender differences were seen in multiple areas. Specifically, females performed better on language and cognitive ability as measured by the MSEL and MCDI.

It is generally believed that females have better language skills than males and it is interesting that this difference is seen at such a young age (Bornstein, Haynes, & Painter, 1998, Hyde & Linn, 1988). The results are different at Time 1 and Time 4 on the MSEL, with male Sibs-ASD showing weaker performance in expressive language relative to female Sibs-ASD at Time 1 and in receptive language at Time 4. This may indicate that males are able to catch up the females on expressive language but may not fully understand all the words that they are saying. STAT scores also showed some gender differences within Sibs-ASD; females scored better on overall STAT score and passed more play items on the measure than did males. This may be an indicator that males are more likely to show signs of the broader autism phenotype than females. Males are more likely to be diagnosed with autism, so it follows logically that they are also more likely to show signs of the broader autism phenotype that are not severe enough to warrant a diagnosis. When the male Sibs-ASD were compared to the male Sibs-TD, the Sibs-ASD males scored lower on cognitive and visual reception scores at Time 1. This finding was not merely driven by the seven males later diagnosed with autism spectrum disorders, as results remained significant with those seven children removed from the

analysis. These differences were not seen in females. These results showing gender differences may indicate that male siblings of children with autism may be at a higher risk of delays related to the broader autism phenotype than female siblings of children with autism.

Finally, we found that the children who were later diagnosed with autism spectrum disorders showed notable delays months before their diagnosis. At Time 1 the group of children later diagnosed with autism spectrum disorders already was scoring lower than the other Sibs-ASD on the overall STAT score and specifically on directing attention and requesting behaviors. They also had lower expressive language scores (as measured by the MSEL) and social skills (as measured by the DAISI) at Time 1.

As with much research done on autism, there are limitations to this study. The use of siblings of typically developing children as a control may limit the breadth of interpretations to the data. Typically developing children differ from children with autism on so many categorical levels of development that it may be difficult to know if delays are specific to autism or if they are due to overall developmental delay or environmental factors. For example, if we see language differences in siblings of children with autism it could be related to genetic risk for autism or it could be related to growing up in a family with a child with a disability (i.e. stress). In future studies this could be studied by using control groups of younger siblings of probands with Downs syndrome or another developmental disorder. The young age of the participants, while a necessary aspect of research looking at early warning signs of autism, may also limit the results because of the high degree of developmental variability that is considered within the “normal” range at such young ages.

In the current study, no family history of a specific disorder was significantly related to development of autism in the younger siblings examined. While many of the children did have siblings (other than the proband) and/or parents diagnosed with specific developmental delays or mental disorders, the sample sizes for each specific disorder were small. This does not mean that there are not specific family history characteristics that may be related to the autism spectrum, but instead indicates that larger scale population studies may be needed to find significant results. Additionally, the procedure in which the family history information was obtained from families was not a fully structured interview. The lack of consistency on this measure would have made interpretation of results difficult, even if a larger sample was obtained. Much of the information was anecdotal and some information from the interviews was vague and therefore could not be coded.

When looking at the results of this study as a whole, it is apparent that broader autism phenotype characteristics are more likely to appear in the “at-risk” group of siblings of children with autism than in siblings of typically developing children. These at-risk children show delays as early as 16 months. While we cannot state with certainty that these children generally catch up to their peers with age because we do not have data on all measures for Sibs-TD at the later time point, they do catch up on the measures for which data was collected for both groups at Time 4; this finding is supported by similar findings reported by Gamliel et al. (2007). The children used in this study will be seen a fifth time and all children in both groups will be administered all measures at this final session. Once these data are analyzed, it will be possible to state with more certainty if, on average, younger siblings of children with autism catch up to their peers.

The results of this study also point to the importance of early detection of deficits in order to provide early intervention. The children who were later diagnosed with an autism spectrum disorder show weaker language and social performance than their peers as early as 16 months. Weaknesses in social behaviors and specifically in requesting and directing attention behaviors are particularly troublesome. Ability to engage in joint attention with an adult and to communicate socially is necessary to further social and language development. Word learning is a specific result of joint attention interactions (Mundy, Kasari, Sigman, & Ruskin, 1995, Mundy, Sigman, & Kasari, 1990). Early interventions designed to target and teach social and attention skills may prevent the later language delays that some of these children may encounter without intervention. Without the basic ability to learn from and socially engage peers and adults, later learning is far more difficult. If we know that siblings of children with autism are likely to show delays, we may be able to provide them with extra support for the development of these skills before weaknesses are apparent and problematic.

This study clearly shows the importance of early detection and intervention, particularly for the at-risk group of siblings of children with autism. This study found a relatively high percentage of autism diagnoses in this at-risk group, perhaps indicating that all younger siblings of children with autism should receive special screening and monitoring or even intervention where there is cause for concern about future prognosis. Future studies following these younger siblings of children with autism in the months and years after the age at which diagnosis is possible are needed to determine whether these children remain at a disadvantage when compared to their peers. This subgroup of younger siblings has proven to be an interesting and significant group of study. More

studies looking at this at-risk group in larger numbers will further the understanding of the development of autism and highlight potential early warning signs. Studies examining more specific environmental and genetic factors may help us understand why some of these younger siblings fare worse than others and why they are more likely not only to develop autism spectrum disorders, but also to develop other developmental delays. With the increased prevalence and increased awareness of autism there are still many questions that need to be answered.

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FIGURE CAPTIONS

Table 1: Schedule of Measures

Table 2 : Group Performance of Sibs-ASD and Sibs-TD at Time 1

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Table 11: Time 4 Performance of Sibs-ASD as a Factor of Clinical Diagnosis

FIGURES:

Table 1: Schedule of Measures

Measure	Method	Sibs- ASD		Sibs- TD	
		T1	T4	T1	T4
DAISI	parent collected	T	T	T	
MCDI	parent collected	T	T	T	T
SBC	parent collected	T		T	
Family Information	parent collected	T		T	
Family History	parent collected	T		T	
MSEL	observational	T	T	T	
CARS	observational	T	T	T	
ADOS-G	observational		T		
STAT	observational	T	T	T	T

Table 2 : Group Performance at Time 1

Measure	Sibs-ASD		Sibs-TD		T-Test
	Mean	Std. Deviation	Mean	Std. Deviation	T
<i>MSEL</i>					
ELC	97.66	14.51	104.18	11.38	-1.99*
Visual reception	49.51	9.14	56.00	7.07	-3.16**
Fine Motor	53.24	8.31	55.54	7.87	-1.15
Receptive Language	46.05	13.50	48.25	10.51	-0.725
Expressive Language	45.8	11.57	48.29	11.21	-0.885
<i>STAT^a</i>					
STAT Score	2.15	0.88	1.81	0.85	1.59
Play	1.05	0.70	1	0.72	0.28
Requesting	0.93	0.85	1.21	0.83	-1.393
Directing Attention	1.12	1.00	1.57	1.06	-1.778
Imitation	2.32	1.15	2.75	0.89	-1.679
<i>MCDI</i>					
Expressive Language	40.07	71.49	41.46	76.86	-0.077
Receptive Language	116.7	100.1	160.6	104.16	-1.76
SBC	30.96	10.136	34.53	9.86	-1.16
DAISI	16.34	3.09	18.05	1.39	-2.35*
CARS	19.01	5.01	16.19	0.98	2.927**

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 3: Outcome Diagnoses for Sibs-ASD and Sibs-TD Groups

	Sibs-ASD (N=40)	Sibs-TD (N=28)
Autism	2 (5%)	0
PDD-NOS	5 (12.5%)	0
Language Delay	5 (12.5%)	0
Developmental Delay	1 (2.5%)	0
Typical	27 (67.5%)	28 (100%)

Table 4: Performance of Sibs-ASD at Time 1 as a Function of Proband Diagnosis

Measure	Proband Autism (N=26)		Proband PDD-NOS/ASP (N=14)		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	96.08	15.27	99.36	12.95	-0.68
Visual Reception	49.15	8.74	49.64	10.28	-0.16
Fine Motor	52.23	8.45	54.86	8.32	-0.94
Receptive Language	45.15	14.29	45.86	10.71	-0.16
Expressive Language	44.73	11.24	48.00	12.69	-0.84
<i>STAT^a</i>					
Total Score	2.14	0.94	2.14	0.82	-0.01
Play	1.04	0.66	1.00	0.78	0.16
Requesting	0.92	0.85	1.00	0.88	-0.27
Directing Attention	1.23	1.03	0.93	0.99	0.89
Imitation	2.27	1.19	2.50	1.09	-0.60
<i>MCDI</i>					
Expressive Language	40.08	66.07	42.57	85.02	-0.10
Receptive Language	113.73	97.03	118.07	111.64	-0.13
<i>SBC</i>	32.54	10.42	28.00	9.75	1.06
<i>DAISI</i>	16.47	3.02	16.00	3.44	0.38
<i>CARS</i>	19.00	4.82	19.00	5.71	0.00

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 5: Performance of Sibs-ASD at Time 4 as a Function of Proband Diagnosis

Measure	Proband Autism (N=26)		Proband PDD-NOS/ASP (N=14)		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	97.27	17.29	101.67	17.13	-0.73
Visual Reception	51.15	11.59	52.00	9.51	-0.22
Fine Motor	22.19	10.27	54.08	8.38	-2.91**
Receptive Language	46.27	12.26	47.00	9.16	-0.18
Expressive Language	52.08	11.82	49.75	14.64	0.52
<i>STAT^a</i>					
Total Score	1.07	0.89	1.11	0.91	-0.13
Play	1.73	0.45	1.64	0.63	0.51
Requesting	1.50	0.76	1.50	0.76	0.00
Directing Attention	2.04	1.15	2.43	1.16	-1.02
Imitation	3.23	1.03	2.86	1.17	1.04
<i>MCDI</i>					
Expressive Language	252.42	116.17	225.93	146.91	0.63
Receptive Language	302.58	93.09	294.50	117.56	0.24
<i>CARS</i>	19.42	4.17	18.73	7.19	0.38

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 6: Diagnostic Outcome of Sibs-ASD in Relation to Proband Diagnoses

Sib-ASD Diagnosis	Proband Diagnosis	
	Autism (N=26)	PDD-NOS (N=14)
Autism	2	0
PDD-NOS	3	2
Language Delays	3	2
Developmental Delays	1	0
Typical	17	9

Table 7: Number of Children with Family History of Developmental or Psychiatric Disorders

	Sibs-ASD (N=30)	Sibs-TD (N=21)
Speech and Language Disorders	9 (11%)	1 (5%)
Developmental Delays	2 (6%)	2 (10%)
OCD	0 (0%)	0 (0%)
Mental Health Disorders	5 (17%)	3 (14%)
Unconfirmed Social Issues	4 (13%)	0 (0%)

Table 8.1: Gender Effects for Cognitive, Social and Language Performance for Sibs-ASD at Time 1

Measure	Male		Female		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	93.75	11.94	103.18	16.31	-2.14*
Visual Reception	47.63	7.78	52.18	10.43	-1.60
Fine Motor	52.17	7.91	54.76	8.86	-0.99
Receptive Language	44.29	10.33	48.53	17.07	-0.99
Expressive Language	42.63	10.74	50.29	11.52	-2.19*
<i>STAT^a</i>					
Total Score	2.27	0.93	1.98	0.79	1.02
Play	0.88	0.68	1.29	0.69	-1.94
Requesting	0.92	0.88	0.94	0.83	-0.09
Directing Attention	1.08	1.06	1.18	0.95	-0.29
Imitation	2.25	1.15	2.41	1.18	-0.44
<i>MCDI</i>					
Expressive Language	37.46	68.66	43.76	77.30	-0.28
Receptive Language	101.54	90.37	138.00	111.73	-1.15
<i>SBC</i>	28.69	8.48	33.64	11.64	-1.17
<i>DAISI</i>	15.65	3.49	17.33	2.19	-1.47
<i>CARS</i>	19.46	5.03	18.38	5.08	0.67

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 8.2: Gender Effects for Cognitive, Social and Language Performance for Sibs-ASD at Time 4

Measure	Male		Female		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	93.87	15.58	107.88	18.38	-2.57*
Visual Reception	49.65	10.97	55.81	12.15	-1.65
Fine Motor	45.39	10.28	50.44	10.58	-1.49
Receptive Language	42.96	10.63	53.00	10.78	-2.89**
Expressive Language	48.87	11.97	56.19	13.03	-1.79
<i>STAT^a</i>					
Total Score	1.30	0.96	0.74	0.65	2.10*
Play	1.50	0.59	2.00	0.00	-3.48**
Requesting	1.38	0.82	1.71	0.59	-1.42
Directing Attention	2.13	1.29	2.29	0.92	-0.46
Imitation	2.92	1.02	3.35	1.12	-1.30
<i>MCDI</i>					
Expressive Language	213.71	131.01	293.29	108.19	-2.06*
Receptive Language	282.21	109.10	329.76	80.58	-1.52
<i>DAISI</i>	17.88	1.73	18.75	0.50	-0.97
<i>CARS</i>	20.02	6.28	17.75	3.04	1.34

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 9: Males Sibs-ASD and Sibs-TD Performance Time 1

Measure	Sibs-ASD		Sibs-TD		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	93.75	11.94	103.06	11.49	-2.54*
Visual Reception	46.63	7.78	55.33	6.23	-3.45*
Fine Motor	52.17	7.92	56.39	8.44	-1.66
Receptive Language	44.29	10.33	45.61	10.37	-0.41
Expressive Language	42.63	10.74	48.39	12.75	-1.59
<i>STAT^a</i>					
Total Score	2.27	0.93	1.99	0.83	1.02
Play	0.88	0.68	0.83	0.62	0.20
Requesting	0.92	0.88	1.22	0.88	-1.11
Directing Attention	1.08	1.06	1.44	1.15	-1.05
Imitation	2.25	1.15	2.50	0.79	-0.79
<i>MCDI</i>					
Expressive Language	37.46	68.66	27.72	50.68	0.51
Receptive Language	101.54	90.37	153.39	98.41	-1.77
<i>DAISI</i>	15.65	3.49	17.93	1.59	-2.25*
<i>CARS</i>	19.46	5.03	16.28	1.13	2.63*

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 10: Time 1 Performance of Sibs-ASD as a Function of Clinical Diagnoses

Measure	ASD Dx (N=7)		Other Dx (N=34)		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	90.86	11.77	99.06	14.77	-1.38
Visual Reception	49.86	6.74	49.44	9.64	0.11
Fine Motor	54.29	9.72	53.03	8.14	0.36
Receptive Language	38.43	10.16	47.62	13.69	-1.68
Expressive Language	38.00	9.15	47.41	11.47	-2.03*
<i>STAT^a</i>					
Total Score	2.93	0.35	1.99	0.87	2.76*
Play	0.86	0.69	1.09	0.71	-0.79
Requesting	0.29	0.49	1.06	0.85	-2.31*
Directing Attention	0.29	0.49	1.29	1.00	-2.58
Imitation	1.71	0.76	2.44	1.19	-1.55
<i>MCDI</i>					
Expressive Language	14.00	34.00	45.44	76.23	1.45
Receptive Language	57.43	81.38	128.85	100.22	1.48
<i>DAISI</i>	12.86	3.89	17.45	1.77	1.92*
<i>CARS</i>	22.21	7.93	18.35	4.05	-4.40

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

Table 11: Time 4 Performance of Sibs-ASD as a Factor of Clinical Diagnosis

Measure	ASD Dx		Other Dx		T-Test
	Mean	SD	Mean	SD	T
<i>MSEL</i>					
ELC	80.00	16.43	103.91	15.36	-3.69**
Visual Reception	44.29	7.69	53.91	11.82	-2.05*
Fine Motor	38.71	9.25	49.38	9.96	-2.59*
Receptive Language	34.71	13.20	49.78	9.55	-3.53**
Expressive Language	39.57	14.55	54.56	11.00	-3.08**
<i>STAT^a</i>					
Total Score	2.21	0.88	0.83	0.68	4.62**
Play	1.29	0.49	1.79	0.48	-2.55*
Requesting	0.71	0.95	1.68	0.59	-3.53**
Directing Attention	0.86	1.46	2.47	0.86	-3.97**
Imitation	2.29	0.95	3.26	1.02	-2.33*
<i>MCDI</i>					
Expressive Language	122.43	144.16	272.29	108.71	-3.14**
Receptive Language	239.14	111.22	314.85	94.90	-1.87
<i>CARS</i>	26.14	3.85	17.55	4.18	4.99**

a: STAT total score is scored 0-4 with lower scores indicating worse performance, individual domain scores is the total # of items passed

* $p < .05$

** $p < .01$

CARS Rating Sheet

Directions: For each category, use the space provided below each scale for taking notes concerning the behaviors relevant to each scale. After you have finished observing the child, rate the behaviors relevant to each item of the scale. For each item, circle the number which corresponds

to the statement that best describes the child. You may indicate the child is between two descriptions by using ratings of 1.5, 2.5, or 3.5. Abbreviated rating criteria are presented for each scale. See chapter 2 of the Manual for detailed rating criteria.

I. RELATING TO PEOPLE

- 1** No evidence of difficulty or abnormality in relating to people • The child's behavior is appropriate for his or her age. Some shyness, fussiness, or annoyance at being told what to do may be observed, but not to an atypical degree.
- 1.5**
- 2** Mildly abnormal relationships • The child may avoid looking the adult in the eye, avoid the adult or become fussy if interaction is forced, be excessively shy, not be as responsive to the adult as is typical, or cling to parents somewhat more than most children of the same age.
- 2.5**
- 3** Moderately abnormal relationships • The child shows aloofness (seems unaware of adult) at times. Persistent and forceful attempts are necessary to get the child's attention at times. Minimal contact is initiated by the child.
- 3.5**
- 4** Severely abnormal relationships • The child is consistently aloof or unaware of what the adult is doing. He or she almost never responds or initiates contact with the adult. Only the most persistent attempts to get the child's attention have any effect.

Observations:

III. EMOTIONAL RESPONSE

- 1** Age-appropriate and situation-appropriate emotional responses • The child shows the appropriate type and degree of emotional response as indicated by a change in facial expression, posture, and manner.
- 1.5**
- 2** Mildly abnormal emotional responses • The child occasionally displays a somewhat inappropriate type or degree of emotional reactions. Reactions are sometimes unrelated to the objects or events surrounding them.
- 2.5**
- 3** Moderately abnormal emotional responses • The child shows definite signs of inappropriate type and/or degree of emotional response. Reactions may be quite inhibited or excessive and unrelated to the situation; may grimace, laugh, or become rigid even though no apparent emotion-producing objects or events are present.
- 3.5**
- 4** Severely abnormal emotional responses • Responses are seldom appropriate to the situation; once the child gets in a certain mood, it is very difficult to change the mood. Conversely, the child may show wildly different emotions when nothing has changed.

Observations:

II. IMITATION

- 1** Appropriate imitation • The child can imitate sounds, words, and movements which are appropriate for his or her skill level.
- 1.5**
- 2** Mildly abnormal imitation • The child imitates simple behaviors such as clapping or single verbal sounds most of the time; occasionally, imitates only after prodding or after a delay.
- 2.5**
- 3** Moderately abnormal imitation • The child imitates only part of the time and requires a great deal of persistence and help from the adult; frequently imitates only after a delay.
- 3.5**
- 4** Severely abnormal imitation • The child rarely or never imitates sounds, words, or movements even with prodding and assistance from the adult.

Observations:

IV. BODY USE

- 1** Age appropriate body use • The child moves with the same ease, agility, and coordination of a normal child of the same age.
- 1.5**
- 2** Mildly abnormal body use • Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor coordination, or the rare appearance of more unusual movements.
- 2.5**
- 3** Moderately abnormal body use • Behaviors that are clearly strange or unusual for a child of this age may include strange finger movements, peculiar finger or body posturing, staring or picking at the body, self-directed aggression, rocking, spinning, finger-wiggling, or toe-walking.
- 3.5**
- 4** Severely abnormal body use • Intense or frequent movements of the type listed above are signs of severely abnormal body use. These behaviors may persist despite attempts to discourage them or involve the child in other activities.

Observations:

V. OBJECT USE

- 1** Appropriate use of, and interest in, toys and other objects • The child shows normal interest in toys and other objects appropriate for his or her skill level and uses these toys in an appropriate manner.
- 1.5**
- 2** Mildly inappropriate interest in, or use of, toys and other objects • The child may show atypical interest in a toy or play with it in an inappropriately childish way (e.g., banging or sucking on the toy).
- 2.5**
- 3** Moderately inappropriate interest in, or use of, toys and other objects • The child may show little interest in toys or other objects, or may be preoccupied with using an object or toy in some strange way. He or she may focus on some insignificant part of a toy, become fascinated with light reflecting off the object, repetitively move some part of the object, or play with one object exclusively.
- 3.5**
- 4** Severely inappropriate interest in, or use of, toys or other objects • The child may engage in the same behaviors as above, with greater frequency and intensity. The child is difficult to distract when engaged in these inappropriate activities.

Observations:

VI. ADAPTATION TO CHANGE

- 1** Age appropriate response to change • While the child may notice or comment on changes in routine, he or she accepts these changes without undue distress.
- 1.5**
- 2** Mildly abnormal adaptation to change • When an adult tries to change tasks the child may continue the same activity or use the same materials.
- 2.5**
- 3** Moderately abnormal adaptation to change • The child actively resists changes in routine, tries to continue the old activity, and is difficult to distract. He or she may become angry and unhappy when an established routine is altered.
- 3.5**
- 4** Severely abnormal adaptation to change • The child shows severe reactions to change. If a change is forced, he or she may become extremely angry or uncooperative and respond with tantrums.

Observations:

VII. VISUAL RESPONSE

- 1** Age appropriate visual response • The child's visual behavior is normal and appropriate for that age. Vision is used together with other senses as a way to explore a new object.
- 1.5**
- 2** Mildly abnormal visual response • The child must be occasionally reminded to look at objects. The child may be more interested in looking at mirrors or lighting than peers, may occasionally stare off into space, or may also avoid looking people in the eye.
- 2.5**
- 3** Moderately abnormal visual response • The child must be reminded frequently to look at what he or she is doing. He or she may stare into space, avoid looking people in the eye, look at objects from an unusual angle, or hold objects very close to the eyes.
- 3.5**
- 4** Severely abnormal visual response • The child consistently avoids looking at people or certain objects and may show extreme forms of other visual peculiarities described above.

Observations:

VIII. LISTENING RESPONSE

- 1** Age appropriate listening response • The child's listening behavior is normal and appropriate for age. Listening is used together with other senses.
- 1.5**
- 2** Mildly abnormal listening response • There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.
- 2.5**
- 3** Moderately abnormal listening response • The child's responses to sounds vary; often ignores a sound the first few times it is made; may be startled or cover ears when hearing some everyday sounds.
- 3.5**
- 4** Severely abnormal listening response • The child overreacts and/or underreacts to sounds to an extremely marked degree, regardless of the type of sound.

Observations:

IX. TASTE, SMELL, AND TOUCH RESPONSE AND USE

- 1** Normal use of, and response to, taste, smell, and touch • The child explores new objects in an age appropriate manner, generally by feeling and looking. Taste or smell may be used when appropriate. When reacting to minor, everyday pain, the child expresses discomfort but does not overreact.
- 1.5**
- 2** Mildly abnormal use of, and response to, taste, smell, and touch • The child may persist in putting objects in his or her mouth; may smell or taste inedible objects; may ignore or overreact to mild pain that a normal child would express as discomfort.
- 2.5**
- 3** Moderately abnormal use of, and response to, taste, smell, and touch • The child may be moderately preoccupied with touching, smelling, or tasting objects or people. The child may either react too much or too little.
- 3.5**
- 4** Severely abnormal use of, and response to, taste, smell, and touch • The child is preoccupied with smelling, tasting, or feeling objects more for the sensation than for normal exploration or use of the objects. The child may completely ignore pain or react very strongly to slight discomfort.

Observations:

X. FEAR OR NERVOUSNESS

- 1** Normal fear or nervousness • The child's behavior is appropriate both to the situation and to his or her age.
- 1.5**
- 2** Mildly abnormal fear or nervousness • The child occasionally shows too much or too little fear or nervousness compared to the reaction of a normal child of the same age in a similar situation.
- 2.5**
- 3** Moderately abnormal fear or nervousness • The child shows either quite a bit more or quite a bit less fear than is typical even for a younger child in a similar situation.
- 3.5**
- 4** Severely abnormal fear or nervousness • Fears persist even after repeated experience with harmless events or objects. It is extremely difficult to calm or comfort the child. The child may, conversely, fail to show appropriate regard for hazards which other children of the same age avoid.

Observations:

XI. VERBAL COMMUNICATION

- 1** Normal verbal communication, age and situation appropriate.
- 1.5
- 2** Mildly abnormal verbal communication • Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.
- 2.5
- 3** Moderately abnormal verbal communication • Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.
- 3.5
- 4** Severely abnormal verbal communication • Meaningful speech is not used. The child may make infantile squeals, weird or animal-like sounds, complex noises approximating speech, or may show persistent, bizarre use of some recognizable words or phrases.

Observations:

XII. NONVERBAL COMMUNICATION

- 1** Normal use of nonverbal communication, age and situation appropriate.
- 1.5
- 2** Mildly abnormal use of nonverbal communication • Immature use of nonverbal communication; may only point vaguely, or reach for what he or she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.
- 2.5
- 3** Moderately abnormal use of nonverbal communication • The child is generally unable to express needs or desires nonverbally, and cannot understand the nonverbal communication of others.
- 3.5
- 4** Severely abnormal use of nonverbal communication • The child only uses bizarre or peculiar gestures which have no apparent meaning, and shows no awareness of the meanings associated with the gestures or facial expressions of others.

Observations:

XIII. ACTIVITY LEVEL

- 1** Normal activity level for age and circumstances • The child is neither more active nor less active than a normal child of the same age in a similar situation.
- 1.5
- 2** Mildly abnormal activity level • The child may either be mildly restless or somewhat "lazy" and slow moving at times. The child's activity level interferes only slightly with his or her performance.
- 2.5
- 3** Moderately abnormal activity level • The child may be quite active and difficult to restrain. He or she may have boundless energy and may not go to sleep readily at night. Conversely, the child may be quite lethargic, and need a great deal of prodding to get him or her to move about.
- 3.5
- 4** Severely abnormal activity level • The child exhibits extremes of activity or inactivity and may even shift from one extreme to the other.

Observations:

XIV. LEVEL AND CONSISTENCY OF INTELLECTUAL RESPONSE

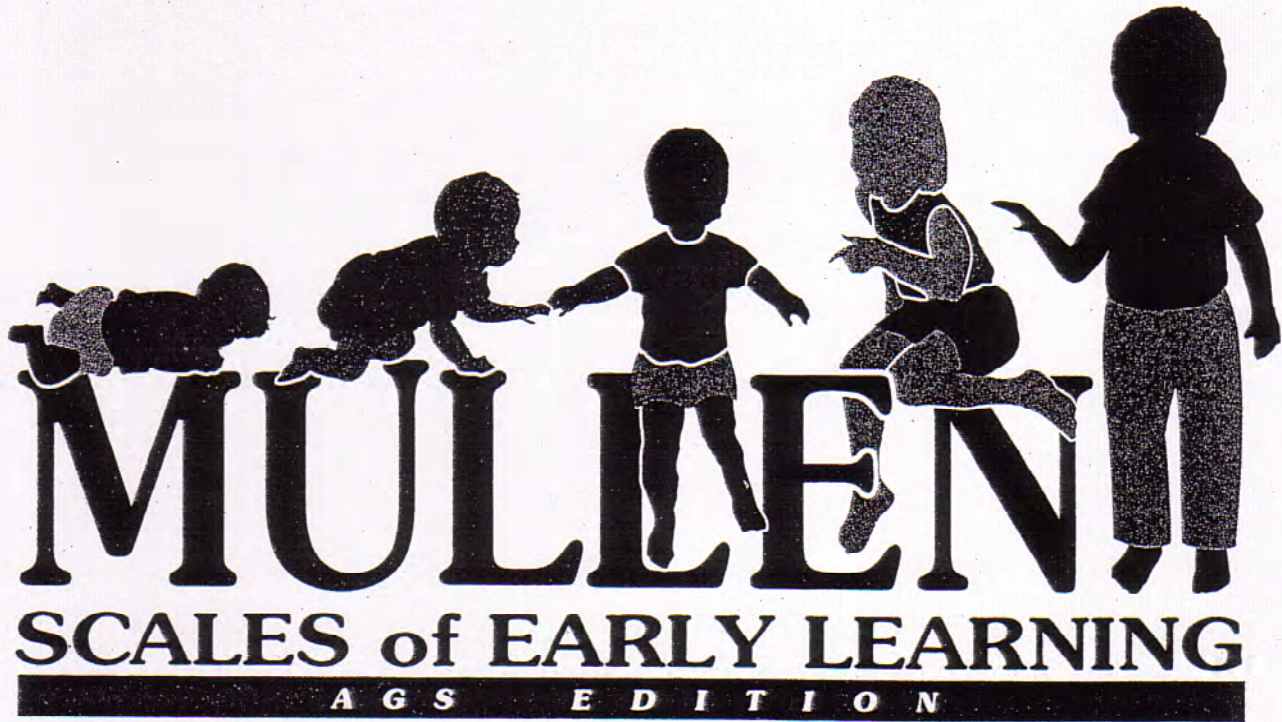
- 1** Intelligence is normal and reasonably consistent across various areas • The child is as intelligent as typical children of the same age and does not have any unusual intellectual skills or problems.
- 1.5
- 2** Mildly abnormal intellectual functioning • The child is not as smart as typical children of the same age; skills appear fairly evenly retarded across all areas.
- 2.5
- 3** Moderately abnormal intellectual functioning • In general, the child is not as smart as typical children of the same age; however, the child may function nearly normally in one or more intellectual areas.
- 3.5
- 4** Severely abnormal intellectual functioning • While the child generally is not as smart as the typical child of his age, he or she may function even better than the normal child of the same age in one or more areas.

Observations:

XV. GENERAL IMPRESSIONS

- 1** No autism • The child shows none of the symptoms characteristic of autism.
- 1.5
- 2** Mild autism • The child shows only a few symptoms or only a mild degree of autism.
- 2.5
- 3** Moderate autism • The child shows a number of symptoms or a moderate degree of autism.
- 3.5
- 4** Severe autism • The child shows many symptoms or an extreme degree of autism.

Observations:



Eileen M. Mullen

RECORD FORM

Child's Name _____
 ID _____ Phone Number _____
 Nickname _____ Boy Girl
 Address _____

 Child's Primary Language _____
 Mother's Name _____
 Father's Name _____
 Examiner _____
 School _____
 No. Weeks Gestation (G.A.) _____ Birth Weight _____
 Apgars 1 min. _____ 5 min. _____
 Hospital _____

Does the child have a known uncorrected vision problem? No Yes
 Does the child have a known uncorrected hearing problem? No Yes
 Personal or physical characteristics that may affect the child's test results

Is the child on any medication? No Yes (please specify)

Referred by _____

Reason for Referral _____

Additional Information/Comments _____

Testing Date _____
 Birth Date _____
 Child's Age _____
 Child's Sex _____
 Child's Race _____
 Child's Ethnicity _____
 Child's Religion _____
 Child's Marital Status _____
 Child's Education _____
 Child's Occupation _____
 Child's Income _____
 Child's Health Insurance _____
 Child's Social Security Number _____
 Child's Address _____
 Child's City _____
 Child's State _____
 Child's Zip _____
 Child's Phone Number _____
 Child's Email Address _____
 Child's Date of Birth _____
 Child's Date of Testing _____
 Child's Date of Birth _____
 Child's Date of Testing _____
 Child's Date of Birth _____
 Child's Date of Testing _____

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Receptive Language

General knowledge

- | | | | | | |
|----------------------|---|---|------------------------|---|---|
| 1) name _____ | + | - | 7) time _____ | + | - |
| 2) boy or girl _____ | + | - | 8) legs _____ | + | - |
| 3) age _____ | + | - | 9) money _____ | + | - |
| 4) eyes _____ | + | - | 10) refrigerator _____ | + | - |
| 5) wash hands _____ | + | - | 11) fingers _____ | + | - |
| 6) half _____ | + | - | 12) roof _____ | + | - |

Expressive Language

1. Picture vocabulary

- | | | | | | |
|---------------------|---|---|--------------------|---|---|
| 1) phone _____ | + | - | 11) umbrella _____ | + | - |
| 2) spoon _____ | + | - | 12) purse _____ | + | - |
| 3) bed _____ | + | - | 13) clock _____ | + | - |
| 4) television _____ | + | - | 14) flower _____ | + | - |
| 5) comb _____ | + | - | 15) leg _____ | + | - |
| 6) ball _____ | + | - | 16) leaf _____ | + | - |
| 7) bird _____ | + | - | 17) chimney _____ | + | - |
| 8) house _____ | + | - | 18) ladder _____ | + | - |
| 9) hand _____ | + | - | 19) lamp _____ | + | - |
| 10) door _____ | + | - | 20) brush _____ | + | - |

3. Answers questions

- | | | |
|------------------|---|---|
| 1) thirsty _____ | + | - |
| 2) hungry _____ | + | - |
| 3) sleepy _____ | + | - |

4. Verbal analogies

- | | | | | | |
|---------------------|---|---|--------------------|---|---|
| 1) big/ _____ | + | - | 6) sidewalk/ _____ | + | - |
| 2) light/ _____ | + | - | 7) awake/ _____ | + | - |
| 3) hot/ _____ | + | - | 8) hard/ _____ | + | - |
| 4) table/ _____ | + | - | 9) light/ _____ | + | - |
| 5) breakfast/ _____ | + | - | 10) wood/ _____ | + | - |

6. Oral vocabulary

- | | | |
|-------------------|---|---|
| 1) hat _____ | + | - |
| 2) car _____ | + | - |
| 3) boots _____ | + | - |
| 4) umbrella _____ | + | - |
| 5) letter _____ | + | - |
| 6) hammer _____ | + | - |
| 7) dime _____ | + | - |
| 8) basket _____ | + | - |
| 9) candle _____ | + | - |
| 10) tire _____ | + | - |
| 11) goat _____ | + | - |
| 12) glue _____ | + | - |
| 13) faucet _____ | + | - |
| 14) canoe _____ | + | - |

27. Practical reasoning

- | | | |
|-----------------|---|---|
| 1) dirty _____ | + | - |
| 2) rain _____ | + | - |
| 3) street _____ | + | - |
| 4) cut _____ | + | - |
| 5) store _____ | + | - |
| 6) fire _____ | + | - |
| 7) dark _____ | + | - |
| 8) swim _____ | + | - |

Scale 1. Gross Motor

Item

Score

1-4 mo.

- | | | |
|--|---|---|
| 1. Enjoys being held/realigns (Up)..... | 1 | 0 |
| 2. Rotates head (P) | 1 | 0 |
| 3. Moves arms, legs vigorously (S)..... | 1 | 0 |
| 4. Held upright, holds head steady (Up)..... | 1 | 0 |

Stage 1

5-8 mo.

- | | | |
|---|---|---|
| 5. Supports on forearms (P)..... | 1 | 0 |
| 6. Sits supported head steady (SSin)..... | 1 | 0 |

Stage 2

9-12 mo.

- | | | |
|---|---|---|
| 7. Rolls over (P to S)..... | 1 | 0 |
| 8. Holds on to fingers/pulls self to sit (S to SSin)..... | 1 | 0 |
| 9. Shifts weight/reaches (P)..... | 1 | 0 |
| 10. Stands with hands held, bounces..... | 1 | 0 |

Stage 3

13-17 mo.

- | | | |
|---|---|---|
| 11. Sits with arms free (Sit)..... | 1 | 0 |
| 12. Pulls self to stand (Sit to stand)..... | 1 | 0 |
| 13. Gets from sitting to hands and knees (Sit)..... | 1 | 0 |

Stage 4

18-20 mo.

- | | | |
|-------------------------------------|---|---|
| 14. Walks with one hand held..... | 1 | 0 |
| 15. Stands alone (1-2 seconds)..... | 1 | 0 |
| 16. Walks alone (4-5 steps)..... | 1 | 0 |
| 17. Throws a ball underhand..... | 1 | 0 |

21-26 mo.

- | | | |
|--|---|---|
| 18. Gets to stand by rolling to side (S to stand)..... | 1 | 0 |
| 19. Stands, squats, stands..... | 1 | 0 |
| 20. Walks up stairs with help, nonalternating..... | 1 | 0 |
| 21. Runs stiffly..... | 1 | 0 |

Stage 5

27+ mo.

- | | | |
|--|---|---|
| 22. Kicks a 10- to 12-inch ball (2 of 5 trials)..... | 1 | 0 |
| 23. Stands on one foot with help..... | 1 | 0 |

Stage 6

- | | | |
|--|---|---|
| 24. Walks 4 to 5 steps, one foot at a time..... | 1 | 0 |
| 25. Walks up stairs by self, nonalternating..... | 1 | 0 |
| 26. Jumps down from bench:
10-14 inches (2-2 feet)..... | 2 | 1 |

Stage 7

- | | | |
|--|---|---|
| 27. Jumps in place, feet together (one jump)..... | 1 | 0 |
| 28. Walks on tiptoes (4-5 steps)..... | 1 | 0 |
| 29. Walks on line, using arms to balance (6-7 steps) ... | 1 | 0 |
| 30. Walks down stairs by self, alternating..... | 1 | 0 |

Stage 8

- | | | |
|---|---|---|
| 31. Gets to stand, one hand to stairs (S to stand)..... | 1 | 0 |
| 32. Balances on one foot (2-3 seconds)..... | 1 | 0 |
| 33. Runs, turns corner, stops..... | 1 | 0 |
| 34. Hops 6-8 times..... | 1 | 0 |
| 35. Walks on line, arms at side (6 steps)..... | 1 | 0 |

BASAL LEVEL = 3 consecutive items with at least 1-point scores
CEILING LEVEL = 3 consecutive items with scores of 0

Gross Motor Raw Score

Scale 2. Visual Reception

Item	Score
1-4 mo. 1. Fixates on and tracks triangle (S) ① fixates ② tracks	2 1 0
2. Tracks schematic face 90 degrees (S).....	1 0
5-8 mo. 3. Tracks moving bull's-eye 180 degrees (PPr).....	1 0
4. Localizes alternating red ball and schematic face (PPr) ..	1 0
5. Stares at own hand (S).....	1 0
6. Localizes bull's-eye near and far (SSit).....	1 0
9-12 mo. 7. Looks for dropped spoon (A/V) (SSit).....	1 0
8. Pulls cord to obtain disc (SSit).....	1 0
13-20 mo. 9. Looks for ring hidden under washcloth (Sit)..... ① partially hidden ② fully hidden	2 1 0
10. Turns cup right-side up.....	1 0
11. Makes object association..... ___ brush ___ spoon ___ cup ___ ball (1)	1 0
12. Looks for car under two washcloths.....	1 0
13. Shows interest in book as hinge.....	1 0
14. Attends to picture (A/V).....	1 0
15. Looks for toy covered, then displaced.....	1 0
1-32 mo. 16. Discriminates forms on formboard..... ① ● ② ●■ ③ ●■▲ ④ ●■▲+	4 3 2 1 0
17A. Matches objects with naming (A/V) (19 months or younger).	
OR	
17B. Matches objects without naming (20 months or older) ___ shoes ___ cars ___ keys ___ sticks	
① one object with naming.....	3 2 1 0
② two objects without naming	
③ three objects without naming	
18. Nests nesting cups..... ① nests three cups ② nests four cups	2 1 0
1-44 mo. 19. Sorts spoons and blocks by category..... (2 each)	1 0
20. Matches by shape..... ___ circles ___ squares ___ triangles (2 each)	1 0
21. Matches pictures..... ___ shoe ___ cup ___ plane (2)	1 0
22. Matches by size, color..... ___ large red circles ___ small red circles (2 each) ___ large yellow circles ___ small yellow circles	1 0
23. Memory for one picture.....	1 0
24. Spatial details I.....	1 0
1+ mo. 25. Spatial details II..... flower ___ 1 ___ 2 ___ 3 ___ 4 (4) (3)	2 1 0
26. Memory for objects..... ___ key ___ ball ___ car (2)	1 0
27. Discriminates spatial position..... form ___ 1 ___ 2 ___ 3 ___ 4 (4)	1 0
28. Matches letters..... ___ L ___ C ___ N ___ B ___ H ___ P (6)	1 0
29. Discriminates left/right..... ___ bunny ___ hammer ___ child ___ wagon (4) (3) (2) (1)	4 3 2 1 0
30. Matches letters, words..... ___ B ___ t ___ d ___ n ___ rt (6) (5) (4) (2) ___ be ___ bat ___ coat ___ will	4 3 2 1 0
31. Memory for three pictures..... ___ key ___ book ___ chair	1 0
32. Spatial details III..... dog ___ 1 ___ 2 ___ 3 ___ 4 ___ 5 (4) (3)	2 1 0
33. Memory for form..... form ___ 1 ___ 2 ___ 3 ___ 4 (3) (2)	2 1 0

Visual Reception Raw Score

Scale 3. Fine Motor

Item	Score
1-4 mo. 1. Arms flexed/hands fisted (S).....	1 0
2. Holds ring reflexively (S).....	1 0
3. Brings fist to mouth (P).....	1 0
5-8 mo. 4. Bilateral orientation in midline (S).....	1 0
5. Grasp reflex integrated (S).....	1 0
6. Grasps peg (ulnar palmar) (PPr or SSit).....	1 0
9-12 mo. 7. Reaches for and grasps block (radial palmar grasp) (SSit).....	1 0
8. Transfers, bangs, drops (SSit)..... (2)	1 0
9. Refined grasp/thumb opposition (Sit).....	1 0
10. Uses pincer grasp (Sit)..... ① partial pincer ② refined pincer	2 1 0
13-17 mo. 11. Bangs in midline, horizontal movement (Sit).....	1 0
12. Takes blocks out, puts blocks in..... Task 1: 1 block ① in or ① out Task 2: 4 blocks ② in or ② out Task 3: 7 to 8 blocks ③ in	3 2 1 0
18-29 mo. 13. Uses two hands together.....	1 0
14. Turns pages in a book..... ① several at a time ② one at a time	2 1 0
15. Imitates crayon lines..... Task 1: ① any direction ② vertical line Task 2: ① horizontal line	3 2 1 0 (sum tasks)
30-44 mo. 16. Puts pennies in slot, horizontal and vertical..... Task 1: ① 3 pennies/horizontal Task 2: ① 3 pennies/vertical	2 1 0 (sum tasks)
17. Stacks blocks vertically..... ① 3-5 blocks ② 6-8 blocks ③ 9 or more blocks	3 2 1 0
18. Imitates four-block train..... ① train ② train with driver	2 1 0
19. Unscrews, screws nut and bolt.....	1 0
20. Strings beads..... (3)	1 0
45+ mo. 21. Imitates four-block tower.....	1 0
22. Copies circle, circle and line..... Task 1: ① circle Task 2: ① circle and line	2 1 0 (sum tasks)
23. Draws in path..... ___ Example ___ Figure 1 ___ Figure 2 ___ Figure 3 (3) (2)	2 1 0
24. Cuts with scissors..... ① 1-inch cut ② 2-inch cut	2 1 0
25. Folds paper three times.....	1 0
26. Imitates drawings..... Task 1: ① circle in circle Task 2: ① square Task 3: ① left diagonal	3 2 1 0 (sum tasks)
27. Touches fingers I.....	1 0
28. Touches fingers II.....	1 0
29. Folds paper twice to form square.....	1 0
30. Copies shapes and letters..... Task 1: ① cross Task 2: ① square Task 3: ① LED Task 4: ① triangle Task 5: ① X	5 4 3 2 1 0 (sum tasks)

Fine Motor Raw Score

Scale 4. Receptive Language

Scale 5. Expressive Language

Item	Score
-4 mo. 1. Reacts reflexively to loud noise (S).....	1 0
2. Alerts to sound (S).....	1 0
3. Responds to voice and face by smiling (A/V) (S).....	1 0
10 mo. 4. Coordinates listening and turning (PPr).....	1 0
5. Responds to voice and face by vocalizing (A/V) (PPr or SSit).....	1 0
6. Coordinates listening and looking (SSit).....	1 0
7. Enjoys self/mirror interaction (A/V) (SSit).....	1 0
14 mo. 8. Attends to words and movement (A/V) (SSit or Sit).....	1 0
9. Recognizes familiar names, words.....	1 0
10. Recognizes own name.....	1 0
11. Understands inhibitory words.....	1 0
22 mo. 12. Understands simple verbal input.....	1 0
13. Understands gesture and commands (A/V).....	1 0
14. Identifies objects (A/V).....	1 0
15. Gives toy on verbal request.....	1 0
16. Comprehends questions I.....	1 0
___ chair ___ door (1)	
17. Follows directions.....	1 0
___ block ___ car (2)	
32 mo. 18. Recognizes body parts (A/V).....	3 2 1 0
___ eyes ___ nose ___ mouth	
___ ears ___ hands ___ feet ___ hair	
① 1 to 3 body parts	
② 4 or 5 body parts	
③ 6 or 7 body parts	
19. Comprehends questions II (A/V).....	1 0
___ cat ___ cup ___ car (1)	
20. Follows related commands.....	1 0
___ ball ___ box (1)	
21. Identifies pictures (A/V).....	1 0
___ car ___ ball ___ shoe ___ doll (2)	
44 mo. 22. Auditory spatial awareness.....	4 3 2 1 0
___ in ___ under ___ behind ___ in front of ___ beside	
① 1 position ② 2 positions	
③ 3 positions ④ 4 or 5 positions	
23. Comprehends action words (A/V).....	2 1 0
___ eating ___ sleeping ___ washing (2-3) (1)	
24. Identifies object function (A/V).....	1 0
___ car ___ scissors ___ spoon ___ chair (3)	
48 mo. 25. Follows two unrelated commands.....	1 0
___ set 1 ___ set 2 (1)	
26. Size concepts (A/V).....	1 0
___ trial 1 ___ trial 2 ___ trial 3 ___ trial 4 (3)	
27. Identifies colors (A/V).....	1 0
___ red ___ green ___ yellow ___ blue (4)	
___ orange ___ black ___ brown ___ purple	
28. Length concepts (A/V).....	1 0
___ trial 1 ___ trial 2 ___ trial 3 ___ trial 4 (3)	
29. Comparative concepts (A/V).....	4 3 2 1 0
___ same ___ not same ___ most (6) (5) (4) (3)	
___ least ___ first ___ last ___ second	
___ middle ___ left of the tree ___ nearest	
30. General knowledge (see flap).....	5 4 3 2 1 0
(10) (9) (8) (7) (6)	
31. Follows three unrelated commands.....	1 0
32. Has concept of six, eight.....	2 1 0
Task 1 ① 6 blocks (sum tasks)	
Task 2 ① 8 blocks	
33. Identifies letters (A/V).....	2 1 0
___ T ___ C ___ L ___ O ___ D ___ N ___ S (14) (12)	
___ R ___ B ___ G ___ M ___ H ___ X ___ P	

Item	Score
1-4 mo. 1. Sucking, swallowing, chewing movements.....	1 0
2. Vocalizes (S).....	1 0
3. Smiles and makes happy sounds (S).....	1 0
5-8 mo. 4. Coos, chuckles, or laughs.....	1 0
(2)	
5. Makes vocalizations (such as ah, eh, m).....	1 0
6. Plays with sounds (such as o, u, ah-goo).....	1 0
9-14 mo. 7. Voluntary babbling (such as "bu, bu, bu").....	1 0
8. Produces three consonant sounds (such as p, d, k, g, m).....	1 0
9. Vocalizes two-syllable sounds (such as "dada" or "baba").....	1 0
10. Plays gesture/language game.....	1 0
15-23 mo. 11. Says first words.....	3 2 1 0
① says 1 word	
② says 2 to 7 words	
③ says 8 words	
12. Jabbers with inflection.....	1 0
13. Combines jargon/gestures.....	1 0
14. Combines words/gestures.....	1 0
24-32 mo. 15. Names objects.....	3 2 1 0
___ ball ___ book ___ car	
___ cup ___ key ___ knife	
① names 1 - 3 objects	
② names 4 - 5 objects	
③ names 6 objects	
16. Labels picture.....	1 0
___ ball ___ dog ___ baby (1)	
17. Uses two-word phrase.....	1 0
18. Picture vocabulary (see flap).....	5 4 3 2 1 0
① names 5-10 pictures	
② names 11-14 pictures	
③ names 15-16 pictures	
④ names 17 pictures	
⑤ names 18 pictures	
33-44 mo. 19. Uses pronouns.....	1 0
20. Counts to two, three, twelve.....	3 2 1 0
① counts to 2	
② counts to 3	
③ counts to 12	
21. Repeats two numbers.....	1 0
___ 6 - 2 (1)	
___ 4 - 7	
45+ mo. 22. Uses three- to four-word sentences.....	1 0
23. Answers questions (see flap).....	2 1 0
① answers two questions	
② answers three questions	
24. Verbal analogies (see flap).....	5 4 3 2 1 0
(8) (7) (6) (5) (4)	
25. Repeats sentences I.....	1 0
___ sentence 1 ___ sentence 2 (2)	
26. Oral vocabulary (see flap).....	4 3 2 1 0
(9) (8) (7) (5)	
27. Practical reasoning (see flap).....	4 3 2 1 0
(7) (6) (5) (4)	
28. Repeats sentences II.....	2 1 0
___ sentence 1 ___ sentence 2 ___ sentence 3 (2) (1)	

Receptive Language Raw Score

Expressive Language Raw Score

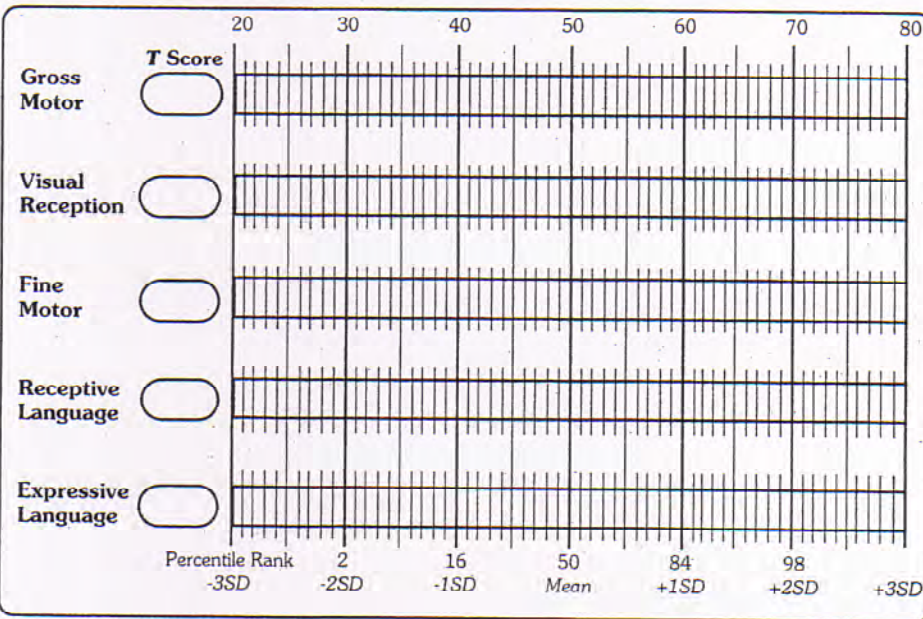
Score Summary

Scale	Raw Score	T Score M=50, SD=10 (Table C.1)	Band of Error % Confidence (Table C.1)	Percentile Rank (Table C.2)	Descriptive Category (Table C.2)	Age Equivalent (Transfer from chart)
Gross Motor	<input type="text"/>	<input type="text"/>	+			
Visual Reception	<input type="text"/>	<input type="text"/>	+			
Fine Motor	<input type="text"/>	<input type="text"/>	+			
Receptive Language	<input type="text"/>	<input type="text"/>	+			
Expressive Language	<input type="text"/>	<input type="text"/>	+			

Cognitive T Score Sum

Early Learning Composite (Optional)	Standard Score M=100, SD=15 (Table C.3)	Band of Error % Confidence (Table C.3)	Percentile Rank (Table C.3)	Descriptive Category (Table C.3)
		+		

Scale T Score Profile



Observations _____

Age Equivalents

Age Stage Equivalent	Gross Motor	Visual Reception	Fine Motor	Receptive Language	Expressive Language
70	—	—	—	—	49-50
69	—	50	—	48	—
68	—	—	49	—	—
67	—	—	—	—	48
66	—	49	—	—	—
65	—	—	48	47	—
64	—	—	—	—	—
63	—	—	—	—	47
62	—	—	47	46	—
61	—	—	—	—	—
60	—	48	—	—	46
59	—	—	46	45	—
58	—	—	—	—	45
57	—	47	45	44	—
56	—	—	—	—	—
55	—	—	44	43	44
54	—	46	—	—	—
53	—	—	43	42	43
52	—	45	—	—	—
51	—	—	42	41	42
50	—	44	—	—	41
49	—	—	41	40	—
48	—	43	—	—	40
47	—	—	40	39	—
46	—	42	—	38	39
45	—	41	39	—	38
44	—	—	38	37	—
43	—	40	—	—	37
42	—	—	37	36	36
41	—	39	—	35	—
40	—	38	36	—	35
39	—	37	35	34	34

8	—	—	—	—	—
7	32	31	—	—	29
	31	—	32	30	29
	30	30	31	29	28
	29	—	30	—	27
	28	29	—	28	27
	27	28	29	27	26
6	—	—	—	—	—
5	19	—	22	—	20
	18	22	21	20	19
	17	21	20	19	18
	16	20	19	18	17
	15	19	18	17	16
4	—	—	—	—	—
3	10	13	13	12	11
	9	12	12	11	10
	8	11	11	10	9
	7	10	10	9	8
2	—	—	—	—	—
1	3	5-6	5	5	4
	2	4	4	4	3
	1	0-3	0-3	0-3	0-2

ADOS-G Module 1

Proposed ADOS-G Algorithm for DSM-IV/ICD-10 Autism

(Convert 3s from the protocol to 2s. Treat all numbers other than 0-3 as 0.)

Communication

Frequency of Vocalization Directed to Others	(A-2)	_____
Stereotyped/Idiosyncratic Words or Phrases	(A-5)	_____
Use of Other's Body to Communicate	(A-6)	_____
Pointing	(A-7)	_____
Gestures	(A-8)	_____

Communication (Autism cut-off = 4; PDD-NOS cut-off = 2)	Total	_____
---	-------	-------

Qualitative Impairments in Reciprocal Social Interaction

Unusual Eye Contact	(B-1)	_____
Facial Expressions Directed to Others	(B-3)	_____
Shared Enjoyment in Interaction	(B-5)	_____
Showing	(B-9)	_____
Spontaneous Initiation of Joint Attention	(B-10)	_____
Response to Joint Attention	(B-11)	_____
Quality of Social Overtures	(B-12)	_____

Social (Autism cut-off = 7; PDD-NOS cut-off = 4)	Total	_____
--	-------	-------

Communication+Social (Autism cut-off = 12; PDD-NOS cut-off = 7)	Total	_____
---	-------	-------

Play

Functional Play with Objects	(C-1)	_____
Imagination/Creativity	(C-2)	_____

Play	Total	_____
------	-------	-------

Stereotyped Behaviors and Restricted Interests

Unusual Sensory Interest in Play Material/Person	(D-1)	_____
Hand and Finger and Other Complex Mannerisms	(D-2)	_____
Unusually Repetitive Interests or Stereotyped Behaviors	(D-4)	_____

Stereotyped Behaviors and Restricted Interests	Total	_____
--	-------	-------

Diagnosis

ADOS-G Diagnosis: _____

Overall Diagnosis: _____

STAT Protocol

8/29/00

Child ID # _____ Date of Birth _____ Sex: M F

Date of STAT _____ Age at STAT _____ Examiner _____

A. Play (Items 1 and 2)

Location: floor

Materials required:

- 1 - 5"-8" baby doll
- 1 - 5"-8" teddy bear
- 1 each - teacup, spoon, baby bottle (for doll)
- 1 each - table, chair, bed (for doll)
- 1 - 5" ball
- 1 - 5" truck or car
- 6 - 1" blocks

1) Turn-taking

Materials required: Ball (5" truck or car if necessary)

of trials allowed: Up to 5 for each toy

Passing response: Rolls the ball or car back and forth for three consecutive turns

Directions:

- a) Place all play materials on floor (preferably before the child enters the room).
- b) Sit on floor and encourage child to sit down. Arrange your position so that you are about 3-4 feet away from the child.

c) Get the child's attention by saying, "Look (child's name), here's the ball!"

d) Roll the ball to the child, hold your hands out and say, "Roll it back to me!" Continue to roll the ball back and forth until the child has rolled or thrown it back to you for three consecutive turns (passing response).

e) If the child does not roll it back the first time, you may initiate the game four more times, so the child has five opportunities to respond.

f) If the child does not demonstrate a passing response with the ball, you may repeat steps c) through e) using the car or truck.

Scoring: Turn-taking

Ball

<i>Trial #</i>	<i>Throws/Rolls Ball Back?</i>		<i># turns</i>
1	Yes	No	
2	Yes	No	
3	Yes	No	
4	Yes	No	
5	Yes	No	

Car (optional)

<i>Trial #</i>	<i>Rolls Car Back?</i>		<i># turns</i>
1	Yes	No	
2	Yes	No	
3	Yes	No	
4	Yes	No	
5	Yes	No	

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

2) Doll play

Materials required: Baby doll, doll furniture, doll dishes and utensils (teddy bear if necessary)

of trials allowed: Up to 5 for each toy

Passing response: Engages in a simple functional play act with the doll or animal. Examples: hugs or kisses the doll, feeds it, has it sit on a chair (no credit for banging it or taking its clothes off)

Directions:

a) Place doll furniture and dishes near the child.

b) Hand the doll to the child and say, "Look (child's name), look at my doll!"

c) Observe whether child engages in a simple functional play act with the doll, such as hugging it, feeding it, or putting it on furniture (passing response).

d) If the child does not take the doll, you may try handing it to him/her four more times, so that the child has five opportunities to respond.

e) If the child takes the doll but does not engage in a functional play act, you may hold up the feeding and/or furniture items and say, "Look at my other toys!" *Do not label the objects or demonstrate any functional play acts.*

f) If the child does not demonstrate a passing response with the doll, you may repeat steps b) through e) using the stuffed animal.

Scoring: (see next page)

Scoring: Doll Play

Doll

<i>Trial #</i>	<i>Functional Play Act?</i>		<i>Action with Doll</i>
----------------	-----------------------------	--	-------------------------

1	Yes	No	
---	-----	----	--

2	Yes	No	
---	-----	----	--

3	Yes	No	
---	-----	----	--

4	Yes	No	
---	-----	----	--

5	Yes	No	
---	-----	----	--

Animal (optional)

<i>Trial #</i>	<i>Functional Play Act?</i>		<i>Action with Animal</i>
----------------	-----------------------------	--	---------------------------

1	Yes	No	
---	-----	----	--

2	Yes	No	
---	-----	----	--

3	Yes	No	
---	-----	----	--

4	Yes	No	
---	-----	----	--

5	Yes	No	
---	-----	----	--

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

B. Communication (Items 3-8)

Location: table

Materials required: see individual items

3) Bubbles

Materials required: Jar of soap bubbles

of trials allowed: Up to 3

Passing response: Requests help to open the bubble jar or requests that you blow more bubbles **by combining eye contact and vocalization**. Example: hands you the jar, looks at you, and says "bu-bu"

Directions:

- a) Hold up bubble jar and get child's attention by saying, "Look, (child's name), look what I have!"
- b) Blow soap bubbles within the child's view. You may direct his/her attention to the bubbles if necessary by saying "Look!," but do not point toward the bubbles.
- c) Place the bubble wand back in the jar, screw the lid on tightly, and hand the jar to the child, saying "Now you do it!"
- d) Observe whether the child requests help opening the bubble jar or requests that you blow more bubbles. If the child requests, check the appropriate boxes on the protocol to indicate which behaviors were used.
- e) If the child does not request, or if s/he requests but does not obtain a passing response (i.e., does not combine eye contact with a vocalization), you may repeat steps a) through c) two more times, so that the child has three opportunities to respond.

Scoring: (see next page)

Scoring: Bubbles

Trial # 1

Did the child request the bubbles? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

Trial # 2

Did the child request the bubbles? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

Trial # 3

Did the child request the bubbles? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

4) Food

Materials required: Clear plastic jar containing food treats

of trials allowed: Up to 3

Passing response: Requests help opening the candy jar or requests that you open the jar **by combining eye contact and vocalization**
Example: hands you the jar, looks at you, and says "Op"

Directions:

a) Hold up jar containing food treats and get child's attention by shaking jar and saying, "Look, (child's name), look what I have!" (The jar lid must be closed tightly.)

b) Hand jar to child and say, "You can have some".

c) Observe whether the child requests help opening the candy jar or requests that you open the jar. If the child requests, check the appropriate boxes on the protocol to indicate which behaviors were used.

d) If the child does not request, you may open the jar and give the child one food treat, then close the jar tightly and hand it to him/her again.

e) If the child still does not request, or if s/he requests but does not obtain a passing response (i.e., does not combine eye contact with a vocalization), you may repeat steps a) through d) two more times, so that the child has three opportunities to respond.

Scoring: (see next page)

Scoring: Food

Trial # 1

Did the child request the food? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

Trial # 2

Did the child request the food? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

Trial # 3

Did the child request the food? Yes No

If so, check all behaviors used to request (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Give Object						
Point						
Manipulate Hand						
None of above						

Vocalizations used: _____

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

5) Balloon

Materials required: 1-3 balloons

of trials allowed: Up to 3

Passing response: Directs your attention to the balloon. Examples: points at the balloon and says "Look!"; looks back and forth between you and the balloon with a surprised facial expression.

Directions:

- a) Hold up deflated balloon and get child's attention by saying, "Look, (child's name), look what I have now!"
- b) Blow up the balloon and hold it over your head.
- c) Get the child's attention, count out loud to three, and then release the balloon so that it flies into the air.
- d) Observe whether the child directs your attention to the balloon (passing response).
- e) If the child does not direct your attention, you may repeat steps a) through d) two more times, so that the child has three opportunities to respond.

Scoring: Balloon (see next page)

Scoring: Balloon

Trial # 1

Did the child direct your attention to the balloon? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 2

Did the child direct your attention to the balloon? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 3

Did the child direct your attention to the balloon? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

6) Puppet

Materials required: Animal puppet

of trials allowed: Only 1

Passing response: Directs your attention to the puppet on your hand.

Examples: points to the puppet and says, "Doggie!"; looks back and forth between the examiner and the puppet and laughs.

Directions:

Note: Only one trial is permitted for this task.

a) When the child is not looking, place the puppet onto your writing hand. Keep your hand under the table or behind your back as you put the puppet on, so that the child does not see you.

b) Hold your pen with the puppet hand and begin writing on the score form. As you do this, get the child's attention by saying, "I've got some writing to do!" Maintain a serious facial expression and do not look at the child as you write. (If the child does not respond, you may engage in other activities with the puppet, such as putting toys away with it, yawning and covering your mouth with it, or scratching your head with it.)

c) Observe whether the child directs your attention to the puppet on your hand (passing response).

Scoring: (see next page)

Scoring: Puppet

Trial # 1

Did the child direct your attention to the puppet? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

7) Bag of toys

Materials required: Cloth bag containing sparkle wand, rubber snake, and fuzzy animal

of trials allowed: Up to 3

Passing response: Directs your attention to any of the toys in the bag.
Examples: looks at you while holding up (showing) a toy;
looks at you and labels the toy (e.g., "Snake").

Directions:

- a) Hold up the bag of toys and get child's attention by shaking the bag and saying, "Look, (child's name), look what I have now!"
- b) Place the bag in front of the child, show him/her the opening, and say, "Look at the toys I have!"
- c) Observe whether the child directs your attention to any of the toys in the bag (passing response).
- d) If the child does not take any toys out of the bag, you may pull one toy partially out of the bag to show him/her.
- e) If the child still does not respond, you may pull one toy completely out of the bag and place it in front of him/her.
- f) If the child does not direct your attention, you may repeat steps d) and e) for each toy in the bag, so that the child has three opportunities to respond. [It may be necessary to return toys to the bag before repeating steps d) and e).]

Scoring: (see next page)

Scoring: Bag of Toys

Trial # 1

Did the child direct your attention to the toys? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 2

Did the child direct your attention to the toys? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 3

Did the child direct your attention to the toys? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

8) Noisemaker

Materials required: Small electronic noisemaker

of trials allowed: Only 1

Passing response: Directs your attention to the sound. Examples: points toward the sound and looks at you; looks back and forth between you and the direction of the sound with a surprised facial expression; comments verbally about the sound (e.g., "What's that?").

Directions:

Note: Only one trial is permitted for this task.

a) Place a toy on the table (alternatively, you can administer this item while the child is engaged with a toy during the previous Bag of Toys item).

b) When the child is not looking at you, hold the noisemaker under the table and activate it for about 10 seconds. Maintain a serious facial expression and do not look directly at the child as the noisemaker sounds. (If the child does not respond, you may activate the noisemaker again for two or three 5-second bursts. You may also activate the noisemaker in bursts as long as the child is attending to the sound.)

c) Observe whether the child directs your attention to the sound (passing response).

Scoring: (see next page)

Scoring: Noisemaker

Trial # 1

Did the child direct your attention to the sound? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

C. Imitation (Items 9-12)

Location: table

Materials required: see individual items

9) Shake rattle

Materials required: Rattle

of trials allowed: Up to 3

Passing response: Shakes the rattle in the air at least 2 times as demonstrated

Directions:

- a) Take out rattle from bag and get child's attention by saying, "Look what I have!"
- b) Shake rattle back and forth for about 10 seconds, saying "bop-bop-bop" in rhythm as you shake it.
- c) Hand the rattle to the child and say, "You do it!" ("Your turn!" is another phrase that can be used.)
- d) If the child does not demonstrate a passing response, you may repeat steps b) and c) two more times, so that the child has a total of three opportunities to respond.

Scoring: Rattle

Trial # *Score (see Manual for definitions)*

1	Pass	Emerge	Fail
---	------	--------	------

2	Pass	Emerge	Fail
---	------	--------	------

3	Pass	Emerge	Fail
---	------	--------	------

ITEM SCORE: **PASS** **FAIL*** **REFUSE (see Manual for definition)**
(* Emerge is scored as Fail)

10) Roll car

Materials required: Small (3") car or truck

of trials allowed: Up to 3

Passing response: Rolls the car back and forth at least one time as demonstrated

Directions:

- Take out car from bag and get child's attention by saying, "Look what I have!"
- Starting at the child's left, roll car back and forth across the table for about 10 seconds, saying "whee-whee-whee" as you roll it.
- Hand the car to the child and say, "You do it!" or "Your turn!"
- If the child does not demonstrate a passing response, you may repeat steps b) and c) two more times, so that the child has a total of three opportunities to respond.

Scoring: Car

Trial # *Score (see Manual for definitions)*

1	Pass	Emerge	Fail
---	------	--------	------

2	Pass	Emerge	Fail
---	------	--------	------

3	Pass	Emerge	Fail
---	------	--------	------

ITEM SCORE: PASS FAIL* REFUSE (see Manual for definition)
(* Emerge is scored as Fail)

11) Drum hands

Materials required: None

of trials allowed: Up to 3

Passing response: Drums hands on table as demonstrated, alternating hands and with each hand touching the table at least one time

Directions:

- a) Get child's attention by saying, "Look what I'm doing!"
- b) Drum your hands on the table slowly, alternating your left and right hands. Continue for about 15 seconds, saying "boom-boom-boom" in rhythm as each hand hits the table.
- c) Point to the child and say, "You do it!" or "Your turn!"
- d) If the child does not demonstrate a passing response, you may repeat steps a) through c) two more times, so that the child has a total of three opportunities to respond.

Scoring: Hands

Trial # *Score (see Manual for definitions)*

1	Pass	Emerge	Fail
---	------	--------	------

2	Pass	Emerge	Fail
---	------	--------	------

3	Pass	Emerge	Fail
---	------	--------	------

ITEM SCORE: **PASS** **FAIL*** **REFUSE** (see Manual for definition)

(* Emerge is scored as Fail)

12) Hop dog

Materials required: Small plastic dog (or other animal)

of trials allowed: Up to 3

Passing response: Hops dog across table at least two times as demonstrated

Directions:

- a) Take out dog from bag and get child's attention by saying, "Look what I have!"
- b) Starting at the child's left, hop the dog across the table for about 10 seconds, saying "beep-beep-beep" as it hits the table.
- c) Hand the dog to the child and say, "You do it!" or "Your turn!"
- d) If the child does not demonstrate a passing response, you may repeat steps b) and c) two more times, so that the child has a total of three opportunities to respond.

Scoring: Dog

Trial # *Score (see Manual for definitions)*

<i>Trial #</i>	<i>Score (see Manual for definitions)</i>		
1	Pass	Emerge	Fail
2	Pass	Emerge	Fail
3	Pass	Emerge	Fail

ITEM SCORE: **PASS** **FAIL*** **REFUSE (see Manual for definition)**
(* Emerge is scored as Fail)

13) Flying Saucer (whirly gigg)

Scoring: Balloon

Trial # 1

Did the child direct your attention to the flying saucer? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 2

Did the child direct your attention to the flying saucer? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

Trial # 3

Did the child direct your attention to the flying saucer? Yes No

If so, check all behaviors used to direct attention (see Manual for definitions):

	Eye Contact	Vocalization	Eye Contact & Vocalization	3-Point Gaze	3-Point Gaze & Vocalization	No EC or Vocaliz.
Point						
Show Object						
Change in Affect						
None of above						

Vocalizations used: _____

Did the child request instead of directing your attention? Yes No

ITEM SCORE: PASS FAIL REFUSE (see Manual for definition)

Post-Screening Questions

1. Were either of the child's parents in the room during the administration of the STAT? YES NO

2. Please circle any of the circumstances listed below that may have interfered with the child's performance on the STAT:

Physical state: Hunger Fatigue Illness Other: _____

Behavioral features: Shyness

Separation distress

Difficulty with transitions

Difficulty parting with preferred objects

Fearfulness of particular objects (specify: _____)

Other: _____

Sensory problems: Hearing impairment

Visual impairment

Other: _____

Motor problems: Hypotonia Poor coordination Other: _____

3. Please describe any play, imitation, or communicative behaviors demonstrated by the child in contexts other than the STAT:

Play:

Imitation:

Requesting:

Directing Attention:

Parent Measures

Information Form

Child's date of birth: _____

Today's date: _____

Child's race/ethnicity: _____

County where child/family lives: _____

Child's preschool: _____

Please give information about the parent(s) who live with the child. DO NOT list the name(s) of the parent(s).

Parent 1: a) _____ (please specify relationship to the child, e.g., birth mother, grandmother, adoptive mother, etc.)

b) What was the highest grade completed by this parent? _____

c) How many years of college did this parent complete? _____

d) How many years of graduate school did this parent complete? _____

e) List this parent's job title, job description, and employer: _____

Job Title: _____

Job Description: _____

Employer/Company name: _____

Parent 2: a) _____ (please specify relationship to the child, e.g., birth father, grandfather, adoptive father, etc.)

b) What was the highest grade completed by this parent? _____

c) How many years of college did this parent complete? _____

d) How many years of graduate school did this parent complete? _____

e) List this parent's job title, job description, and employer: _____

Job Title: _____

Job Description: _____

Employer/Company name: _____

If this child is not an only child, please provide the following information about his or her siblings. DO NOT list the name(s) of the other children.

Age Birthdate Gender Relationship (step/half/natural)

1.

2.

3.

4.

Siblings/half siblings not living in the home (gender/birthdate)

Name of Child _____ DOB _____ DO _____ ECA (y-m) _____ Therapist _____

ADI-R Algorithm for ICD-10/DSM-IV

For short form of ADI-R
(revised May 1999)

(Use current for children under age 4 and most abnormal 4-5
for others except where otherwise noted)

person being interviewed
(mom, dad, grandmother)

Qualitative Impairments in Reciprocal Social Interaction

B1: Failure to use nonverbal behaviors to regulate social interaction

- Direct Gaze _____ (37)
- Social Smiling _____ (38)
- Range of Facial Expressions _____ (44)

Total B1 _____

B2: Failure to develop peer relationships

- Imaginative Play with Peers (over 4 yrs. only) _____ (49)
- Interest in Children _____ (51)
- Response to Approaches of Other Children _____ (52)
- Group Play with Peers (CA 4-10 yrs.) OR _____ (53)
- Friendships (CA 10-15 yrs.) _____ (54)

Total B2 _____

B3: Lack of shared enjoyment

- Showing and Directing Attention _____ (39)
- Offering to Share _____ (40)
- Seeking to Share His/Her Enjoyment with Others _____ (41)

Total B3 _____

B4: Lack of socioemotional reciprocity

- Use of Other's Body to Communicate (Score Ever) _____ (8)
- Offers Comfort _____ (42)
- Quality of Social Overtures _____ (43)
- Inappropriate Facial Expressions (Score Ever) _____ (45)
- Appropriateness of Social Responses _____ (46)

Total B4 _____

Total B = B1 + B2 + B3 + B4

_____ (Cutoff = 10)

Communication (all subjects)

C1: Lack of, or delay in, spoken language and failure to compensate through gesture

- Pointing to Express Interest (29) _____
- Conventional/Instrumental Gestures (30) _____
- Nodding (31) _____
- Head Shaking (32) _____

Total C1 _____

C4: Lack of varied spontaneous make-believe or social imitative play

- Spontaneous Imitation of Actions (28) _____
- Imaginative Play (48) _____
- Imitative Social Play (50) _____

Total C4 _____

Verbal Subjects (overall level of language (20) = 0)

C2V: Relative failure to initiate or sustain conversational interchange

- Social Vocalization/Chat (21) _____
- Reciprocal Conversation (Score Current) (22) _____

Total C2V _____

C3V: Stereotyped, repetitive or idiosyncratic speech

- Stereotyped Utterances and Delayed Echolalia (Score Ever) (19) _____
- Inappropriate Questions or Statements (Score Ever) (23) _____
- Pronominal Reversal (Score Ever) (24) _____
- Neologisms/Idiosyncratic Language (Score Ever) (25) _____

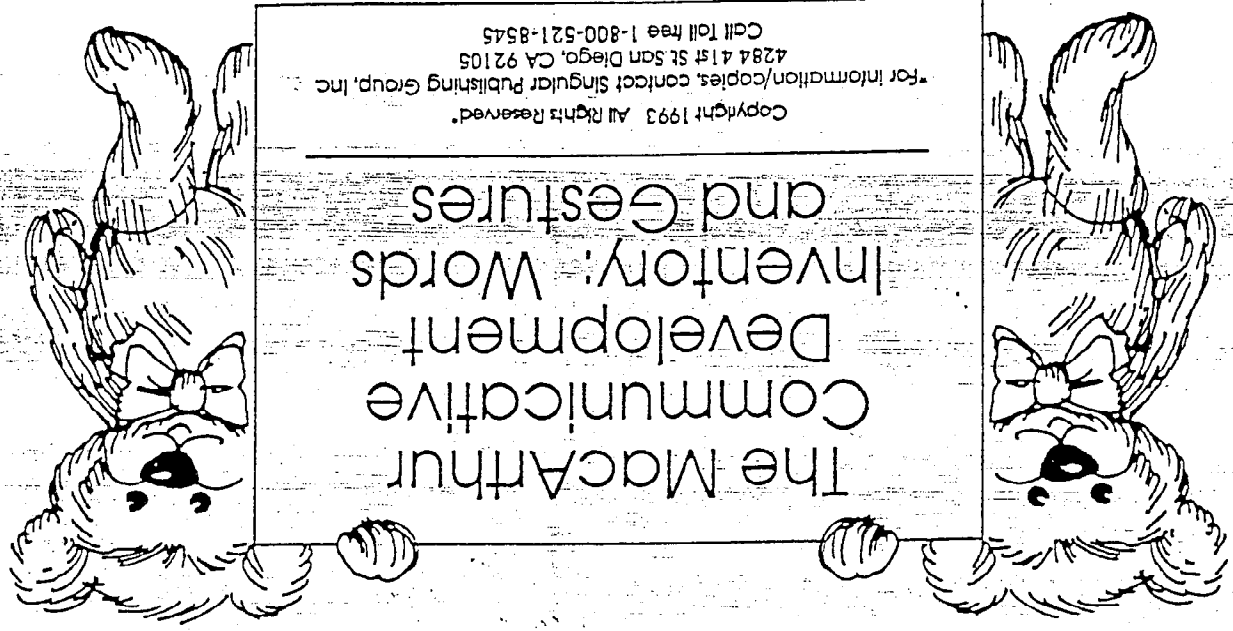
Total C3V _____

Verbal Total = C1 + C4 + C2V + C3Verbal (Cutoff = 8) _____

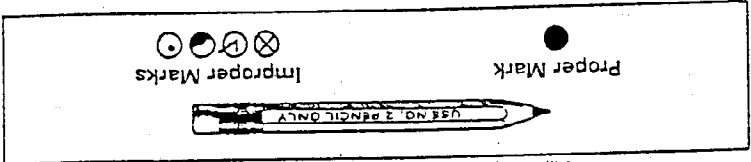
Nonverbal children [Overall Level of Language (20) = 1 or 2]

Nonverbal Total = C1 + C4 (Cutoff=7) _____

Birthdate _____ Today's Date _____
 Sex _____



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 4284 41st St. San Diego, CA 92105
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PART I EARLY WORDS

A. FIRST SIGNS OF UNDERSTANDING
 Before children begin to speak, they show signs of understanding language by responding to familiar words and phrases. Below are some common examples. Does your child do any of these?
 Yes No

1. Respond when name is called. (e.g., by turning and looking at source)
2. Respond to "no-no" (by stopping what he/she is doing, at least for a moment).
3. React to "there's mommy/daddy" by looking around for them.

B. PHRASES (28)
 In the list below, please mark the phrases that your child seems to understand.

understands	understands	understands
Open your mouth.	Get up.	Are you hungry?
Sit down.	Give it to mommy.	Are you tired/sleepy?
Spit it out.	Give me a hug.	Be careful.
Spit it.	Give me a kiss.	Be quiet.
Time to go night night.	Go get _____.	Clap your hands.
Throw the ball.	Good girl/boy.	Change diaper.
This little piggy.	Hold still.	Come here/come on.
Want to go for a ride?	Let's go bye bye.	Daddy's/mommy's home.
	Look/look here.	Do you want more?
		Don't do that.

C. STARTING TO TALK

1. Some children like to "parrot" or imitate things that they've just heard (including new words that they are just learning, and/or parts of sentences, for example, repeating "work now" after mother says "Mommy's going to work now.") How often does your child imitate words?

Often Sometimes Never

2. Some children like to go around naming or labeling things, as though proud of knowing the names and wanting to show this. How often does your child do this?

Often Sometimes Never

D. VOCABULARY CHECKLIST

The following is a list of typical words in young children's vocabularies. For words your child understands but does not yet say, place a mark in the first column (understands). For words that your child uses a different pronunciation of a word (for example, "raffe" for "giraffe" or "sketti" for "spaghetti") mark the word anyway. Remember, this is a "catalogue" of words that are used by many different children. Don't worry if your child knows only a few right now.

1. SOUND EFFECTS AND ANIMAL SOUNDS - (12)

understands	understands	meow	meow	uh oh	uh oh
understands	understands	baa baa	meow	wool wool	wool wool
understands	understands	choo choo	ouch	yum yum	yum yum
understands	understands	cockadoodieoo	quack quack		
understands	understands	grrr			

2. ANIMALS NAMES (Real or Toy) (36)

understands	understands	animal	duck	penguin	penguin
understands	understands	bear	elephant	pig	pig
understands	understands	bee	fish	pony	pony
understands	understands	bird	trog	puppy	puppy
understands	understands	bug	giraffe	sheep	sheep
understands	understands	bunny	goose	squirrel	squirrel
understands	understands	butterfly	horse	teddy bear	teddy bear
understands	understands	cat	kitty	tiger	tiger
understands	understands	chicken	lamb	turkey	turkey
understands	understands	cow	lion	turtle	turtle
understands	understands	deer	monkey		
understands	understands	dog	mouse		
understands	understands	donkey	owl		

3. VEHICLES (Real or Toy) (9)

understands	understands	airplane	car	stroller	stroller
understands	understands	bicycle	firetruck	train	train
understands	understands	bus	motorcycle	truck	truck

4. TOYS (8)

ball	<input type="radio"/>	<input type="radio"/>	book	<input type="radio"/>	<input type="radio"/>	pen	<input type="radio"/>	<input type="radio"/>
balloon	<input type="radio"/>	<input type="radio"/>	bubbles	<input type="radio"/>	<input type="radio"/>	toy	<input type="radio"/>	<input type="radio"/>
block	<input type="radio"/>	<input type="radio"/>	doll	<input type="radio"/>	<input type="radio"/>			

5. FOOD AND DRINK (30)

apple	<input type="radio"/>	<input type="radio"/>	chicken	<input type="radio"/>	<input type="radio"/>	meat	<input type="radio"/>	<input type="radio"/>
banana	<input type="radio"/>	<input type="radio"/>	coffee	<input type="radio"/>	<input type="radio"/>	milk	<input type="radio"/>	<input type="radio"/>
bread	<input type="radio"/>	<input type="radio"/>	cookie	<input type="radio"/>	<input type="radio"/>	noodles	<input type="radio"/>	<input type="radio"/>
butter	<input type="radio"/>	<input type="radio"/>	cracker	<input type="radio"/>	<input type="radio"/>	orange	<input type="radio"/>	<input type="radio"/>
cake	<input type="radio"/>	<input type="radio"/>	drink	<input type="radio"/>	<input type="radio"/>	peas	<input type="radio"/>	<input type="radio"/>
candy	<input type="radio"/>	<input type="radio"/>	egg	<input type="radio"/>	<input type="radio"/>	pizza	<input type="radio"/>	<input type="radio"/>
carrots	<input type="radio"/>	<input type="radio"/>	fish	<input type="radio"/>	<input type="radio"/>	raisin	<input type="radio"/>	<input type="radio"/>
cereal	<input type="radio"/>	<input type="radio"/>	food	<input type="radio"/>	<input type="radio"/>	spaghetti	<input type="radio"/>	<input type="radio"/>
cheerios	<input type="radio"/>	<input type="radio"/>	ice cream	<input type="radio"/>	<input type="radio"/>	toast	<input type="radio"/>	<input type="radio"/>
cheese	<input type="radio"/>	<input type="radio"/>	juice	<input type="radio"/>	<input type="radio"/>	water	<input type="radio"/>	<input type="radio"/>

6. CLOTHING (19)

beads	<input type="radio"/>	<input type="radio"/>	hat	<input type="radio"/>	<input type="radio"/>	shoe	<input type="radio"/>	<input type="radio"/>
bib	<input type="radio"/>	<input type="radio"/>	jacket	<input type="radio"/>	<input type="radio"/>	shorts	<input type="radio"/>	<input type="radio"/>
boots	<input type="radio"/>	<input type="radio"/>	jeans	<input type="radio"/>	<input type="radio"/>	sock	<input type="radio"/>	<input type="radio"/>
button	<input type="radio"/>	<input type="radio"/>	necklace	<input type="radio"/>	<input type="radio"/>	sweater	<input type="radio"/>	<input type="radio"/>
coat	<input type="radio"/>	<input type="radio"/>	pajamas	<input type="radio"/>	<input type="radio"/>	zipper	<input type="radio"/>	<input type="radio"/>
diaper	<input type="radio"/>	<input type="radio"/>	pants	<input type="radio"/>	<input type="radio"/>			
dress	<input type="radio"/>	<input type="radio"/>	shirt	<input type="radio"/>	<input type="radio"/>			

7. BODY PARTS (20)

arm	<input type="radio"/>	<input type="radio"/>	finger	<input type="radio"/>	<input type="radio"/>	nose	<input type="radio"/>	<input type="radio"/>
belly button	<input type="radio"/>	<input type="radio"/>	hair	<input type="radio"/>	<input type="radio"/>	nose/boo boo	<input type="radio"/>	<input type="radio"/>
cheek	<input type="radio"/>	<input type="radio"/>	hand	<input type="radio"/>	<input type="radio"/>	tooth	<input type="radio"/>	<input type="radio"/>
ear	<input type="radio"/>	<input type="radio"/>	head	<input type="radio"/>	<input type="radio"/>	toe	<input type="radio"/>	<input type="radio"/>
eye	<input type="radio"/>	<input type="radio"/>	knee	<input type="radio"/>	<input type="radio"/>	tongue	<input type="radio"/>	<input type="radio"/>
face	<input type="radio"/>	<input type="radio"/>	leg	<input type="radio"/>	<input type="radio"/>	tummy	<input type="radio"/>	<input type="radio"/>
foot	<input type="radio"/>	<input type="radio"/>	mouth	<input type="radio"/>	<input type="radio"/>			

8. FURNITURE AND ROOMS (24)

barroom	<input type="radio"/>	<input type="radio"/>	drawer	<input type="radio"/>	<input type="radio"/>	refrigerator	<input type="radio"/>	<input type="radio"/>
bathtub	<input type="radio"/>	<input type="radio"/>	garage	<input type="radio"/>	<input type="radio"/>	rocking chair	<input type="radio"/>	<input type="radio"/>
bed	<input type="radio"/>	<input type="radio"/>	high chair	<input type="radio"/>	<input type="radio"/>	sink	<input type="radio"/>	<input type="radio"/>
bedroom	<input type="radio"/>	<input type="radio"/>	kitchen	<input type="radio"/>	<input type="radio"/>	stairs	<input type="radio"/>	<input type="radio"/>
chair	<input type="radio"/>	<input type="radio"/>	living room	<input type="radio"/>	<input type="radio"/>	stove	<input type="radio"/>	<input type="radio"/>
couch	<input type="radio"/>	<input type="radio"/>	oven	<input type="radio"/>	<input type="radio"/>	table	<input type="radio"/>	<input type="radio"/>
crib	<input type="radio"/>	<input type="radio"/>	play pen	<input type="radio"/>	<input type="radio"/>	TV	<input type="radio"/>	<input type="radio"/>
door	<input type="radio"/>	<input type="radio"/>	potty	<input type="radio"/>	<input type="radio"/>	window	<input type="radio"/>	<input type="radio"/>

13. ACTION WORDS (55)		under-stands	under-stands	under-stands	under-stands
show	hit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
sing	hit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
sleep	hit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
smile	hug	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
splash	hurry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
stop	jump	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
swim	kiss	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
swing	look	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
take	love	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
throw	open	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tickle	play	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
touch	pull	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
watch	push	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
walk	put	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wash	read	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wipe	ride	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
write	run	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	say	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	see	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. WORDS ABOUT TIME (8)		under-stands	under-stands	under-stands	under-stands
tomorrow	night	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tonight	now	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	today	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. DESCRIPTIVE WORDS (37)		under-stands	under-stands	under-stands	under-stands
old	empty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
pretty	fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
red	fine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
scared	gentle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
sick	good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
sleepy	happy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
soft	hard	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
thirsty	hot	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
tired	hungry	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wet	hurt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
yucky	little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	naughty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. PRONOUNS (11)		under-stands	under-stands	under-stands	under-stands
this	me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
you	mine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
your	my	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	that	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B. GAMES AND ROUTINES

Does your child do any of the following?

1. Play peekaboo.	<input type="radio"/>	<input type="radio"/>
2. Play patry cake.	<input type="radio"/>	<input type="radio"/>
3. Play "so big".	<input type="radio"/>	<input type="radio"/>
4. Play chasing games.	<input type="radio"/>	<input type="radio"/>
5. Sing.	<input type="radio"/>	<input type="radio"/>
6. Dance.	<input type="radio"/>	<input type="radio"/>

A. FIRST COMMUNICATIVE GESTURES

When infants are first learning to communicate, they often use gestures to make their wishes known. For each item below, mark the line that describes your child's actions right now.

1. Extends arm to show you something he/she is holding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Reaches out and gives you a toy or some object that he/she is holding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Points (with arm and index finger extended) at some interesting object or event.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Waves bye-bye on his/her own when someone leaves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Extends his/her arm upward to signal a wish to be picked up.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Shakes head "no".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Nods head "yes".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Gestures "hush" by placing finger to lips.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Requests something by extending arm and opening and closing hand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Blows kisses from a distance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Smacks lips in a "yum yum" gesture to indicate that something taste good.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Shrugs to indicate "all gone" or "where'd it go".	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PART II ACTIONS AND GESTURES

19. QUANTIFIERS (8)

all	<input type="radio"/>	<input type="radio"/>	none	<input type="radio"/>	<input type="radio"/>	some	<input type="radio"/>	<input type="radio"/>
another	<input type="radio"/>	<input type="radio"/>	not	<input type="radio"/>	<input type="radio"/>	some	<input type="radio"/>	<input type="radio"/>
more	<input type="radio"/>	<input type="radio"/>	other	<input type="radio"/>	<input type="radio"/>	same	<input type="radio"/>	<input type="radio"/>

18. PREPOSITIONS AND LOCATIONS (11)

away	<input type="radio"/>	<input type="radio"/>	inside	<input type="radio"/>	<input type="radio"/>	there	<input type="radio"/>	<input type="radio"/>
back	<input type="radio"/>	<input type="radio"/>	off	<input type="radio"/>	<input type="radio"/>	under	<input type="radio"/>	<input type="radio"/>
down	<input type="radio"/>	<input type="radio"/>	on	<input type="radio"/>	<input type="radio"/>	up	<input type="radio"/>	<input type="radio"/>
in	<input type="radio"/>	<input type="radio"/>	out	<input type="radio"/>	<input type="radio"/>			

17. QUESTION WORDS (6)

how	<input type="radio"/>	<input type="radio"/>	when	<input type="radio"/>	<input type="radio"/>	who	<input type="radio"/>	<input type="radio"/>
what	<input type="radio"/>	<input type="radio"/>	where	<input type="radio"/>	<input type="radio"/>	why	<input type="radio"/>	<input type="radio"/>

C. ACTIONS WITH OBJECTS

Does your child do or try to do any of the following?

1. Eat with a spoon or fork.	<input type="radio"/>	<input type="radio"/>
2. Drink from a cup containing liquid.	<input type="radio"/>	<input type="radio"/>
3. Comb or brush own hair.	<input type="radio"/>	<input type="radio"/>
4. Brush teeth.	<input type="radio"/>	<input type="radio"/>
5. Wipe face or hands with a towel or cloth.	<input type="radio"/>	<input type="radio"/>
6. Put on hat.	<input type="radio"/>	<input type="radio"/>
7. Put on a shoe or sock.	<input type="radio"/>	<input type="radio"/>
8. Put on a necklace, bracelet, or watch.	<input type="radio"/>	<input type="radio"/>
9. Lay head on hands and squeeze eyes shut as if sleeping.	<input type="radio"/>	<input type="radio"/>
10. Blow to indicate something is hot.	<input type="radio"/>	<input type="radio"/>
11. Hold plane and make it "fly".	<input type="radio"/>	<input type="radio"/>
12. Put telephone to ear.	<input type="radio"/>	<input type="radio"/>
13. Sniff flowers.	<input type="radio"/>	<input type="radio"/>
14. Push toy car or truck.	<input type="radio"/>	<input type="radio"/>
15. Throw a ball.	<input type="radio"/>	<input type="radio"/>
16. Pour pretend liquid from one container to another.	<input type="radio"/>	<input type="radio"/>
17. Stir pretend liquid in a cup or pan with a spoon.	<input type="radio"/>	<input type="radio"/>

D. PRETENDING TO BE A PARENT

Here are some things that young children sometimes do with stuffed animals or dolls. Please mark the actions that you have seen your child do.

1. Put to bed.	<input type="radio"/>	<input type="radio"/>
2. Cover with blanket.	<input type="radio"/>	<input type="radio"/>
3. Feed with bottle.	<input type="radio"/>	<input type="radio"/>
4. Feed with spoon.	<input type="radio"/>	<input type="radio"/>
5. Brush/comb its hair.	<input type="radio"/>	<input type="radio"/>
6. Pat or burp it.	<input type="radio"/>	<input type="radio"/>
7. Push in stroller/buggy.	<input type="radio"/>	<input type="radio"/>
8. Rock it.	<input type="radio"/>	<input type="radio"/>
9. Kiss or hug it.	<input type="radio"/>	<input type="radio"/>
10. Try to put shoe or sock or hat on it.	<input type="radio"/>	<input type="radio"/>
11. Wipe its face or hands.	<input type="radio"/>	<input type="radio"/>
12. Talk to it.	<input type="radio"/>	<input type="radio"/>
13. Try to put diaper on it.	<input type="radio"/>	<input type="radio"/>

E. IMITATING OTHER ADULT ACTIONS (Using real or toy implements)

Does your child do or try to do any of the following?

1. Sweep with broom or mop.	<input type="radio"/>	<input type="radio"/>
2. Put key in door or lock.	<input type="radio"/>	<input type="radio"/>
3. Pound with hammer or mallet.	<input type="radio"/>	<input type="radio"/>
4. Attempt to use saw.	<input type="radio"/>	<input type="radio"/>
5. Type at a typewriter or computer keyboard.	<input type="radio"/>	<input type="radio"/>
6. Read (opens book, turns page).	<input type="radio"/>	<input type="radio"/>
7. Vacuum.	<input type="radio"/>	<input type="radio"/>
8. Water plants.	<input type="radio"/>	<input type="radio"/>
9. Play musical instrument (e.g., piano, trumpet).	<input type="radio"/>	<input type="radio"/>
10. Drive car by turning steering wheel.	<input type="radio"/>	<input type="radio"/>
11. Wash dishes.	<input type="radio"/>	<input type="radio"/>
12. Clean with cloth or duster.	<input type="radio"/>	<input type="radio"/>
13. Write with a pen, pencil, or marker.	<input type="radio"/>	<input type="radio"/>
14. Dig with a shovel.	<input type="radio"/>	<input type="radio"/>
15. Put on glasses.	<input type="radio"/>	<input type="radio"/>

PRETEND OBJECTS

During play, children sometimes use an object as a replacement for another. For example, a child wishing to feed a teddy bear might pretend that a block is an apple. A child might pretend that a bowl is a hat. Have you seen your child make substitutions of this kind?

Yes No

If yes, please give several examples:

[Empty space for providing examples of pretend objects]

OTHER COMMENTS:

[Empty space for other comments]

ID: _____

Date of Birth: _____

Today's Date: _____

Social Behavior Checklist

DIRECTIONS: Please read each of the following items carefully and respond in two ways:

First, indicate the extent to which each item is true of your child **now** by circling the appropriate number.

Next, **for all items circled 0**, please indicate whether this item used to be true of your child when he/she was younger by circling either "Y" for Yes or "N" for No

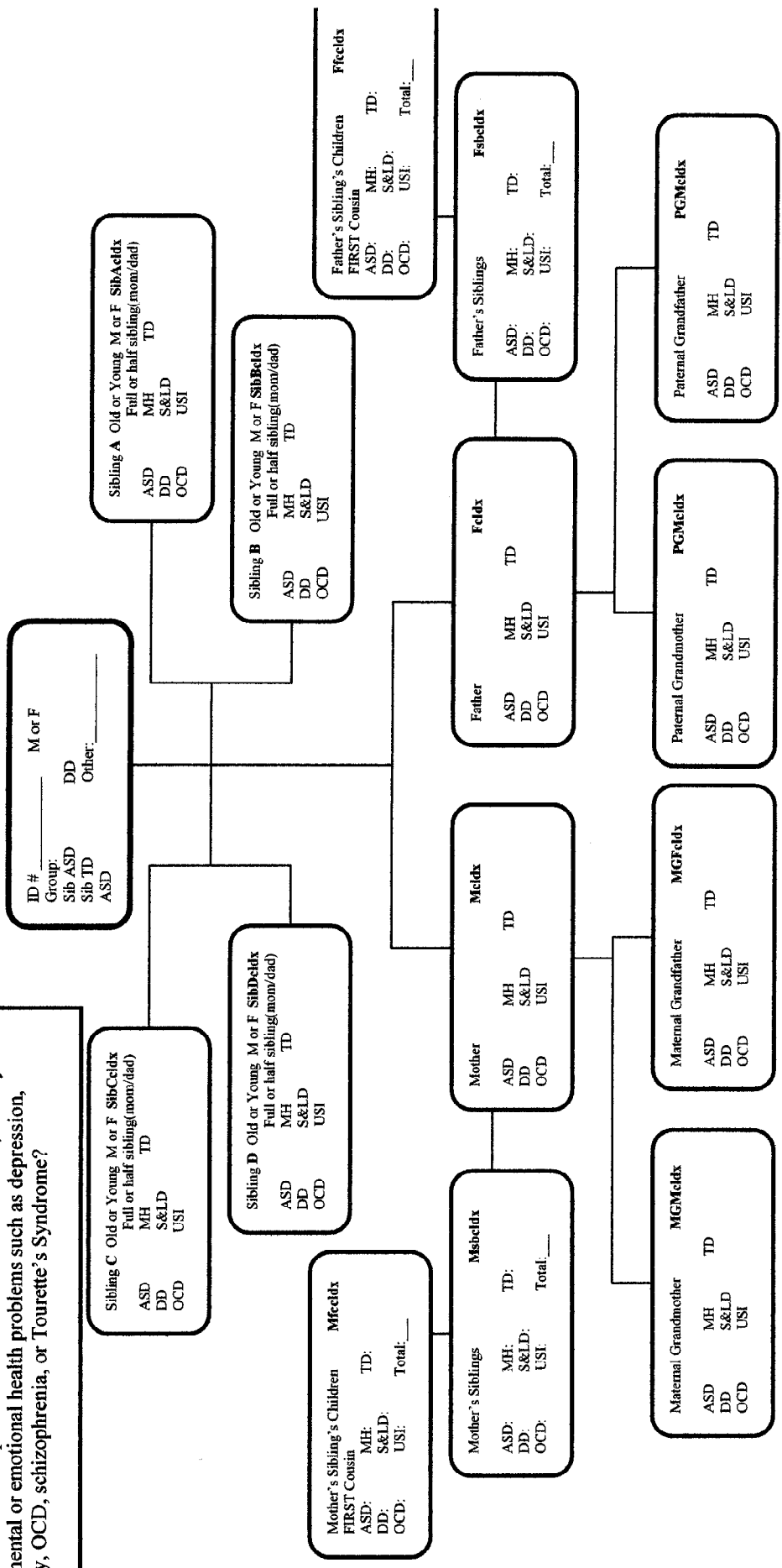
		How True Now?				
		Almost	Some- times	Always		
		Never	Almost	Always	Used to, but doesn't anymore	
1.	Expresses two or more recognizable emotions such as pleasure, fear, sadness, or distress.	0	1	2	Y	N
2.	Gains adult's attention by offering toys or objects.	0	1	2	Y	N
3.	Shows affection toward familiar people by hugging or kissing them.	0	1	2	Y	N
4.	Plays simple interaction games such as peek-a-boo with adults.	0	1	2	Y	N
5.	Imitates simple adult movements, such as clapping hands or waving good-bye.	0	1	2	Y	N
6.	Shows interest in other children.	0	1	2	Y	N
7.	Imitates movements of another child at play.	0	1	2	Y	N
8.	Laughs or smiles appropriately in response to praise from adults.	0	1	2	Y	N
9.	Repeats actions that produce laughter and attention.	0	1	2	Y	N
10.	Imitates household tasks such as dusting or sweeping.	0	1	2	Y	N
11.	Pulls at an adult to show him/her something.	0	1	2	Y	N
12.	Directs attention toward him/herself or his/her activities.	0	1	2	Y	N

		How True Now?			Used to, but doesn't anymore?
		Almost	Some- times	Always	
13.	Engages in simple make-believe activities.	0	1	2	Y N
14.	Enjoys playing near other children.	0	1	2	Y N
15.	Shows a desire to please his/her parents.	0	1	2	Y N
16.	Plays interactive games with another child for 2-5 minutes.	0	1	2	Y N
17.	Plays simple group games such as "Ring around the Rosy".	0	1	2	Y N
18.	Joins in play with other children.	0	1	2	Y N
19.	Prefers to play with other children than alone.	0	1	2	Y N
20.	Understands the concept of taking turns.	0	1	2	Y N
21.	Engages in make-believe play with invented people and objects.	0	1	2	Y N
22.	Understands the concept of sharing.	0	1	2	Y N
23.	Has a favorite playmate.	0	1	2	Y N
24.	Enjoys playing "dress up" in adult clothes.	0	1	2	Y N
25.	Follows rules in simple games.	0	1	2	Y N
26.	Is protective toward younger children and pets.	0	1	2	Y N
27.	Comforts playmates in distress.	0	1	2	Y N
28.	Plays cooperatively in groups of 2 to 5 children.	0	1	2	Y N
29.	Plays simple table games such as checkers.	0	1	2	Y N
30.	Chooses his/her own friends.	0	1	2	Y N

Family History Form
Revised 9/28/2005

ID #: _____ Completed by: _____
Date: _____ Parent being interviewed: _____

I'd like a picture of your family. As I ask about each person tell me if they had any developmental or social difficulties as a child or if they have received special services in school. As adults, do they have mental or emotional health problems such as depression, anxiety, OCD, schizophrenia, or Tourette's Syndrome?



ASD, Autism Spectrum Disorder= 1; S&LD, Speech and Language Disorder= 2; DD, Other Developmental Disorder Excluding Language=3; OCD= 4; MH, Other Mental Health Disorder= 5; USI, Unconfirmed Social Issues= 6; TD, Typical= 8, Sib, Sibling of child w/ASD

Revised Family History Data Categories 9/26/2005

RULES

- Descriptions containing words such as possible, maybe, might, undiagnosed, tendencies, a little, or followed by a ? (indicating uncertainty in that description) are not coded. In the "non-examples" boxes, located under each category, are samples of parent responses that are not coded. To emphasize reasons for non-inclusion, portions of "non-examples" are bolded, as to note separation from examples that are coded (e.g., autism vs. autism?).
- If a person has multiple conditions that fall in separate categories (two diagnosis) (e.g., ADHD and anxiety) each condition is counted within its respective category (e.g., **cldx1** = 3, Other Developmental Disorders Excluding Language and **cldx2** = 5, Other Mental Health Disorders).
- However, if a person has multiple conditions (e.g., schizophrenia and depression) that fall in the same category only count them as one condition (one diagnosis) for that category (e.g., **cldx1** = 5, Other Mental Health Disorders, **cldx2** = 888).
- If diagnostic information is written in it is to be entered over circled categories. (example: if depression is written in but TD (typical) is circled the only clinical diagnosis entered for that person should be Other Mental Health Disorders, 5)
- If a person falls into any category 1-6 they cannot also be entered as typical (e.g., if it is written in that they are "very shy" **cldx1** = 6, Unconfirmed Social Issues, then **cldx2** = 888)
- Half-siblings in the child's extended family (e.g., mother's half-sibling) are treated as full siblings for the purposes of data collection and entry since some people may not mention that siblings are indeed half-siblings. Adopted siblings are not counted.
- There is space to enter six siblings in the current database, in the event that there are more than six siblings with diagnosis other than typical (18) you may add additional columns as needed. Do not enter additional columns for typical siblings.
- We will no longer seek and/or enter information past the grandparents of the child in the study since these reports seem to be unreliable.
- If parent reports a person in the family died, died at a young age, or died at birth enter them as typically developing unless otherwise noted (Note: an exception to this is suicide, which is coded 5).
- Enter any additional information that is written in from top to bottom, left to right.

Non-examples Speech & Language Disorders	
<i>no dx, possible ADHD LD</i>	<i>talked early</i>
	<i>talked at 2 or talked at 1</i>

2 - Speech & Language Disorders	
<i>Not due to hearing impairment or MR. Includes late talking and articulation.</i>	
articulation	speech articulation
articulation help	speech delay
delayed speech	speech therapy
diagnosed minor expressive language	speech tx in high school
delay now normal range	speech tx hisp
jargon until 7	ST
language delay	stutters
late language	talked at 4 or 5
late talker/SLI	talked late
late talking	talked/didn't speak until 5 or 6
slow speech (slow talker, slow to verbalize)	
some speech therapy	

Non-examples Autism Spectrum Disorders	
<i>autism? (anything followed by a ?)</i>	<i>no diagnosis ASD</i>
<i>definite suspicion</i>	<i>possible PDD-NOS</i>
<i>maybe autistic</i>	

1 - Autism Spectrum Disorders	
Asperger's	high functioning ASD
autism	mild ASD
diagnosed PDD	PDD or PDD-NOS
formerly PDD	

<i>OCD tendencies</i>	
<i>OCD not officially diagnosed</i>	<i>Tourette's-like</i>
Non-examples OCD	

4 - OCD	
compulsions	
OCD	
Tourette's	

Non-examples Other Developmental Disorders	
<i>birth defects died at 6 mos</i>	<i>no dx, possible ADHD LD</i>
<i>chromosomal abnormality, distant/savant</i>	<i>premature baby behind in development</i>
<i>difficulty in school</i>	<i>problems writing</i>
<i>early learner/early reading</i>	<i>testing for special ed</i>
<i>epilepsy maybe</i>	<i>trouble in school</i>
<i>hospitalized</i>	<i>trouble with reading/math</i>
<i>LD - comprehension, social</i>	

3 - Other Developmental Disorders – Excluding Language	
<i>Includes seizures, motor, LD, MR, and hearing.</i>	
ADD	low muscle tone
ADD/ADHD	mentally retarded
ADHD	motor planning disorder
Adult ADD	MR
CP	no speech, hearing problem due to OM
DD	OT
Down's Syndrome	outgrown ADD
dysgraphia	PT/OT
dyslexia	reading (assistance)
epilepsy	SED/SPED
fetal alcohol syndrome	seizure disorder
Fragile X	seizures
Friedreich's ataxia	slow learner
hearing problems	special ed
late reader	special ed/resource
LD - math	speech due to OM
LD - reading	spinabifida
LD or learning disabilities	

Non-examples Unconfirmed Social Issues	
<i>a little shy</i>	<i>"something", no dx</i>
<i>behavior problems</i>	<i>personality impairments</i>
<i>delays</i>	<i>reacts weird</i>
<i>difficulties</i>	<i>sensory issues</i>
<i>have issues</i>	<i>some kind of delay</i>

6 - Unconfirmed Social Issues	
<i>↑ social</i>	<i>shy</i>
<i>anti-social</i>	<i>shy, ASD?</i>
<i>anti-social/narcissistic</i>	<i>slow social</i>
<i>inverted</i>	<i>social difficulties</i>
<i>isolated</i>	<i>social isolation</i>
<i>lost in society</i>	<i>social maturity</i>
<i>no friends</i>	<i>social problems</i>
<i>not interactive</i>	<i>socially backward</i>
<i>not very social</i>	<i>socially odd/awkward</i>
<i>possible undiagnosed social problems</i>	<i>very shy, no talking in K-1</i>
<i>reclusive</i>	

Non-examples Other Mental Health Disorders	
<i>addiction</i>	<i>on medication</i>
<i>bipolar tendencies or bipolar?</i>	<i>possible anxiety/bipolar/depression</i>
<i>emotional problems</i>	<i>possible mental issues (no dx)</i>
<i>mental illness</i>	<i>undiagnosed mental disorder</i>

5 - Other Mental Health Disorders	
<i>anxiety</i>	<i>manic depressive</i>
<i>attempted suicide (depression)</i>	<i>multiple personalities</i>
<i>bipolar</i>	<i>on lithium</i>
<i>borderline dissociative identity disorder</i>	<i>paranoia</i>
<i>borderline personality disorder</i>	<i>personality disorder</i>
<i>depression</i>	<i>PMDD depression</i>
<i>depression (temp)</i>	<i>post partum depression</i>
<i>depression over colon cancer/medical</i>	<i>Prozac</i>
<i>depression since adolescence</i>	<i>PTSD</i>
<i>dissociative identity disorder</i>	<i>schizophrenia</i>
<i>ED depression</i>	<i>situational depression</i>
<i>episodic depression</i>	<i>social anxiety</i>
<i>insomnia</i>	<i>SSRI low dose</i>
<i>institutionalized</i>	<i>suicide</i>
<i>manic</i>	<i>uni-polar</i>

Full, alphabetical list of "non-examples"	
A little shy	delays
above ave	depression is common (8)
abusive, physical	didn't like crowds
active	died at birth
adaptive behavior, LD?	died premature
addiction	died young/infant
addiction - alcohol, gambling	different
addiction (drug)	difficulties
addiction, recovering	difficulty in school
adopted	difficulty in school
advanced	drug abuse
affected death	drugs
aggression	ear infection
alcohol/alcoholic	ear tubes
alcohol/drugs	early
alcoholic & DD	early learner
all gp addiction	early reading
anal	eccentric
angry	emotional
anorexia	emotional confused
anoxia	emotional detached problems
ASD?	emotional disturbance
Asperger's?	emotional mental illness
attention	emotional problems
auditory processing	epilepsy maybe
autism in 1 child of this generation	fast talker
Autism?	frontal lobe Alzheimer's type disease
autoimmune	gifted
bad temper	have issues
bedwetting	he (father) thinks he has Asperger's
beh	high IQ
behavior problems	hole in heart
big tantrums, delays	hospitalized
bipolar/tendencies	hyper focus on games
bipolar?	hyper sensory
birth defects died at 6 mos	hypertensive
blocked memories	hypochondriac
brain tumor	insane
bright	intelligent
child molester	klutzy
chromosomal abnormality, distant/savant	late dev
chronic liar	LD - comprehension, social
club foot/malformed foot	lead poison MR
communication	leukemia
conduct disorder	malformed hand
counselor?	math tech
crib death	maybe autistic
definite suspicion (father)	maybe autistic

Alphabetical list of "non-examples" (continued)	
meanness	possible depression
memory	possible developmental delays
memory/Alzheimer's	possible mental issues (no dx)
mental concerns	possible PDD-NOS not diagnosed
mental GM	precocious
mental health	premature
mental illness	premature baby behind in development
mental illness-undiagnosed	problems with adjustment
mental issues	problems writing
mental/emotional disabilities	processing
MI	psych issues
migraine	quick temper
mood	quirky
nerves	reaction to polio vaccine
nervous	reacts weird
nervous breakdown	Rh neg
nervous breakdown	rocks/tics
nervous something	schizophrenia undiagnosed
no crawling, used rolling	scoliosis
no diagnosis ASD	sees other people that are not seen
no dx, possible ADHD LD	self-focused
no remorse	sensitive
noise sensitive	sensory issues
non-functional	sensory/preference
not nurturing	severely arthrogryposis
OCD not officially diagnosed	SI (and)
OCD tendencies	skipped a grade
OCD?	sleep problems as baby
ODD	slow
ODD, emotional disability	smart
on drugs pregnant	social
on medication	socially ok
on Ritalin?	some kind of delay
out of sync child	"something", no dx
panic	stillborn
Parkinson's	stress
peculiarities	strong tempered
perfectionist	stunted growth
personality disorder?	substance abuse
personality impairments	talk at 2
plague	talked at 1
played alone	talked early
polio	tantrums
poor decisions	TBI (traumatic brain injury?)
possible anxiety	temper
possible ASD	testing for special ed
possible bipolar	thyroid
possible cleft palate	too smart

Alphabetical list of "non-examples" (continued)	
Tourette's - like	was toe-walker
trauma at young age	with syndrome?
trouble in school	↓ math
trouble in school, stayed back GED	↓ smart
trouble reading	↑ bright
trouble with math	↑ communication
undiagnosed mental disorder	↑ crowd
unusual family	↑ emotions
verbal tics	↓ language
very cerebral	↑ reading
very smart/advanced	↑ school
vet mental illness?	↑ sensory integration
VI	↑ sp
walked late	