ADAPTIVE BEHAVIOR, AUTISM SYMPTOM SEVERITY, AND CAREGIVER

DEPRESSION IN FAMILIES WITH YOUNG CHILDREN

WITH AUTISM

by

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DISSERTATION ABSTRACT

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Title: Adaptive Behavior, Autism Symptom Severity, and Caregiver Depression in
Families with Young Children with Autism

Individuals with autism spectrum disorder (ASD) represent a heterogeneous
population, with wide variability in adaptive behavior. Understanding sources of
variability in adaptive behavior in children with ASD has important implications for early
intervention. From a bioecological perspective, it may be critical for researchers and
clinicians to examine the joint influence of child specific attributes and family
characteristics in order to gain a better understanding of adaptive behavior development
among children with ASD. Previous studies examining the association between adaptive
behavior and autism symptom severity have yielded inconsistent results, emphasizing the
need for additional research. Additionally, the link between caregiver depression and
adaptive behavior warrants investigation given initial evidence that familial depression
negatively influences adaptive behavior in children with ASD.

The present study extended previous research efforts by examining the relations
among adaptive behavior (communication, socialization, and daily living skills), autism
symptom severity, and caregiver depression in families with young children with ASD.
Families were recruited through early intervention and early childhood special
education/preschool programs. Data were collected from 60 primary caregivers of young

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children through the use of extensive in-home interviews and child assessments. Adaptive behavior, autism symptom severity, and caregiver depression were measured using the Vineland Adaptive Behavior Scales, Childhood Autism Rating Scale, and Center for Epidemiologic Studies Depression Scale, respectively. Findings suggest that after controlling for child age, autism symptom severity accounted for significant variance in adaptive behavior skills, with socialization being most impacted. Furthermore, adaptive behavior profiles differed across autism symptom severity levels. While more than half of the caregivers reported heightened depressive symptoms, caregiver depression was not statistically related to adaptive behavior. Limitations, directions for future research, and implications for practice are discussed.

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I dedicate this dissertation to the memory of Dr. Ken Merrell. My life is richer for having known him.

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CHAPTER I

INTRODUCTION

The objective of this study was to gain a better understanding of variability in adaptive behavior (communication, socialization, and daily living skills) in relation to autism symptom severity and caregiver depression. In support of this objective, this chapter makes a case for the significance of the problem, describes the conceptual framework, provides a rationale for the study, and introduces the research questions that guide the analyses.

Significance of the Problem

Autism is characterized by impairments in socialization, communication, and restricted and repetitive behaviors (American Psychiatric Association, 2000). The triad of impairments associated with autism is variable in expression and severity (Jones & Klin, 2009). Indeed, the vast number of possible combinations and permutations of the triad accounts for the wide range of the autism spectrum. Individuals with autism spectrum disorder (ASD) are distributed along a bell-shaped curve of impairment and represent a heterogeneous population (Rapin & Tuchman, 2008). This heterogeneity spans the entire range of cognitive function and the terms "low-functioning autism" and "high-functioning autism" are often used to describe the two ends of the autism continuum.

The impairments that are characteristic of autism are generally defined in relation to typical development. In fact, a core tenet of developmental psychopathology is that typical development and atypical development are mutually informative (Cicchetti, 1993). During early childhood, which extends approximately from two to five years of age, typically developing children perceive and explore their worlds in increasingly

complex ways (Fabes & Martin, 2003). Early social, communication, and play behaviors represent critical skills with cascading impacts on other areas of development (Kasari et al., 2005). Not only are these skills inextricably linked, they are also a foundation for later language abilities, adaptive functioning, and academic performance (Bergen & Mauer, 2000; McGovern & Sigman, 2005). As typically developing children become more socially sophisticated in the first few years of life, the impairments of children with autism may build on each other and become more apparent.

The general importance of early intervention for autism is widely recognized. ASD is the fastest growing neurodevelopmental disorder in childhood, affecting 1 in 68 children (Centers for Disease Control and Prevention, 2014). According to Myers and Johnson (2007), the primary goals of intervention are to maximize the child's ultimate functional independence and quality of life by minimizing the core autism characteristics, facilitating development and learning, promoting socialization, increasing adaptive behaviors, and educating and supporting families. Adaptive functioning has been associated with positive outcomes in ASD, irrespective of cognitive ability (Farley et al., 2009). Development of functional adaptive skills is critical because they prepare children for increased independence in the real world.

Conceptual Framework

Young children spend many hours in the surroundings of home and family and this is the context in which they most likely acquire and practice most social, communicative, self-care, and behavioral adaptations (Dunlap, Newton, Fox, Benito, & Vaughn, 2001). The current study was grounded in the bioecological model of child development (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998), which

emphasizes the dynamic, transactional interplay between the child's characteristics (biological and genetic) and the environmental characteristics (proximal and distal). The bioecological model is an extension of Bronfenbrenner's (1979) ecological systems theory which views the context as a "set of nested structures, each inside the next, like a set of Russian dolls" (p. 3).

The bioecological model (see Figure 1) conceptualizes the environment as a set of nested contexts, with the child at the center. The innermost context in the model is the *microsystem*, or the activities and interactions that affect a child directly on a daily basis. The *mesosystem* refers to all microsystems and the interrelationships among them, for example, between home and preschool. The *exosystem* includes those settings that indirectly affect or are affected by the micro- and mesosystems, such as neighborhood or community services. The outermost context in the model is the *macrosystem*, or the broad social factors and cultural values that influence the other settings. The *chronosystem* refers to the timeframe within which the different interactions between systems occur. The micro-, meso-, exo- and macrosystems are bidirectional and synergistic in nature.

Developmental psychopathologists emphasize the importance of understanding the nested ecologies that transact with individual functioning to affect development. In combination with child specific attributes, proximal and distal contexts may serve to promote or hinder child development at particular ages and/or stages (Carter, Marakovitz, & Sparrow, 2006). In early childhood, proximal contexts primarily include homes, child care programs, and preschools. This theoretical model suggests that it may be important for researchers and clinicians to examine the joint influence of child specific attributes (e.g., age, gender, health, disability, temperament) and contextual factors (e.g., parent-

child interaction, parent mental health, peer interaction) in order to gain a better

understanding of adaptive behavior development in children with ASD.

Chronosystem
Macrosystem
Exosystem
Mesosystem

Home

Microsystems

Daycare   **Child**   Preschool

Microsystems

Peer Group
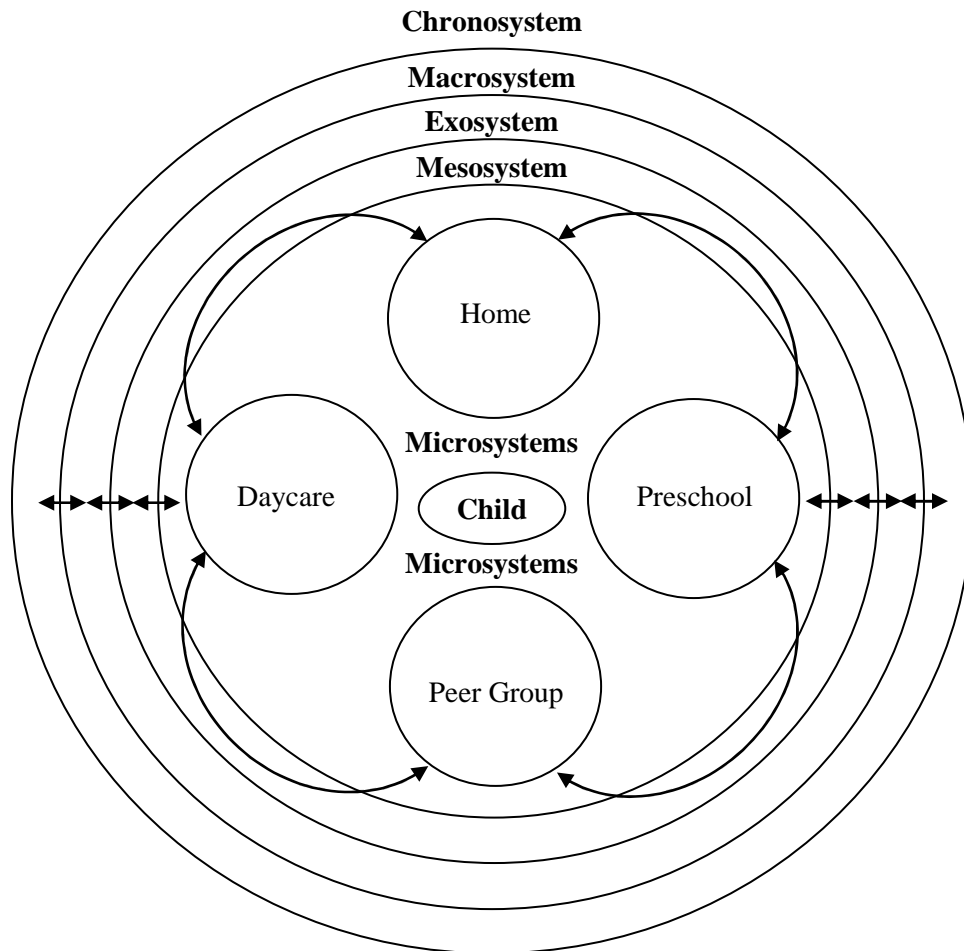
Figure 1. Bronfenbrenner's bioecological model of child development

Study Rationale

During early childhood, expected adaptive behavior skills include the appropriate

use of expressive and receptive language skills, the ability to interact with others, the

emergence of social reasoning and social comprehension, basic self-care, and

participation in simple household chores (Chawarska & Bearss, 2008). For preschool children, educational objectives are most often referenced to adaptive behavior. Information about adaptive behavior in young children with ASD may be especially important because diagnostic assessments are frequent during the preschool years (Mandell, Novak, & Zubritsky, 2005), and assessing a child's adaptive behavior has been shown to improve diagnostic accuracy over and above that provided by reliable instruments for ASD (Tomanik, Pearson, Loveland, Lane, & Shaw, 2007).

This study built on past research that has identified patterns in adaptive behavior scores for individuals on the autism spectrum as a group. A better understanding of how child specific attributes and family characteristics jointly influence adaptive behavior among young children with ASD may have important implications for early intervention. Previous studies analyzing the relation between adaptive behavior and autism symptom severity have yielded inconsistent results (e.g., Klin et al., 2007; Perry, Flanagan, Geier, & Freeman, 2009), highlighting the need for additional research in this area. Preliminary evidence suggests that a family history of depression has a negative impact on child adaptive behavior (Mazefsky, Williams, & Minshew, 2008). Because parents play an important role in early intervention, it is important to address the influence of family history variables. There is a paucity of research on the link between caregiver depression and child adaptive behavior, and this study aimed to fill that gap in the autism literature.

Research Questions

The three research questions addressed in this study are presented below. Given the exploratory nature of the study and the inconsistencies in previous findings, *a priori* hypotheses were not specified.

1. After controlling for child age, how are autism symptom severity, caregiver depression, communication, socialization, and daily living skills related among young children with ASD?

2. After controlling for child age, how well do autism symptom severity and caregiver depression predict communication, socialization, and daily living skills among young children with ASD?

3. After controlling for child age, do different levels of autism symptom severity and caregiver depression affect communication, socialization, and daily living skills among young children with ASD?

CHAPTER II

LITERATURE REVIEW

This chapter provides a context for the study and reviews relevant literature. The chapter begins with an overview of autism that addresses core characteristics, etiology and prevalence, diagnosis and assessment, and early intervention goals. Next, adaptive behavior patterns in ASD and the influences of IQ and age are discussed. Key studies that have examined adaptive behavior in relation to autism symptom severity and caregiver depression are then synthesized and evaluated to highlight research trends and gaps.

Overview of Autism

Clinical definitions and conceptualizations of autism have changed several times since Kanner's (1943) original description. The diagnostic criteria have been revised, refined, and broadened in recent years. The definition of autism in the newly published *Diagnostic and Statistical Manual, Fifth Edition* (DSM-5; American Psychiatric Association, 2013) differs from the previously published *Diagnostic and Statistical Manual-IV, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000). However, since all the literature that was reviewed for this study was published prior to the adoption of the new DSM-5 diagnostic criteria and the data that were analyzed were not reflective of the DSM-5 guidelines, the DSM-IV-TR diagnostic taxonomy served as the basis for this study and is reviewed below.

Autism is a neurodevelopmental disorder characterized by deficits in reciprocal social interaction, qualitative impairments in communication, and the presence of restricted and/or repetitive interests and behaviors, with onset during early childhood (American Psychiatric Association, 2000). In addition to the three core areas, the criteria

listed in the DSM-IV-TR specify that delays or abnormal functioning be observed prior to the age of three years, in at least one of the following areas: (a) social interaction, (b) language as used in social communication, or (c) symbolic or imaginative play (American Psychiatric Association, 2000). Autism, or autistic disorder, is one of a spectrum of developmental disorders termed pervasive developmental disorders (PDDs). Other disorders under the PDD umbrella include Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) and Asperger's syndrome.

Core characteristics. Children with autism show characteristic patterns of impairments that are distinct from typically developing children and children with other developmental disabilities (Delmolino & Harris, 2011). The three core characteristics of autism are described below.

Social impairments. Impairments in social interaction associated with autism include: (a) deficits in nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction; (b) failure to develop peer relationships appropriate to developmental level; (c) lack of spontaneous seeking to share enjoyment and interests, or achievements with other people; and (d) lack of social or emotional reciprocity (American Psychiatric Association, 2000). Furthermore, young children with autism have been found to be less likely than those with other developmental disabilities (e.g., Down syndrome) to orient to naturally occurring social stimuli, to respond to social initiations of others, and to initiate social interactions with others (Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Hauck, Fein, Waterhouse, & Feinstein, 1995).

Communication deficits. Communication difficulties associated with autism include: (a) delay in, or total lack of the development of spoken language in individuals with adequate speech; (b) marked impairment in the ability to initiate or sustain a conversation with others; (c) stereotyped or repetitive use of language or idiosyncratic language; (d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level (American Psychiatric Association, 2000). Children with autism have overall reduced rates of communication (Paul & Sutherland, 2005). Speech, if used, may be characterized by echolalia (immediate or delayed repetition of language), pronoun confusion, unusual prosody, pitch, or volume, and self-stimulatory vocalizations (Fay, 1980; Tager-Flusberg, Paul, & Lord, 2005). In addition, children with autism often do not follow the typical pattern of play development. The play of children with autism is often limited, solitary, and repetitive when it does occur, with a tendency towards intense preoccupation with visual examination of objects (Williams, 2003).

Restricted and repetitive behaviors. Restricted and repetitive behaviors associated with autism include: (a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus; (b) apparently inflexible adherence to specific, nonfunctional routines or rituals; (c) stereotyped and repetitive motor mannerisms; and (d) persistent preoccupation with parts of objects (American Psychiatric Association, 2000). Age has been associated with the expression of restricted and repetitive behaviors. Several researchers have concluded that younger children with autism are more likely to engage in "sensory-motor" behaviors, whereas older children with autism are more likely to exhibit "insistence on sameness" behaviors (e.g., Bishop, Richler, & Lord, 2006; Turner, 1999).

Etiology and prevalence. Although the etiology of ASD is unknown, most scientists agree that it is influenced by genetic factors. Evidence for a genetic contribution to ASD is found in twin and sibling studies (Rutter, 2005). In addition, the presence of related but milder characteristics, known as the broader autism phenotype, in family members of individuals with ASD is another line of evidence of the disorder's heritability (Piven, 1999). Despite the strong genetic influences, some scientists believe there are environmental factors that are likely to interact with genetic predispositions to contribute to ASD. Prenatal exposures to chemicals such as thalidomide, misoprostol, and valproic acid have been linked with a higher risk of ASD (Landrigan, 2010). Perinatal or obstetrical factors (e.g., low birth weight, premature birth) have also been associated with increased ASD risk (Sigman, Spence, & Wang, 2006).

The complex nature of ASD, coupled with a lack of biological markers for diagnosis, creates challenges in monitoring the prevalence of ASD. In the past, autism was thought to be a low-incidence disability, affecting about 1 in 2,000 individuals (Fombonne, 2005). In recent years, however, there has been a sharp rise in prevalence. ASD is now estimated at 1 in 68 children ages birth to eight, a 30% increase from 1 in 88 about two years ago, and it is 5 times more common among boys than among girls (Centers for Disease Control and Prevention, 2014). While the reasons for this increase are not known, some researchers believe that the upward trend is likely related to changes in concepts, diagnostic criteria, identification and screening methods, awareness among parents and clinicians, and availability of services (Hill, Zuckerman, & Fombonne, 2014; Rice et al., 2012).

Diagnosis and assessment. Diagnosing ASD with accuracy can pose challenges for clinicians, particularly when there is considerable overlap between symptoms of ASD and symptoms characteristic of intellectual disability, fragile-X syndrome, attention deficit hyperactivity disorder, depression, anxiety disorders, and other childhood psychiatric diagnoses (Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Levy et al., 2010; Simonoff et al., 2008). While clinicians have been traditionally hesitant to make diagnoses of ASD in children under the age of three, studies suggest that diagnoses of ASD made at two years can be very stable (e.g., Charman et al., 2005; Lord et al., 2006). Conceptualizing impairments as dimensions help characterize the behavior of individuals whose social deficits fall below the threshold for a full diagnosis (Constantino, Przybeck, Friesen, & Todd, 2000; Ronald et al., 2006). Detection of ASD symptoms tends to become easier as children age and symptoms become more apparent (Bishop, Luyster, Richler, & Lord, 2008).

Filipek et al. (1999) proposed a dual-level approach to assessment, which involves screening all children at-risk for developmental delay for characteristics associated with ASD, followed by thorough diagnostic testing and evaluation of children who fail the initial screening. More recently, the guidelines issued by the American Academy of Pediatrics (AAP) emphasize the importance of ongoing developmental surveillance of all children during preventive care visits and recommend that all infants receive routine screening for autism at their 18- and 24-month well-baby visits (Johnson & Myers, 2007). Further, the AAP guidelines highlight the critical role that primary care pediatricians play in the identification of risk factors. The diagnostic assessment is dependent on a comprehensive evaluation process, not the results of a single measure or

procedure. Ozonoff, Goodlin-Jones, and Solomon (2005) recommended that the diagnostic assessment of ASD be multidisciplinary, whenever possible, and include information from multiple sources and contexts. Given the complex nature of ASD, collaboration among professionals, parents, and teachers is necessary for an effective assessment process.

Goals of early intervention. There is a growing consensus that important principles and components of effective early childhood intervention for children with ASD include the following: (a) intervention should be provided at the earliest possible age; (b) intervention must be intensive; (c) parent training and support should be a component of the program; (d) the curriculum should focus on the social and communication domains; (e) instruction should be systematic with individualized goals and objectives; and (f) particular emphasis should be placed on teaching for generalization (Powers, 1992). The Committee on Educational Interventions for Children with Autism (National Research Council, 2001) concluded that the following features are critical: (a) early entry into an intervention program; (b) active engagement in intensive instructional programming for the equivalent of a full school day, including services that may be offered in different sites, for a minimum of 5 days a week with full-year programming; (c) use of planned teaching opportunities, organized around relatively brief periods of time for the youngest children (e.g., 15- to 20-minute intervals); and (d) sufficient amounts of adult attention in one-to-one or very small group instruction to meet individualized goals.

While there is no known cure for ASD, early intervention treatment services can greatly improve outcomes (Dawson et al., 2010). An important goal of early intervention

is to develop the child's functional adaptive skills because they prepare the child for increased responsibility and independence (Myers & Johnson, 2007). Adaptive behavior has consistently been associated with positive outcomes in ASD (Farley et al., 2009). The next section expands on the topic of adaptive behavior and reviews studies that have focused on adaptive behavior patterns in ASD and the influences of IQ and age.

Adaptive Behavior

Adaptive behavior, as defined by Sparrow, Cicchetti, and Balla (2005), is the extent to which an individual is capable of being self-sufficient in real-life situations. Sparrow et al. discussed four elements that are inherent in their definition: (a) adaptive behavior is an age-related construct, and as children grow older, adaptive behavior increases and becomes more complex; (b) adaptive behavior is determined by the expectations, cultural values, and standards of people who live, play, teach, and interact regularly with the child; (c) adaptive behavior is modifiable and can deteriorate or improve depending on interventions, changes in environment, or other events; and (d) adaptive functioning emphasizes the child's observable performance of daily activities and places less emphasis on ability. Adaptive behavior skills are multidimensional and they provide an index of how an individual is able to function in the environment (Oswald & DiSalvo, 2003). An assessment of adaptive behavior, typically based on caregiver report, is considered best practice in evaluation of ASD (Filipek et al., 1999; Perry, Condillac, & Freeman, 2002).

Patterns of adaptive behavior in ASD. The importance of adaptive behavior in children with ASD is not only underscored by its strong contribution to diagnosis, but also to prognosis (Gillham, Carter, Volkmar, & Sparrow, 2000). Research has

demonstrated that children with ASD have greater deficits in adaptive behavior skills than children without ASD matched for age and IQ (Carpentieri & Morgan, 1996). Adaptive skills are important in children with ASD and related conditions because it is these, rather than cognitive skills, that contribute most to the child's ability to function successfully and independently in the world (Liss et al., 2001). There is an observed discrepancy between the levels of cognitive functioning and the ability to translate these skills into real-world functioning, at least among children with high-functioning autism (Klin et al., 2007), indicating that they have deficits in adaptive functioning that extend beyond their cognitive deficits.

In addition to providing valuable information about the level of functioning, examining how adaptive behavior develops can provide insight into the nature of the functional deficits of ASD. Much of the published research is based on the original version of the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984), a semi-structured caregiver report instrument that assesses adaptive behavior from birth through 90 years. A second edition of the VABS was published more recently (Vineland-II; Sparrow et al., 2005). Several studies using the VABS (e.g., Boltë & Poustka, 2002; Gillham et al., 2000) have documented a characteristic profile of adaptive behavior in children with ASD, i.e., relative deficits in socialization, relative strengths in daily living skills, and communication scores falling between these two extremes.

Influence of IQ. Liss and colleagues (2001) examined adaptive behavior in 9-year-old children with high- and low-functioning autism and their age and nonverbal IQ matched controls, and found that adaptive impairments were more pronounced in the high-functioning group than in the low-functioning group. These findings were

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confirmed by Boltë and Poustka (2002) who examined the association between adaptive behavior and IQ in individuals with autism or PDD-NOS aged 8–49 years with and without co-occurring intellectual disability. In addition to documenting the typical autism profile, Boltë and Poustka found that adaptive behavior and IQ level differed significantly in individuals with high-functioning autism but not in individuals with low-functioning autism. These studies also revealed that while cognitive ability can be predictive of adaptive behavior in individuals with low-functioning autism, it is not typically predictive of adaptive behavior in individuals with high-functioning autism.

Influence of age. Most studies of adaptive behavior of individuals with ASD have included participants spanning a wide age range. However, there is evidence that patterns of adaptive behavior in ASD populations can vary as a function of age. For instance, in a study of adaptive behavior patterns in children aged 21–108 months with ASD and moderate to severe developmental delay, Fenton et al. (2003) uncovered the typical adaptive behavior pattern only in younger children with ASD, indicating that the autism profile is less likely to manifest as the gap increases between chronological and mental age. Fenton et al. concluded from their study that when this gap is more than 40 months, the VABS profile no longer follows previously reported patterns. Moreover, Klin et al. (2007), who assessed the adaptive behaviors of 7- to 18-year-olds with high-functioning autism, demonstrated that individuals with high-functioning autism become increasingly more impaired relative to their typically developing peers through later childhood and into adolescence.

In summary, many studies have demonstrated the expected autism profile of higher daily living skill scores, lower socialization scores, and intermediate

communication scores. Some studies have shown that the difference between IQ and adaptive behavior is greatest in samples of individuals with high-functioning autism (e.g., Boltë & Poustka, 2002; Liss et al., 2001). Evidence also suggests that lower adaptive functioning becomes more prominent at older ages (e.g., Fenton et al., 2003; Klin et al., 2007). These studies imply that identifying sources of variability in adaptive behavior is critical to obtaining a more complete understanding of ASD development and the identification of treatment targets. In addition to cognitive ability and age, variability in adaptive behavior is also influenced by symptomatology. The next section reviews studies that have examined adaptive behavior in relation to autism symptom severity.

Autism Symptom Severity

An aspect of autism that makes it heterogeneous is that there is a wide range in terms of types and severity of symptoms (Rapin & Tuchman, 2008). Measuring the relative severity of the core features of the autism spectrum could contribute to our ability to accurately describe ASD phenotypes across samples and across time in clinical and treatment research (Gotham, Pickles, & Lord, 2009). The Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 1999) and the Autism Diagnostic Interview–Revised (ADI-R; Lord, Rutter, & LeCouteur, 1994) are among the most prominent measures of symptom severity. While the ADOS is a semi-structured autism diagnostic observation, the ADI-R is a caregiver report of autism symptoms. The ADI-R is frequently used in conjunction with the ADOS, and together they are considered the "gold standard" tools for diagnosis of ASD (Filipek et al., 1999).

The few studies that have examined the relation between adaptive behavior and autism symptomatology have found varying trends. Klin et al. (2007) examined the

relation between adaptive behavior (VABS) and autism symptomatology (ADOS) in 187 cognitively higher functioning school-age and adolescent males with ASD. Klin and colleagues, who characterized autism symptomatology as indicative of *disability* and adaptive functioning as indicative of *ability*, were among the first to document a weak and marginally significant negative correlation between these two constructs. The anticipated strong relation between lower levels of symptomatology and higher levels of adaptive skills was thus not supported by their data, causing the authors to speculate that these are two relatively independent constructs.

In a multi-site study that investigated genetic features in simplex families of 1,089 relatively high-functioning youth with ASD ages 4–17, Kanne et al. (2011) were able to corroborate the weak association between adaptive behavior (Vineland-II) and level of autism symptomatology by clinician observation (ADOS). However, they found a stronger association between adaptive behavior and autism symptomatology as reported by parents (ADI-R), particularly in younger children. Based on these results, the authors concluded that there is a stronger relation between autism symptomatology and adaptive behavior early in development, and that this association weakens with age. In addition, Kanne and colleagues advanced the theory that the correlation between the ADI-R and the VABS was stronger because they are both caregiver report measures.

In another study, Liss et al. (2001) used parents' responses to the Wing Autistic Disorder Interview Checklist (WADIC; Wing, 1996) to assess autism symptomatology. The WADIC is a checklist of autism symptoms reflecting impairments in socialization, communication, and restrictive/repetitive behaviors. In sharp contrast to the results obtained by Klin et al. (2007) and Kanne et al. (2011), Liss and colleagues found that

symptom severity (WADIC) was significantly negatively correlated with adaptive

functioning (VABS) for children with higher-functioning autism. However, the authors

reported that for children with low-functioning autism, symptom severity was not

significantly correlated with adaptive functioning. In fact, at lower levels, IQ accounted

for the greatest portion of the variance.

Research conducted by Perry, Flanagan, Geier, and Freeman (2009) is of

particular relevance to the present study because of its focus on preschool children with

ASD of varying cognitive levels ($n = 290$). The authors used the Childhood Autism

Rating Scale (CARS; Schopler, Reichler, & Renner, 1988), a widely-used measure of

autism symptom severity that is based on caregiver report. Perry et al. demonstrated that

autism severity, as measured by the CARS was moderately to strongly negatively

correlated with VABS scores. Furthermore, the study showed that statistically unique

variance in VABS scores was attributable to autism severity, although more variance was

accounted for by age and developmental level.

Kenworthy, Case, Harms, Martin, and Wallace (2010) assessed the adaptive

behavior of 12- to 22-year-olds with high-functioning autism ($n = 40$) compared to

matched controls ($n = 30$) using the second edition of the Adaptive Behavior Assessment

System (ABAS-II; Harrison & Oakland, 2003). The original ABAS (Harrison &

Oakland, 2000) is a caregiver completed checklist that is used to assess adaptive behavior

for ages 5 through 89 years. ABAS-II includes a downward extension of norms for young

children from birth to 5 years. Kenworthy et al. found significant deficits for the high-

functioning group in overall adaptive behavior, relative to controls. Higher ratings of

ASD symptoms on the ADOS generally were associated with lower ABAS-II composite

scores, consistent with other reports of a strong negative association between autism symptoms and adaptive behavior (e.g., Liss et al., 2001; Perry et al., 2009). Given the widespread use of the VABS in clinical, educational, and research settings, relatively less is known about adaptive behaviors when using other measures. Thus, the unique contribution of this study was the use of a caregiver completed checklist of adaptive functioning. Kenworthy et al., however, did not collect VABS data along with the ABAS data for the purposes of comparing the two measures within the same population.

In summary, research findings describing the association between adaptive behavior and autism symptom severity are contradictory. While some studies have demonstrated a weak negative relation between autism symptomatology and adaptive behavior (e.g., Kanne et al., 2011; Klin et al., 2007), other studies have indicated a strong negative association (e.g., Kenworthy et al., 2010; Liss et al., 2001; Perry et al., 2009). This contradiction may stem from the differences in age and functional level of the samples, as well as the instrument used to measure symptom severity, emphasizing the need for additional research. There exists a possibility that in addition to child variables (e.g., IQ, age, symptom severity), familial history variables are a potential source of variability in adaptive behavior in ASD. The next section examines the role of affective disorders, particularly caregiver depression, and builds the case for a possible link between caregiver depression and child adaptive behavior.

Caregiver Depression

Depression manifests as a combination of feelings of sadness, loneliness, irritability, worthlessness, hopelessness, agitation, and guilt, accompanied by an array of physical symptoms (American Psychiatric Association, 2000). Parental depression may

adversely affect the family environment. There is an increase in marital discord and conflict within families of depressed parents, all of which can have an adverse effect on children (Burke, 2003). Studies have revealed that parental stress and depression are negatively associated with parenting self-efficacy, or parents' perceived feelings of competence in the parenting role (Kuhn & Carter, 2006; Teti, O'Connell, & Reiner, 1996). Women are very often the primary caregivers and the adverse effects of maternal depression on child development are well documented.

In their meta-analytic study, Lovejoy and colleagues found maternal depression to be strongly associated with irritability and hostility toward the child, moderately associated with disengagement from the child, and weakly associated with rates of play and other active and pleasant social interactions (Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Given that parent-child interactions are highly salient in early childhood and continue to play a role in child social competence through adolescence (Weinfeld, Ogawa, & Egeland, 2002), the implications of chronic and severe maternal depression on children are far-reaching. Typically developing children of depressed mothers are at risk for developing poor self-control, internalizing and externalizing problems, and difficulties in cognitive functioning and in social interactions with parents and peers (Cummings & Davies, 1994; Goodman et al., 2011; Lovejoy et al., 2000).

Compared to parents of typically developing children, parents raising children with developmental disabilities experience more stress (Smith, Oliver, & Innocenti, 2001) and have higher rates of depression (Dumas, Wolf, Fisman, & Culligan, 1991). Even among parents raising children with developmental disabilities, parents of children with ASD report significantly higher levels of stress (Dumas et al., 1991) and are more

likely to experience depression (Olsson & Hwang, 2001). Mothers of children with ASD are at an increased risk of depression, compared to fathers (Olsson & Hwang, 2001). In fact, mothers of preschool-aged children with ASD report lower psychological well-being and coping compared to mothers of children with Down syndrome, fragile-X syndrome, and cerebral palsy (Eisenhower, Baker, & Blacher, 2005). Due to the nature of ASD, these findings are not surprising. Young children with ASD have more behavior problems and less sociability than children with other developmental disabilities (Eisenhower et al., 2005) and the trend continues in older individuals with ASD (Blacher & McIntyre, 2006). Because parents of children with ASD comprise a uniquely susceptible population, there is a critical need to address parent mental health.

There is burgeoning evidence to indicate that the increased risk of affective disorders, mainly depression, is not solely the consequence of the stress of raising a child with ASD. In these studies, the majority of parents report experiencing their first depressive episode *prior* to the birth of their child with ASD (Ingersoll & Hambrick, 2011; Micali, Chakrabarti, & Fombonne, 2004). Studies also support the presence of related but milder characteristics, known as the broader autism phenotype (BAP), in family members of individuals with ASD (Piven, 1999). BAP is a subclinical set of personality and other features that is thought to index familiality and/or genetic liability to autism (Lainhart et al., 2002). Both BAP symptoms and affective (mood and anxiety) disorders are present in first degree relatives of children with ASD at rates significantly higher than both in the general population and in families of children with other developmental disabilities (Bolton, Pickles, Murphy, & Rutter, 1998), lending support to the notion of familial genetic predispositions.

It is likely that feelings of despair or depression in many parents of children with ASD are connected to the child's inability to affectively "connect" with the parent or caregiver. Kasari and Sigman (1997) studied caregiver-child interactions and reported that parents of children with ASD who perceived their children to be temperamental were less likely to socially engage with them. A variety of self-reported measures are available to assess caregiver depression, the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) being one of them. The CES-D is designed to measure self-reported symptoms associated with depression such as sleep disturbance, loss of appetite, and feelings of helplessness and hopelessness. Another widely-used measure of caregiver depression is the second edition of the Beck Depression Inventory (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II asks participants to rate how they have been feeling for the past two weeks, as opposed to the past one week in the CES-D.

Not many studies have focused on the relation between caregiver depression and the child's adaptive behavior. There is evidence of a familial influence on adaptive scores among siblings with ASD. For instance, MacLean et al. (1999) examined familial correlations for ASD subtype, symptom severity, adaptive behaviors, and nonverbal IQ in 94 children with ASD from 46 families. The authors found that there was no familial aggregation of ASD subtype or symptom severity. However, MacLean and colleagues found that measures of nonverbal IQ and adaptive behaviors in socialization and communication showed a moderate degree of familial resemblance. In another study, Goin-Kochel, Mazefsky, and Riley (2008) examined phenotypic congruence among siblings with ASD in a sample of 348 multiplex families. Their findings were comparable

to those of MacLean et al. in that siblings with ASD were more similar on measures of cognition and adaptive functioning than non-siblings with ASD.

Based on evidence of familial resemblance for adaptive scores in affected siblings, Mazefsky, Williams, and Minshew (2008) explored the relation between family history factors and adaptive functioning in 77 individuals with high-functioning autism aged 8–39 years. The authors sought to clarify whether VABS scores in individuals with ASD were related to family history characteristics of first degree relatives. Parents completed a family history interview about the presence of developmental disorders, social impairments, cognitive deficits, and psychiatric disorders in family members. Findings revealed that a family history of autistic-like social dysfunction, shyness, and depression were significant predictors of adaptive behavior. Furthermore, a family history of depression significantly predicted lower scores in socialization and daily living skills.

In summary, there is a growing body of literature in the field of autism that addresses familial genetic predispositions. While the stress of parenting a child with ASD has been assumed to result in increased rates of depression (Dumas et al., 1991), genetic evidence suggests that this does not fully explain the elevated rates of depression (e.g., Ingersoll & Hambrick, 2011; Micali et al., 2004). Furthermore, studies have shown evidence of a familial influence on adaptive scores among siblings with ASD (Goin-Kochel et al., 2008; MacLean et al., 1999), and preliminary evidence suggests that a family history of depression and shyness negatively influences adaptive behavior in children with autism (Mazefsky et al., 2008). The link between caregiver depression and child adaptive behavior, which may have important implications for early interventionists, has not been fully explored and thus warrants further research.

CHAPTER III

METHOD

This chapter describes the methodology and analyses that were used to answer the research questions that were formulated for this study. First, the purpose of the study and the research questions are defined. Second, the characteristics of participants and recruitment procedures are described. Third, the psychometric properties of the measures that were utilized are explained. Finally, the statistical analysis that was used for each research question is discussed.

Purpose of the Study

The study was part of a larger, ongoing project (Oregon Early Autism Project; McIntyre, PI) that aims at exploring child, family, and community variables associated with early identification and treatment of preschool-age children with ASD. As the present study involved analysis of extant data that were de-identified, an application to request exemption from review for human subject research was completed and approved. The purpose of the present study was to gain a better understanding of variability in child adaptive behavior (communication, socialization, and daily living skills) in relation to autism symptom severity and caregiver depression in families with young children with ASD. Three research questions were addressed in this study and are presented below. Given the exploratory nature of the study and the inconsistencies in previous findings, *a priori* hypotheses were not specified.

1. After controlling for child age, how are autism symptom severity, caregiver depression, communication, socialization, and daily living skills related among young children with ASD?

2. After controlling for child age, how well do autism symptom severity and caregiver depression predict communication, socialization, and daily living skills among young children with ASD?

3. After controlling for child age, do different levels of autism symptom severity and caregiver depression affect communication, socialization, and daily living skills among young children with ASD?

Participants

As part of the larger Oregon Early Autism Project, parents and their young children were recruited from various counties within Oregon through the Child Development and Rehabilitation Center (CDRC) and Early Childhood CARES (EC CARES). Families with a young child with ASD were invited to participate in the study through letters mailed by CDRC and EC CARES. The recruitment letter contained a brief description of the study and contact information for project staff. Families wishing to participate were screened over the telephone to assess whether their child met the following inclusionary criteria: (a) the child had either a medical diagnosis of ASD or a special educational eligibility of autism, (b) the child was six years old or younger, and (c) the child lived with the primary caregiver for at least one year.

Sixty caregivers with young children with ASD served as participants for this study. The average age of children was 53.78 months ($SD = 14.55$), or 4.48 years. Consistent with the male-to-female ratio for ASD, 83% of children were male. The majority of children in the sample were identified as White/Caucasian. Approximately 30% of children in the sample were reported to have a diagnosis of autism and 20% were reported to be diagnosed with Pervasive Developmental Disorder (PDD) or Pervasive

Developmental Disorder-Not Otherwise Specified (PDD-NOS). Slightly more than half were in preschool programs, with fewer in kindergarten and Early Intervention programs.

The majority of the families had two-parent, married caregivers. In all but two families, the primary caregiver was the child's mother. The average age of mothers was 35.23 years (SD = 7.95). Just over half of mothers in the sample reported having a high school diploma or its equivalent as the highest degree earned, and 43% of all mothers worked either full-time or part-time. The majority of children had siblings living at home. The average household size was 4 people, with a median annual income ranging from $25,000 to $34,999. Approximately 70% of participants reported a history of ASD, learning disabilities, or mental health problems in the immediate family (i.e., biological parents or biological siblings). Child and family demographics are displayed in Tables 1 and 2, respectively.

Procedures

Upon eligibility determination, a phone interview and home interview with the primary caregiver were scheduled. Families were mailed a packet via US mail containing the informed consent form and measures of parent well-being, including a measure of caregiver depression. Subsequently, a research assistant administered an adaptive behavior measure as a phone interview lasting 30-45 minutes. Two researcher assistants completed a home visit to administer the remaining measures, including a measure of autism symptom severity. The home visit lasted approximately 90 minutes. Each participating family received a $25 gift card to a retail store as a research participation honorarium.

Table 1

*Child Demographics (*N = *60)*

Demographic	*n*	%
Sex		
Male	50	83.3
Female	10	16.7
Race/ethnicity		
White	42	70.0
Hispanic	3	5.0
Mixed	15	25.0
Primary diagnosis		
Autism	19	31.7
PDD or PDD-NOS	12	20.0
Asperger's syndrome	1	1.7
Other	15	25.0
No medical diagnosis of ASD	13	21.7
Educational placement		
Early intervention	10	16.7
Early childhood special education/preschool	32	53.3
Kindergarten	12	20.0
Other	6	10.0

Table 2

*Maternal and Family Demographics (*N = 60*)*

Demographic	*n*	%
Mother's marital status		
Married or living with partner	54	90.0
Divorced or separated	3	5.0
Single	3	5.0
Mother's education		
Less than high school	4	6.7
High school or equivalent	32	53.3
Vocational or associate's degree	10	16.7
Bachelor's degree or beyond	14	23.3
Mother's employment		
Not employed	34	56.7
Part-time	19	31.7
Full-time	7	11.7
Siblings at home		
None	11	18.3
One	31	51.7
Two or more	18	30.0
Immediate family history		
ASD	24	40.0
Learning disabilities	35	58.3
Mental health problems	18	30.0

Measures

Oregon Early Autism Project Family Demographic Questionnaire. The

Oregon Early Autism Project Family Demographic Questionnaire (Appendix A) was

developed to gather information from the primary caregiver about child and family

characteristics. Child variables included age, sex, race/ethnicity, medical diagnosis, and

educational placement. Family variables included parents' age, education, and

employment; household size and income; number of siblings; and immediate family

history of ASD, learning disabilities, and metal health problems.

Vineland Adaptive Behavior Scales, Second Edition–Survey Interview Form.

Adaptive behavior was measured by the Vineland Adaptive Behavior Scales, Second

Edition–Survey Interview Form (Vineland-II; Sparrow et al., 2005; Appendix B). The

Vineland-II is a structured interview that assesses adaptive behavior birth through 90

years in four domains: communication, daily living skills, socialization, and motor skills.

The domains, and subdomains that comprise them, are described briefly in Table 3.

Examiners may choose to administer a single domain or any combination of domains to

assess adaptive functioning in one or more areas, or administer all domains required at a

given age to obtain an adaptive behavior composite score. For the purposes of this study,

only the communication, daily living skills, and socialization domains were considered

given that the motor skills domain of the Vineland-II was not designed for use with

children older than six years (Sparrow et al., 2005).

Table 3

Items on the Vineland Adaptive Behavior Scales, Second Edition–Survey Interview Form

Domain and subdomains	Brief description
Communication	
Receptive	How the individual listens and pays attention, and what he or she understands
Expressive	What the individual says, how he or she uses words and sentences to gather and provide information
Written	What the individual understands about how letters make words, and what he or she reads and writes
Daily living skills	
Personal	How the individual eats, dresses, and practices personal hygiene
Domestic	What household tasks the individual performs
Community	How the individual uses time, money, the telephone, the computer, and job skills
Socialization	
Interpersonal relationships	How the individual interacts with others
Play and leisure time	How the individual plays and uses leisure time
Coping skills	How the individual demonstrates responsibility and sensitivity to others
Motor skills	
Gross	How the individual uses arms and legs for movement and coordination
Fine	How the individual uses hands and fingers to manipulate objects
Adaptive behavior composite	A composite of the communication, daily living skills, socialization, and motor skills domains

Scoring. The Vineland-II items are scored according to whether the activity described by the item is (a) usually or habitually performed without physical help or reminders (score 2), (b) performed sometimes or partially without physical help or reminders (score 1), or (c) never or very seldom performed or never performed without help or reminders (score 0). Rules for determining the starting point and establishing the basal and ceiling are specified in the manual. Subdomain scores are reported as v-scale scores ($M = 15$; $SD = 3$). Domain and adaptive behavior composite scores are reported as standard scores ($M = 100$; $SD = 15$).

Psychometric properties. Sparrow et al. (2005) reported that the Vineland-II has (a) moderate to high internal consistencies, with most subdomain, domain, and adaptive behavior composite values above .75, (b) high test-retest reliabilities (for an interval between 13 and 34 days, and an average of approximately 18 days), with most subdomain, domain, and adaptive behavior composite values above .85, and (c) good inter-interviewer reliabilities, with subdomain, domain, and adaptive behavior composite values generally above .70. Confirmatory factor analysis supported the domain structure of the Vineland-II, and inter-correlations between subdomains are reported to be moderate in size (Sparrow et al., 2005). In a longitudinal study of children with autism aged 2-5 years ($n = 48$), the Vineland-II demonstrated sensitivity to changes over time, indicating the validity of the measure for assessment of developmental acquisition of skills (McGovern & Sigman, 2005). The Vineland-II scores were compared to scores on the Adaptive Behavior Assessment System, Second Edition (ABAS-II; Harrison & Oakland, 2003) for 197 individuals, and the composite scores correlated at .70 (Sparrow et al., 2005).

Childhood Autism Rating Scale, Second Edition–Standard Version. Autism symptom severity was measured using the Childhood Autism Rating Scale, Second Edition–Standard Version (CARS2-ST; Schopler, Van Bourgondien, Wellman, & Love, 2010; Appendix C). Formerly titled as the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988), the CARS2-ST is a 15-item rating scale designed to assist in the diagnosis of ASD. The 15 items included on the scale are briefly described in Table 4. The CARS2-ST is appropriate for use with children younger than six years of age and can be completed based on information obtained from a parent interview.

Table 4

Items on the Childhood Autism Rating Scale, Second Edition–Standard Version

Item	Brief description
1. Relating to people	Rating of how the child behaves in a variety of situations involving interaction with other people
2. Imitation	Rating of how the child imitates both verbal and nonverbal acts
3. Emotional response	Rating of how the child reacts to both pleasant and unpleasant situations
4. Body use	Rating of both coordination and appropriateness of body movements
5. Object use	Rating of both the child's interests in toys or other objects, and his or her uses of them
6. Adaptation to change	Rating of difficulties in changing established routines and in changing from one activity to another
7. Visual response	Rating of unusual visual attention patterns or unusual visual responses

Table 4 (continued)

Item	Brief description
8. Listening response	Rating of unusual listening behavior or unusual responses to sounds
9. Taste, small, and touch response and use	Rating of the child's response to stimulation of the taste, smell, and touch senses (including pain)
10. Fear or nervousness	Rating of unusual or unexplainable fears as well as absence of fears
11. Verbal communication	Rating of all facets of the child's use of speech and language
12. Nonverbal communication	Rating of the child's nonverbal communication through the use of facial expression, posture, gesture, and body movements
13. Activity level	Rating of how much the child moves about in both structured and unstructured situations
14. Level and consistency of intellectual response	Rating of both the child's general level of intellectual functioning and the consistency of functioning from one type of skill to another
15. General impressions	Overall rating based on examiner's subjective impression of the degree to which the child has autism as defined by the other 14 items

Scoring. Each item is rated by a trained examiner on a 7-point scale (1–4 with half-points), by considering not only the child's chronological age, but also the peculiarity, frequency, intensity, and duration of his or her behavior. The greater the degree to which a child differs along these dimensions from a typically developing child of the same age, the higher the value that is assigned. Rating values are summed to produce a total raw score, which ranges from 15 to 60, with higher scores indicating

greater severity. A score of 15-29 indicates minimal symptoms of ASD, 30-36.5 indicates

mild-to-moderate symptoms of ASD, and 37-60 indicates severe symptoms of ASD.

Psychometric properties. The CARS2-ST items are identical to those of the

original CARS. Thus, all the psychometric information available about the original

CARS is equally applicable to the CARS2-ST. The internal consistency coefficient for

the CARS2-ST (alpha = .93, n = 1,034) is robust (Schopler et al., 2010) and the inter-

rater reliability estimate for the original CARS (kappa = .84, n = 280) indicates strong

agreement between raters (Schopler et al., 1988). Perry and Freeman (1996) examined

the retest stability for the original CARS and reported correlations of .90 (n = 11) one

year apart and .78 (n = 30) two years apart. In a multi-site study of 274 preschool

children, Perry, Condillac, Freeman, Dunn-Geier, and Belair (2005) found good

agreement (88%) between the original CARS and clinical diagnosis using DSM-IV

(including a sensitivity of .94 and a specificity of .85). Eaves and Milner (1993)

compared the original CARS with the Autism Behavior Checklist (ABC; Krug, Arick, &

Almond, 1980) and reported a validity coefficient of .67 (n = 77). The validity coefficient

between the CARS2-ST and the Autism Diagnostic Observation Schedule (ADOS; Lord,

Rutter, DiLavore, & Risi, 1999) is .79 (n = 37), as reported by Schopler et al. (2010).

Center for Epidemiological Studies Depression Scale. Caregiver depression

was measured using the Center for Epidemiological Studies Depression Scale (CES-D;

Radloff, 1977; Appendix D). The CES-D is a 20-item scale that is designed to measure

self-reported symptoms associated with depression experienced in the preceding week.

The scale is appropriate for use with the general population and may be self- or

interviewer-administered in a relatively short time. The items on the CES-D are selected

from previously validated depression scales and reflect major components of depressive symptomatology such as sleep disturbance, loss of appetite, and feelings of helplessness and hopelessness.

Scoring. Response categories indicate the frequency of occurrence of each item, and are scored on a 4-point scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time). Items 4, 8, 12, and 16 are worded in the positive direction to break tendencies toward response bias as well as to assess positive affect (or its absence). Therefore, scores for those items are reversed before summing all items to yield a total score. Total scores range from 0 to 60, with high scores indicating greater depressive symptoms. A score of 0-15 indicates low depressive symptoms and a score of 16 or higher has been used extensively as the cutoff score for high depressive symptoms on this scale.

Psychometric properties. The internal consistency coefficients for the CES-D in a community sample (alpha = .85, *n* = 2514) and a clinical sample (alpha = .90, *n* = 70) are high (Radloff, 1977). Test-retest reliability estimates are moderate and range from .51 to .67 in 2- to 8-week intervals and .41 to .54 in 3- to 12-month intervals (Radloff, 1977). The moderate test-retest estimates are consistent with the CES-D's design, which emphasizes current affective symptoms that are expected to fluctuate between test administrations. The CES-D has proved to be a reliable measure for assessing depressive symptoms across age, gender, and cultural groups (Knight, Williams, McGee, & Olaman, 1997; Lewinsohn, Seeley, Roberts, & Allen, 1997; Vázquez, Blanco, & López, 2007). Thomas, Jones, Scarinci, Mehan, and Brantley (2001) established the utility of the CES-D as a depression screening measure and found that the traditional cutoff score of 16

yielded a sensitivity of .95 and a specificity of .70 in predicting major depressive disorder

($n = 179$). The CES-D is a sensitive tool for detecting depressive symptoms and change

in symptoms over time in clinical samples, and it agrees quite well with more lengthy

self-report scales used in clinical studies and with clinician interview ratings (Radloff,

1977; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). The construct validity

of the CES-D is supported by its consistent factor structure (Shafer, 2006).

Data Analysis

The study used a quantitative nonexperimental research design to analyze data

and test the relations among variables (see Shadish, Cook, & Campbell, 2002).

Communication, socialization, and daily living skills (Vineland-II) served as the outcome

variables for this study. The predictor variables were autism symptom severity (CARS2-

ST) and caregiver depression (CES-D). Child age was selected as a covariate because of

the influence of age on skill acquisition and the developmental nature of adaptive

behavior. Additionally, child age was selected for statistical control *a priori* to replicate

previous studies that controlled for age of children with ASD when measuring adaptive

behavior using the Vineland scales (e.g., Kanne et al., 2011; Mazefsky et al., 2008; Perry

et al., 2009). Prior to analyses, data were screened for missing values, outliers, normality,

linearity, and homoscedasticity (Tabachnick & Fidell, 2007). All analyses were

performed using SPSS 20.0 for Windows (IBM Corp., Armonk, NY), including

descriptive and inferential statistics. Specific analysis for each research question is

described below.

1. The aim of the first research question was to describe the relation among the

   variables of interest, in terms of both the strength of the relation and the direction.

Pearson's zero-order correlation coefficients were first computed among child age, communication, socialization, daily living skills, autism symptom severity, and caregiver depression, yielding a total of 15 correlation coefficients. In order to answer this research question, the correlation analyses were repeated, while controlling for the effects of child age.

2. The aim of the second research question was to consider autism symptom severity and caregiver depression as continuous variables in order to maximize statistical power and retain predictive utility of these variables on a continuum. To address this research question, three separate hierarchical linear regression analyses were run to examine the relative predictive power of child age, autism symptom severity, and caregiver depression with respect to adaptive behavior outcomes.

3. The aim of the third research question was to consider autism symptom severity and caregiver depression as categorical variables in order to use manual recommended cutoffs and increase clinical utility. To address this research question, a factorial multivariate analysis of covariance (MANCOVA) was conducted to investigate the effects of autism symptom severity, caregiver depression, and their interaction on the linear combination of communication, socialization, and daily living skills, after adjusting for child age.

CHAPTER IV

RESULTS

This chapter provides a description of the analyses that were used to evaluate the data for this study and the results of these analyses. Preliminary analyses are reported first followed by specific analyses performed for each of the research questions. Results are presented in order of research questions posed. *A priori* alpha level for statistical significance was set at .05.

Preliminary Analyses

Data were first screened for errors, missing data, and outliers (Tabachnick & Fidell, 2007). The accuracy of the data entry was determined by frequency distributions and descriptive statistics. For quantitative variables, the range was examined and no data were found to be outside the range of possible values. For categorical variables, data corresponding to the coded values for the possible categories were examined and no inaccuracies were found. Descriptive statistics revealed that missing values were restricted to items on the CES-D, a self-administered questionnaire measuring caregiver depression. As very few values were missing (5 out of 1195 or 0.4%), a missing response for an item on the CES-D was replaced by the participant's mean score across all relevant items for the scale. While this approach of estimating missing values is not preferable when there are many missing values, it is generally acceptable when missing values are few in number (Tabachnick & Fidell, 2007). Box plots were used to screen the data for univariate outliers and no extreme values were found. A preliminary regression analysis was conducted to test Mahalanobis distance and no values exceeded the critical criteria ($\chi^2 = 20.52$, $p < .001$), indicating that there were no multivariate outliers.

Data were further examined to check if they met the basic assumptions of normality, linearity, and homoscedasticity (Stevens, 2009). Univariate normality was assessed with histograms and normal probability plots, and all distributions were approximately normal. The skewness (symmetry of distribution) and kurtosis (peakedness of distribution) values ranged between -1 and +1, further indicating that univariate normality was defensible. Multivariate normality and linearity were evaluated by creating scatter plots of all variables in relation to one another. Bivariate scatter plots were approximately elliptical, indicating that all combinations of variables were normally distributed and linearly related. Bivariate scatter plots also served as a graphical indication of homoscedasticity.

Table 5 provides a summary of the sample characteristics. There was a wide distribution in the age range of children in the sample (21 – 83 months). Autism symptom severity scores, as measured by the CARS2-ST, ranged from 24 to 50.5 ($M = 39.12$, $SD = 6.51$). Using the cutoff scores provided in the CARS2-ST manual, 8.3% ($n = 5$) of children were characterized as having minimal autism symptoms, 25% ($n = 15$) as having mild-to-moderate autism symptoms, and 66.7% ($n = 40$) as having severe autism symptoms. Notably, the five children who were characterized as having minimal autism symptoms had scores very near the cutoff. Thus, in an effort to balance group sizes for subsequent multivariate analyses, the minimal and mild-to-moderate groups were combined and referred to as the mild autism symptoms group.

Caregiver depression scores, as measured by the CES-D, ranged from 0 to 46 ($M = 17.82$, $SD = 11.18$). Using the standard CES-D cutoff score of 16, 45% ($n = 27$) of caregivers were characterized as having low depressive symptoms and 55% ($n = 33$) as

having high depressive symptoms. On average, adaptive behavior scores, as measured by the Vineland-II, were nearly two standard deviations below the mean across domains. Socialization scores ($M = 71.37$, $SD = 9.33$) were generally lower than daily living skills scores ($M = 75.57$, $SD = 12.24$) and communication scores ($M = 74.15$, $SD = 16.86$).

Table 5

Sample Characteristics (N = 60)

Variable	*M*	*SD*	Minimum	Maximum
Child age[a]	53.78	14.55	21	83
Autism symptom severity	39.12	6.51	24	50.5
Caregiver depression	17.82	11.18	0	46
Communication[b]	74.15	16.86	36	116
Socialization[b]	71.37	9.33	51	94
Daily living skills[b]	75.57	12.24	43	97

[a] In months. [b] Standard score ($M = 100$, $SD = 15$).

Correlation Analyses

The first research question examined how autism symptom severity, caregiver depression, communication, socialization, and daily living skills were related, after controlling for child age. Pearson's zero-order correlations were first computed to examine associations among all the variables of interest. Next, partial correlations were generated, controlling for child age. With one exception, zero-order and partial correlations were virtually identical, and the partial correlations are reported here. The

results showed that 8 out of the 15 correlations were statistically significant. Effect sizes for correlations were interpreted using Cohen's (1988) guidelines (.10 = small, .30 = moderate, and .50 = large).

The results of the correlation analyses are summarized in Table 6. Significant, moderate-to-large, and negative partial correlations were discerned between autism symptom severity and communication ($r = -.49$, $p < .001$), socialization ($r = -.60$, $p < .001$), and daily living skills ($r = -.58$, $p < .001$), indicating that children with more autism symptoms had lower adaptive behavior skills. There was a significant, moderate, and positive partial correlation between caregiver depression and autism symptom severity ($r = .30$, $p = .021$), such that caregivers of children with more autism symptoms reported higher depressive symptoms. Partial correlations between caregiver depression and communication ($r = -.07$, $p = .587$), socialization ($r = -.16$, $p = .223$), and daily living skills ($r = -.19$, $p = .155$) all failed to reach statistical significance. Significant, large, and positive partial correlations were detected between communication and socialization ($r = .57$, $p < .001$) and daily living skills ($r = .77$, $p < .001$), with children with higher communication skills having more socialization and daily living skills. There was a significant, large, and positive partial correlation between daily living skills and socialization ($r = .69$, $p < .001$), such that children with more daily living skills had higher socialization skills.

Table 6

Zero-Order and Partial Correlations Among Study Variables (N = 60)

Variables	1	2	3	4	5	6
1. Autism symptom severity	__					
2. Caregiver depression	.30* (.30*)	__				
3. Communication	-.49* (-.49*)	-.07 (-.07)	__			
4. Socialization	-.52* (-.60*)	-.15 (-.16)	.54* (.57*)	__		
5. Daily living skills	-.55* (-.58*)	-.18 (-.19)	.76* (.77*)	.70* (.69*)	__	
6. Child age	-.13	-.03	.01	-.30*	-.18	__

Note. Partial correlations controlling for child age are shown in parentheses.

*p < .05.

An inspection of the zero-order correlations revealed a significant, moderate, and negative correlation between child age and socialization ($r = -.30$, $p = .019$), indicating that older children had lower socialization skills, relative to same-age typical peers. Child age did not significantly correlate with autism symptom severity ($r = -.13$, $p = .313$), caregiver depression ($r = -.03$, $p = .848$), communication ($r = .01$, $p = .944$), and daily living skills ($r = -.18$, $p = .170$). It is worth highlighting that while zero-order and partial correlations were virtually identical, there was one exception: The correlation between autism symptom severity and socialization ($r = -.52$, $p <. 001$) was strengthened after controlling for child age ($r = -.60$, $p <. 001$).

Hierarchical Regression Analyses

The second research question examined how well autism symptom severity and caregiver depression predicted communication, socialization, and daily living skills, after controlling for child age. To address this research question, three separate hierarchical regressions were conducted with communication, socialization, and daily living skills as outcome variables, respectively. Each time, child age (control variable) was entered in the first step, and autism symptom severity and caregiver depression (predictor variables) were entered in the second step. This order of entry made it possible to assess the unique contribution of the predictor variables, once the influence of child age was controlled. Collinearity, the extent to which the predictor variables have non-zero correlations with each other, was assessed prior to conducting the regressions (Tabachnick & Fidell, 2007). Values for tolerance exceeded 0.1, indicating a lack of collinearity. Durbin-Watson test for autocorrelation among residuals was run for all regression analyses in order to test the

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assumption of independence of errors (Stevens, 2009). Values for Durbin-Watson tests all fell within the acceptable range (1.5 – 2.5), signifying a lack of autocorrelation.

Communication. The results of the first hierarchical regression analysis (see Table 7) indicated that child age was not significantly predictive of communication at step one. The addition of autism symptom severity and caregiver depression to the equation at step two made a unique and significant contribution to the explanation of variance in communication, $R^2 = .25$, $F(3, 56) = 6.20$, $p = .001$. In this model, autism symptom severity was the only significant predictor of communication; child age and caregiver depression did not significantly contribute to the overall model.

Table 7

Hierarchical Regression Analysis for Variables Predicting Communication (N = 60)

Step and predictor variables	B	$SE\ B$	β	R^2	ΔR^2
Step 1				.00	.00
Child age	0.01	0.15	.01		
Step 2				.25**	.25
Child age	-0.07	0.14	-.06		
Autism symptom severity	-1.35	0.32	-.52***		
Caregiver depression	0.13	0.18	.08		

$**p < .01$. $***p < .001$.

Socialization. The results of the second hierarchical regression analysis (see Table 8) indicated that child age was significantly predictive of socialization at step one, $R^2 = .09$, $F(1, 58) = 5.86$, $p = .019$. The addition of autism symptom severity and

caregiver depression to the equation at step two significantly improved the model, $R^2 =$ .42, $F(3, 56) = 13.28$, $p < .001$. In this model, both child age and autism symptom severity emerged as significant predictors of socialization; caregiver depression did not significantly contribute to the overall model. While autism symptom severity and child age each added significantly to the predictive power of the overall model, autism symptom severity was the stronger of the two predictors.

Table 8

Hierarchical Regression Analysis for Variables Predicting Socialization (N = 60)

Step and predictor variables	*B*	*SE B*	β	R^2	ΔR^2
Step 1				.09*	.09
Child age	-0.19	0.08	-.30*		
Step 2				.42***	.32
Child age	-0.24	0.07	-.38**		
Autism symptom severity	-0.83	0.16	-.58***		
Caregiver depression	0.02	0.09	.02		

*$p < .05$. **$p < .01$. ***$p < .001$.

Daily living skills. The results of the third hierarchical regression analysis (see Table 9) indicated that child age was not significantly predictive of daily living skills at step one. The addition of autism symptom severity and caregiver depression to the equation at step two made a unique and significant contribution to the explanation of variance in daily living skills, $R^2 = .36$, $F(3, 56) = 10.62$, $p < .001$. In this model, both child age and autism symptom severity emerged as significant predictors of daily living

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skills; caregiver depression did not significantly contribute to the overall model. While autism symptom severity and child age each added significantly to the predictive power of the overall model, autism symptom severity was the stronger of the two predictors.

Table 9

*Hierarchical Regression Analysis for Variables Predicting Daily Living Skills (*N = *60)*

Step and predictor variables	B	$SE\ B$	β	R^2	ΔR^2
Step 1				.03	.03
Child age	-0.15	0.11	-.18		
Step 2				.36***	.33
Child age	-0.22	0.09	-.26*		
Autism symptom severity	-1.08	0.21	-.58***		
Caregiver depression	-0.02	0.12	-.01		

*$p < .05$. ***$p < .001$.

Multivariate Analysis of Covariance

The third research question examined if different levels of autism symptom severity and caregiver depression affected communication, socialization, and daily living skills, after controlling for child age. To address this research question, a factorial multivariate analysis of covariance (MANCOVA) was performed. This method made it possible to simultaneously examine communication, socialization, and daily living skills, with regard to autism symptom severity and caregiver depression, while accounting for child age. Autism symptom severity had two levels (mild and severe) and caregiver depression had two levels (high and low). Results of evaluation of assumptions of

normality, homogeneity of variance-covariance matrices, linearity, and multicollinearity were satisfactory (Tabachnick & Fidell, 2007).

Table 10 provides a summary of the factorial MANCOVA. As the interaction between autism symptom severity and caregiver depression was not significant, the main effect of each predictor was examined. The main effect of autism symptom severity was significant, Wilks' Λ = .72, F(3, 53) = 6.84, p = .001, η^2 = .28, observed power = .97. The main effect of caregiver depression was, however, not significant, Wilks' Λ = .93, F(3, 53) = 1.32, p = .278, η^2 = .07, observed power = .33. The covariate, child age, significantly influenced the multivariate composite, Wilks' Λ = .82, F(3, 53) = 3.91, p = .013, η^2 = .18, observed power = .80. To further understand the multivariate solution, a dimension reduction analysis was conducted and only one discriminant function emerged as statistically significant. Examination of associated standardized discriminant function coefficients (*SDFC*) used to weight the multivariate composite revealed that socialization (*SDFC* = -.78) was most important in forming the function that discriminated the mild and severe autism symptom groups. Communication (*SDFC* = -.25) contributed less to the function, while daily living skills (*SDFC* = -.10) contributed least to the function. Inspection of the structure coefficients indicated that the outcome measures had large to very large negative correlations with the multivariate composite, socialization (*r* = -.96), communication (*r* = -.68), and daily living skills (*r* = -.75).

Table 10

Multivariate Analysis of Covariance Summary (N = 60)

Source of variance	Wilks' lambda	df_1	df_2	F
Child age	.82	3	53	3.91*
Autism symptom severity	.72	3	53	6.84**
Caregiver depression	.93	3	53	1.32
Interaction	.95	3	53	0.90

*$p < .05$. **$p < .01$.

Post-hoc univariate analysis of covariance (ANCOVA) on each of the three measures comprising the multivariate composite revealed statistically significant mean differences between autism symptom severity groups. Alpha was adjusted to .017 (i.e., .05/3) to control for type I error. The results indicated that autism symptom severity had significant effects on communication, $F(1, 55) = 9.96$, $p = .003$, $\eta^2 = .15$; socialization, $F(1, 55) = 19.57$, $p < .001$, $\eta^2 = .26$; and daily living skills, $F(1, 55) = 12.01$, $p = .001$, $\eta^2 = .18$. The covariate, child age, had a significant effect only on socialization, $F(1, 55) = 9.49$, $p = .003$, $\eta^2 = .15$.

Table 11 presents the adjusted and unadjusted group means for communication, socialization, and daily living skills. A within-group comparison of adjusted means revealed that children with mild autism symptoms scored relatively lower on socialization, and their scores on communication and daily living skills were relatively higher. On the other hand, children with severe autism symptoms scored relatively lower on socialization and communication, and their scores on daily living skills were relatively

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higher. A between-group comparison of adjusted means indicated that the difference

between the two autism symptoms groups was the greatest for communication. While

both autism symptoms groups scored the least on socialization, the deficit was more

pronounced in children with mild autism symptoms. Figure 2 presents the adjusted group

means for communication, socialization, and daily living skills by autism symptoms

groups.

Table 11

Adjusted and Unadjusted Group Means for Adaptive Behavior Domains

	Communication		Socialization		Daily living skills	
	Adj *M*	Unadj *M*	Adj *M*	Unadj *M*	Adj *M*	Unadj *M*
Mild autism symptoms	83.66	84.55	78.62	77.40	83.08	83.45
Severe autism symptoms	69.03	68.95	68.49	68.35	72.17	71.63

Follow-up Analyses

As findings demonstrated that only autism symptom severity had a significant

effect on adaptive behavior, with socialization contributing the most to group differences,

the Vineland-II socialization subdomains were further analyzed. The means, standard

deviations, and ranges for the socialization subdomains are presented in Table 12. A one-

way MANCOVA was performed with child age as covariate. Outcome variables were

interpersonal relationships, play and leisure time, and coping skills. Autism symptom

severity, with two levels (mild and severe), was the predictor variable. Results of

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evaluation of assumptions of normality, homogeneity of variance-covariance matrices, linearity, and multicollinearity were satisfactory (Tabachnick & Fidell, 2007).
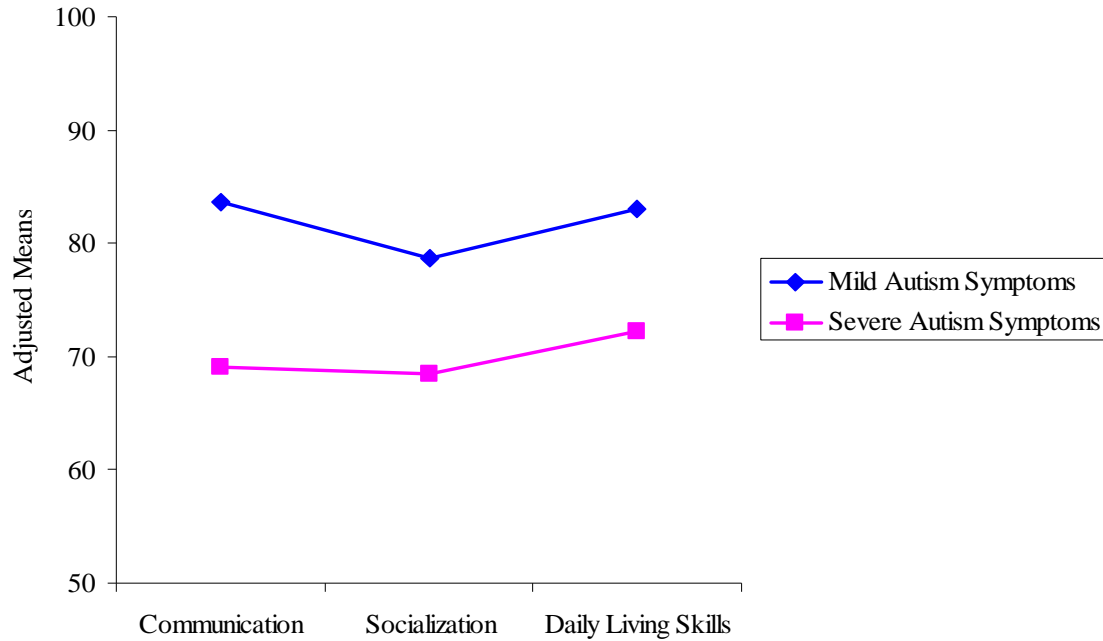
Figure 2. Pattern of adaptive behavior at different autism symptom severity levels

Table 12

*Descriptive Statistics of Vineland-II Socialization Subdomains (*N *= 60)*

Subdomain	*M*	*SD*	Minimum	Maximum
Interpersonal relationships[a]	9.77	2.22	6	16
Play and leisure time[a]	9.70	2.45	5	15
Coping skills[a]	10.33	1.87	8	18

[a] v-Scale score (*M* = 15, *SD* = 3).

The results of the one-way MANCOVA indicated that the main effect of autism symptom severity was significant, Wilks' $\Lambda = .70$, $F(3, 55) = 7.86$, $p < .001$, $\eta^2 = .30$, observed power $= .99$. The covariate, child age, significantly influenced the multivariate composite, Wilks' $\Lambda = .78$, $F(3, 55) = 5.05$, $p = .004$, $\eta^2 = .22$, observed power $= .90$. To further understand the multivariate solution, a dimension reduction analysis was conducted and only one discriminant function emerged as statistically significant. Examination of associated standardized discriminant function coefficients (*SDFC*) used to weight the multivariate composite revealed that interpersonal relationships (*SDFC* = -.66) was most important in forming the function that discriminated the mild and severe autism symptom groups. Coping skills (*SDFC* = -.43) contributed less to the function, while play and leisure time (*SDFC* = -.28) contributed least to the function. Inspection of the structure coefficients indicated that the outcome measures had large to very large negative correlations with the multivariate composite, interpersonal relationships (*r* = -.87), play and leisure time (*r* = -.59), and coping skills (*r* = -.61).

Post-hoc univariate analysis of covariance (ANCOVA) on each of the three measures comprising the multivariate composite revealed statistically significant mean differences between autism symptom severity groups. Alpha was adjusted to .017 (i.e., .05/3) to control for type I error. The results indicated that autism symptom severity had significant effects on interpersonal relationships, $F(1, 57) = 18.29$, $p < .001$, $\eta^2 = .24$; play and leisure time, $F(1, 57) = 8.58$, $p = .005$, $\eta^2 = .13$; and coping skills, $F(1, 57) = 8.94$, $p = .004$, $\eta^2 = .14$. The covariate, child age, had a significant effect only on coping skills, $F(1, 57) = 12.15$, $p = .001$, $\eta^2 = .18$.

Table 13 presents the adjusted and unadjusted group means for interpersonal relationships, play and leisure time, and coping skills. A within-group comparison of adjusted means revealed that children with mild autism symptoms scored relatively lower on play and leisure time, and their scores on interpersonal relationships and coping skills were relatively higher. On the other hand, children with severe autism symptoms scored relatively lower on interpersonal relationships and play and leisure time, and their scores on coping skills were relatively higher. A between-group comparison of adjusted means indicated that the difference between the two autism symptoms groups was the greatest for interpersonal relationships, and the smallest for coping skills. Figure 3 presents the adjusted group means for interpersonal relationships, play and leisure time, and coping skills by autism symptoms groups.

Table 13

Adjusted and Unadjusted Group Means for Socialization Subdomains

	Interpersonal relationships		Play and leisure time		Coping skills	
	Adj *M*	Unadj *M*	Adj *M*	Unadj *M*	Adj *M*	Unadj *M*
Mild autism symptoms	11.29	11.20	10.92	10.80	11.24	11.10
Severe autism symptoms	9.00	9.05	9.09	9.15	9.88	9.95
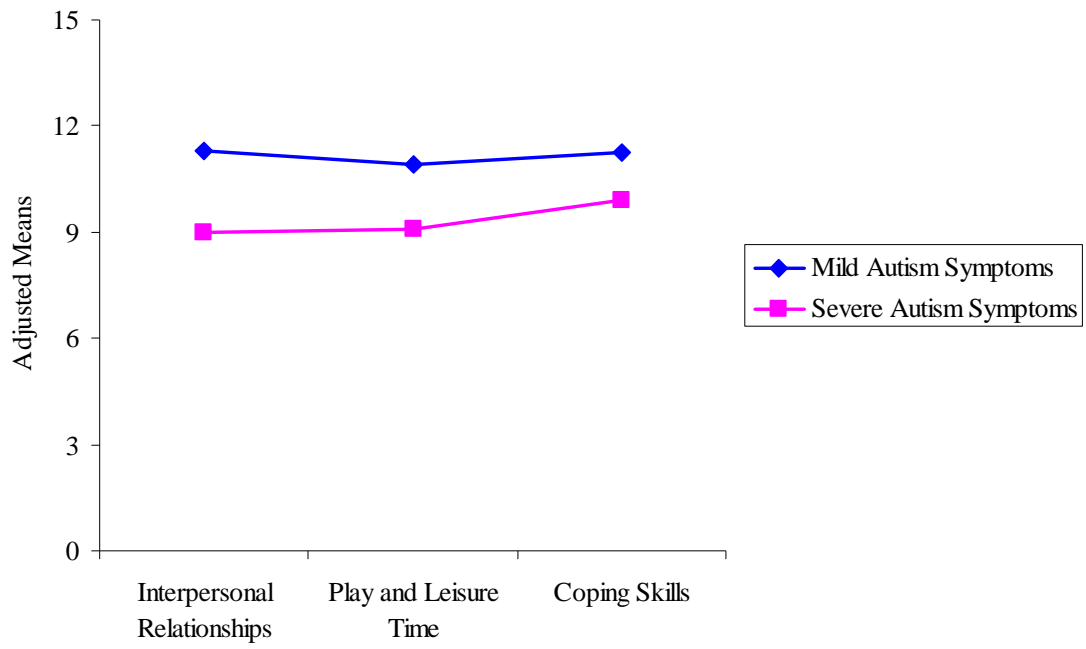
Figure 3. Pattern of socialization at different autism symptom severity levels

CHAPTER V

DISCUSSION

This chapter summarizes and interprets the results in light of the study's research questions, literature review, and conceptual framework. In addition, this chapter describes limitations of the present study and future directions for research. The chapter concludes with a discussion of implications for practice and contributions to the broader literature of adaptive behavior in children with ASD.

Summary of Research Findings

This study sought to examine variability in adaptive behavior in young children with ASD and the role of autism symptom severity and caregiver depression. Descriptive statistics revealed that children scored nearly two standard deviations below the mean, or in the moderately low range, across domains on the Vineland-II. Previous literature attesting to the adaptive deficits in autism dates back at least to Volkmar et al. (1987). Several later studies (e.g., Boltë & Poustka, 2002; Klin et al., 2007; Liss et al., 2001) have endorsed the utility of the VABS in documenting delays in adaptive behavior development in individuals on the autism spectrum. Moreover, the typical profile described in past research for individuals with ASD as a group (e.g., Boltë & Poustka, 2002; Carter et al., 1998; Gillham et al., 2000), namely lower socialization scores, intermediate communication scores, and higher daily living skills scores, was found in the present study.

The results of the correlation analyses suggested that higher scores on the CARS2-ST were strongly related to lower scores on the Vineland-II domains, which is in contrast to Kanne et al.'s (2011) and Klin et al.'s (2007) reports of weak, negative

relations between autism symptoms and adaptive behavior, but is consistent with other reports of strong, negative associations between autism symptoms and adaptive behavior (e.g., Kenworthy et al., 2010; Liss et al., 2001; Perry et al., 2009). The instrument used for measuring autism symptom severity could serve as one possible explanation for this contradiction in findings. Interestingly, studies that used clinical observations to measure autism symptoms demonstrated weak, negative relations, while those that used caregiver reports to measure autism symptoms demonstrated strong, negative relations. Therefore, it is possible that caregivers who report more autism symptoms may also report more deficits in adaptive skills, and vice versa.

The results of the correlation analysis further indicated that higher scores on the CARS2-ST were moderately related to higher scores on the CES-D. It is established in the literature that parents with children with ASD report higher levels of parenting stress and depression as compared to parents of typically developing children and children with other developmental disabilities (Dumas et al., 1991; Eisenhower et al., 2005; Olsson & Hwang, 2001; Smith et al., 2001). At the same time, studies have shown that mothers experiencing depressive symptoms have difficulties attending to their child's needs, responding effectively, and maintaining high levels of involvement (Brennan et al., 2000; Lovejoy et al., 2000). Considered within the framework of the bioecological model (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 1998), one can better appreciate the transactional nature of the relation between child and parent characteristics.

The zero-order correlations were virtually identical as the partial correlations, indicating the general robustness of the zero-order correlations. There was, however, one

exception; the significant, negative correlation between autism symptom severity and socialization was strengthened after the influence of child age was partialled out. This difference is not surprising, given the significant, negative correlation between child age and socialization. This trend, also observed by Kanne et al. (2011) and Klin et al. (2007), implies that the gap in socialization skills between children with ASD and their typical peers increase with age. As Klin and colleagues noted in their study, this result does not reflect a loss of skills over time; rather, it indicates that children with ASD fail to make gains in skills at a level commensurate with their gains in chronological age.

The results of the hierarchical regression analyses indicated that the CARS2-ST scores significantly contributed to the variance in Vineland-II standard scores beyond that explained by child age. The variance explained by autism symptom severity ranged from 25% for communication to 33% for daily living skills. These results are in sharp contrast to the findings of Perry et al. (2009), although their study controlled for child IQ in addition to child age. It is possible that Perry and colleagues found a very small percentage of variance in communication, socialization, and daily living skills that were accounted for by autism symptom severity because much more of variance in adaptive scores was explained by child age and IQ.

The MANCOVA indicated that after adjusting for child age, autism symptom severity explained 28% of the variance in a newly created linear combination of original adaptive measures. The adaptive measures were treated in combination in order to achieve a more "holistic" picture of adaptive behavior and incorporate the intercorrelations of communication, socialization, and daily living skills (see Tabachnick & Fidell, 2007). The central finding of the MANCOVA was that there were significant

group differences based on autism symptom severity, and that socialization was the most impacted of the three adaptive behavior domains. Regardless of autism symptom severity, children scored relatively low on socialization in the present study. Klin et al. (2007) found that irrespective of cognitive potential, children scored relatively low on socialization, supporting the theory that, almost universally, children have difficulties translating cognitive skills to adaptive skills (Liss et al., 2001).

Interpersonal relationships were most impacted of the three socialization subdomains. These findings are in line with the few studies that have analyzed subdomains of Vineland scales (e.g., Kanne et al., 2011; Klin et al., 2007). On the Vineland-II, interpersonal relationships tap into behaviors such as: responding to others (e.g., shows interest in children the same age, shows preference for certain people and objects); expressing and recognizing emotions (e.g., uses words to express own emotions, uses words or actions to show happiness or concern for others); imitating (e.g., repeats phrases heard spoken before by an adult, imitates actions as they are being performed by another person or several hours after watching someone else perform them); social communication (e.g., makes social contact, answers when familiar adults make small talk); and friendship (e.g., demonstrates friendship-seeking behavior with same-age peers, has best friend or shows preference for certain friends over others).

Given that a family history of depression significantly predicts lower scores in socialization and daily living skills (Mazefsky et al., 2008), this study sought to explore the impact of caregiver depression on adaptive behavior in children with ASD. Multivariate analyses did not indicate that caregiver depression significantly impacted any of the adaptive behavior domains. This finding is surprising given that 55% of

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caregivers in the current sample reported symptoms on the CES-D that met the clinical

risk cutoff score of ≥ 16. While average CES-D scores found in community surveys have

been found to vary between 8.0 and 8.5 (Aneshensel, Frerichs, Clark, & Yokopenic,

1982), the mean CES-D score in the current sample was twice that figure. However, 90%

of the families in this sample had two-parent, married caregivers, which may have helped

mitigate some of the negative outcomes associated with maternal depression. Cairney,

Boyle, Offord, and Racine (2003) found that single mothers, who may have to balance

multiple roles, experience higher rates of depression and parenting stress.

Limitations of the Present Study and Recommendations for Future Research

There are several limitations which need to be considered when interpreting the

findings. First, the data that were analyzed were based solely on primary caregiver

reports, which may have increased reporting bias. Moreover, many mothers in the sample

reported heightened depressive symptoms, which may have further increased reporting

bias. While some studies have found no evidence of caregiver depression causing

reporting bias (e.g., Mowbray, Lewandowski, Bybee, & Oyserman, 2005; Querido,

Eyberg, & Boggs, 2001; Richters & Pellegrini, 1989), other studies have suggested that

depressed mothers overstate and overgeneralize their child's behavior problems (e.g.,

Chilcoat & Breslau, 1997; Gartstein, Bridgett, Dishion, & Kaufman, 2009). On the one

hand, the psychiatric status of informants becoming a potential source of bias is

particularly problematic in early childhood and family research, where mothers are often

the sole informant; on the other hand, maternal perceptions of early childhood behavior

are clearly important because mothers tend to have greater opportunities to be and

interact with their child. Some studies have addressed this problem by using additional

raters as criterion raters. When using additional raters as criterion raters (e.g., fathers, teachers), it would be important for future studies to also document the context, length, and quality of the criterion rater's relationship with the child.

Second, this study tapped into one dimension of caregiver depression, i.e., severity. Future studies should include data on other dimensions of caregiver depression, such as chronicity and timing of maternal depressive symptoms. Understanding the characteristics of the mother's depression may also explain possible reporting discrepancies of children's behavior between the mother and criterion rater. Whether maternal depression preceded child maladaptive behavior, or the other way round, may also be addressed with the use of additional informants knowledgeable about the child.

Third, caution should be used when generalizing this data to all children with autism due to the limited sample. As this sample was a relatively homogeneous sample of White, two-parent families drawn from one geographical region, future research should aim to include a more diverse sample.

Fourth, it is difficult to say with certainty that the reported data regarding special educational eligibility, service utilization, and medical diagnoses were accurate. Future studies should use educational or medical records to corroborate information gathered from participants.

Fifth, similar to previous studies assessing adaptive behavior in children with ASD, the present study focused on communication, socialization, and daily living skills, but not on motor skills. Recently, MacDonald, Lord, and Ulrich (2014) provided initial evidence of a direct relation between motor skills and autism severity, suggesting that

development of fine and gross motor skills is an important aspect of treatment plans for young children with ASD. Future research should replicate and extend these findings.

Implications and Contributions

Limitations notwithstanding, the present study confirmed the magnitude of socialization impairments in children with ASD, which may be relevant for early identification and intervention. Children with mild autism symptoms, who may fall below the threshold for a medical diagnosis or a special educational eligibility of autism, still need support in the area of socialization. This study also demonstrated that children with mild autism symptoms may require more help with play and leisure time skills. Failure to develop appropriate play skills can result in children with ASD remaining socially isolated and marginalized (Simpson & Myles, 1993). Many single-subject studies have found child-preferred play objects and/or activities in therapeutic interventions for children with ASD to increase interactions with adults and play skills while decreasing inappropriate behaviors (Hwang & Hughes, 2000; Mechling, Gast, & Cronin, 2006; Reinhartsen, Garfinkle, & Wolery, 2002).

Consistent with findings from previous studies that have examined mothers with children with autism (e.g., Dumas et al., 1991; Kuhn & Carter, 2006; Olsson & Hwang, 2001), more than half of mothers in the sample reported heightened levels of depression. While caregiver depression did not emerge as a significant predictor of adaptive behavior skills, it could have negative outcomes in other proximal and distal contexts, which could in turn influence child adaptive behavior development (Malik et al., 2007). For instance, mothers with high depressive symptoms could have less parenting self-efficacy and agency, which could in turn negatively impact their participation in early intervention. A

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study by Osborne and colleagues suggested that the effectiveness of early intervention programs for young children with ASD was mitigated by parenting stress (Osborne, McHugh, Saunders, & Reed, 2008). Therefore, from a research perspective, it would be important to identify mediating variables that better explain the relation between caregiver depression and stress with child adaptive behavior. From a practitioner's standpoint, it would be important to examine the availability of support systems that promote parent mental health.

Traditionally, interventions for children with ASD focus solely on intervening with the child. However, these interventions overlook the importance of the family context in which the child functions. By taking into account the entire family system, interventions can become more comprehensive and individualized to the needs of each family. Given that parenting a child with autism is uniquely challenging, understanding factors that contribute to parental well-being is of importance. Improvement in the child's adaptive skills may be greater if treatment models began with an assessment of family variables and more actively involved family members in treatment rather than focusing solely on increasing the adaptive skills of the child with autism.

Most studies in the past have examined adaptive behavior using samples of school-aged children and adolescents. Thus, an important contribution of this study is that it examined adaptive behavior in a sample of young children with ASD, which has important implications for early intervention. It is worth mentioning that much of the research on adaptive behavior has been based on the original VABS. This study used the updated Vineland-II to assess adaptive behavior domains. The norm sampling for the Vineland-II included larger pools of individuals ages birth to 5, thereby increasing the

scale's sensitivity and utility for this age group in particular (Sparrow et al., 2005). Therefore, the current study also added to existing literature on the Vineland-II.

In summary, identifying sources of variability in adaptive behavior is critical to obtaining a more complete picture of adaptive development in individuals with autism as well as identification of treatment targets. Research suggests that the consideration of child specific attributes in combination with family characteristics leads to the development of intervention strategies that are more likely to be acceptable, effective, and sustainable. The needs and strengths of young children with ASD are very heterogeneous. The current study highlighted the level of functional impairment that young children with ASD experience in relation to autism symptom severity, allowing for a deeper understanding of ASD with implications for treatment focus.

APPENDIX A

OREGON EARLY AUTISM PROJECT FAMILY DEMOGRAPHIC

QUESTIONNAIRE

1. Name of Child: _____
                            Last,   Middle,   First

2. Date of Birth: _____ Age: _____

3. Current Education/Therapeutic Placement:
    (1) **Early Intervention (birth – 3 years)**
        Please specify type of EI: (1) Parent Toddler Classroom
                                                  (2) Home only
                                                  (3) Combined (classroom + home)
                                                  (4) Other _____
                                                  (5) N/A (not enrolled in EI)
    (2) **Early Childhood Special Education (3 – 5 years)**
        Please specify type of ECSE: (1) Segregated program
                                                    (2) Inclusive program
                                                    (3) Community preschool
                                                    (4) Home only
                                                  (5) Other _____
                                                  (6) N/A (not enrolled in ECSE)
    (3) **Kindergarten**
        Please specify type of K Prog: (1) General education
                                                    (2) Education Resource Room (ERR)
                                                    (3) Life skills program
                                                    (4) Autism classroom
                                                    (5) Other _____
                                                  (6) N/A (not enrolled in K)
    (4) **Other:** _____
    (5) **None (not receiving services)**

4. Education/therapeutic placement is:
    (1) Part-time (2.5 hours or less per day) _____
    (2) Full-time (5 hours/day <u>and</u> 5 days/week)
    (0) N/A (not receiving services)

5. Gender:
    (1) Male
    (2) Female

6. Race/ethnic background of child:
    (1) White/Caucasian
    (2) Black/African American
    (3) Hispanic/Latino: _____
    (4) Asian: _____
    (5) Native American: _____
    (6) Pacific Islander: _____

    (7) Mixed: _____

    (8) Other: _____

7. **Education eligibility** of autism?
    (0) No
    (1) Yes
    (2) Don't know

8. **Medical diagnosis** of an autism spectrum disorder?
    (0) No
    (1) Yes_____
    (2) Don't know

9. What is child's **medical diagnosis**?
    (1) Autism (Autistic Disorder)
    (2) PDD or PDD-NOS
    (3) Asperger's Syndrome
    (4) Other _____
    (5) Unknown
    (6) Multiple _____
    (7) None (no medical diagnosis of ASD)

10. <u>When</u> was child identified with **medical diagnosis**? _____ (Specify Date)
    (1) At birth or infancy (0-11 months)
    (2) One-year old (12-23 months)
    (3) Two-years old (24-35 months)
    (4) Three-years old (36-47 months)
    (5) Four-years old (48-59 months)
    (6) Five-years old (60-71 months)
    (7) Unknown
    (8) N/A (no medical diagnosis of ASD)

11. <u>Who</u> identified child (with **medical diagnosis** of ASD)?
    (1) Primary Care Physician/Pediatrician
    (2) Other Physician/Specialist _____
    (3) Psychologist _____
    (4) Other: _____
    (5) Unknown
    (6) N/A (no medical diagnosis of ASD)

12. <u>Secondary</u> Diagnosis: (Please circle one)
    (1) Developmental delay (or MR or ID)
    (2) Sensory dysfunction disorder
    (3) ADHD
    (4) Disruptive behavior disorder
    (5) Seizure disorder
    (6) Other: _____
    (7) None
    (8) Multiple

13. When was child diagnosed with secondary diagnosis?
    (1) At birth or infancy (0-11 months)
    (2) One-year old (12-23 months)
    (3) Two-years old (24-35 months)
    (4) Three-years old (36-47 months)
    (5) Four-years old (48-59 months)
    (6) Five-years old (60-71 months)
    (7) Unknown
    (8) N/A (No secondary diagnosis)

14. Who diagnosed child (with secondary diagnosis)?
    (1) Primary Care Physician/Pediatrician
    (2) Other Physician/Specialist _____
    (3) Psychologist _____
    (4) Other: _____
    (5) Unknown
    (6) N/A (No secondary diagnosis)

15. When was child identified with **education eligibility** of autism? _____ (Specify Date)
    (1) At birth or infancy (0-11 months)
    (2) One-year old (12-23 months)
    (3) Two-years old (24-35 months)
    (4) Three-years old (36-47 months)
    (5) Four-years old (48-59 months)
    (6) Five-years old (60-71 months)
    (7) Unknown
    (8) N/A (no education eligibility of autism)

16. Who identified child with **education eligibility** of autism?
    (1) Early Childhood CARES (EC CARES)
    (2) School district _____
    (3) Other: _____
    (4) Unknown
    (5) N/A (no education eligibility of autism)

17. Does child have medical/health problems (in addition to primary/secondary diagnoses)?
    (1) Yes: _____
    (0) No
    (2) Don't know

18. Is child seen regularly by a physician?
    (1) Yes
    (0) No

19. Is child currently taking any medication (including vitamins/supplements)?
    (1) Yes:
        Name _____Reason: _____
        Name _____Reason: _____
        Name _____Reason: _____
        Name _____Reason: _____
    (0) No

20. Does child have health insurance?
   (1) Yes
   (0) No

21. What type of health insurance?
   (1) Private Insurance (e.g., Blue Cross) _____
   (2) Oregon Health Plan/State Insurance
   (3) Medicaid
   (4) Other_____
   (5) Multiple_____
   (6) None (does not have health insurance)

Early Intervention/Early Childhood Special Education (Preschool) History

22. Did/does child receive Early Intervention services (0-3 yrs)?
   (1) Yes
   (0) No
   (2) Don't Know

23. Is child currently enrolled in preschool or other early childhood education (or received in past)?
   (1) Yes
   (0) No
   (2) N/A (currently too young for preschool/ECSE)

24. Is child enrolled in a program (EI, ECSE, Kindergarten) with special education eligibility (with an IFSP or IEP)?
   (1) Yes
   (0) No
   (2) Don't Know

25. Does child receive <u>related services</u> in addition to special education services?
   (1) Yes
   (0) No
   (2) Don't Know

26. If yes, which related services does your child receive?
   Speech therapy
   (1) **Yes**
      Frequency (# of sessions/week or # of sessions/month): _____
      Please specify: (a) Child direct therapy
            (1) Yes
            (0) No
            (8) N/A (not receiving speech)
         (b) Parent consultation

(1) Yes
                    (0) No
                    (8) N/A (not receiving speech)
(0) **No**

Occupational Therapy (OT)
(1) **Yes**
    Frequency (# of sessions/week or # of sessions/month): _____
    Please specify: (a) Child direct therapy
                    (1) Yes
                    (0) No
                    (8) N/A (not receiving OT)
               (b) Parent consultation
                    (1) Yes
                    (0) No
                    (8) N/A (not receiving OT)
(0) **No**

Sensory Integration combined with OT or other therapy (e.g., use of weighted vests, brushing, swinging, body sock, joint compression, sensory table, sensory diet, etc.?)
(1) Yes
(0) No

Physical Therapy (PT)
(1) **Yes**
    Frequency (# of sessions/week or # of sessions/month): _____
    Please specify: (a) Child direct therapy
                    (1) Yes
                    (0) No
                    (8) N/A (not receiving PT)
               (b) Parent consultation
                    (1) Yes
                    (0) No
                    (8) N/A (not receiving PT)
(0) **No**

Behavioral programming (e.g., ABA) – either home- or center-based
(1) **Yes**
Frequency (# of hours/week): _____
(0) **No**

DIR/Floor time – either home- or center-based
(1) **Yes**
Frequency (# of hours/week): _____
(0) **No**

Other: _____
    (1) **Yes**
        Frequency (# of sessions/week or # of sessions/month): _____

        If yes, specify "other" category:

1:1 Aide	(1) **Yes**	(0) **No**
Adaptive P.E.	(1) **Yes**	(0) **No**
Play Therapy	(1) **Yes**	(0) **No**
Music Therapy	(1) **Yes**	(0) **No**
Therapeutic Listening	(1) **Yes**	(0) **No**
Other	(1) **Yes**	(0) **No**

    (0) **No**

27. Special Diets (e.g., Gluten Free/Casein Free)
    (1) Yes _____
    (0) No

28. Do any of these related services/therapies cost you money (out-of-pocket)?
    (1) Yes _____
    (0) No

29. Name of School Program (ECSE or Elementary): _____

30. Name of School District family resides in: _____

Mother/Mother Figure Information

31. Name of Mother:

_____
          Last,   Middle,   First

32. Mother's Date of Birth: _____ Age: _____

33. Is Mother/Mother Figure the Primary Caregiver?
    (1) Yes
    (0) No
        If no, who is? _____

34. Race/Ethnic Background of Mother:
    (1) White/Caucasian
    (2) Black/African American
    (3) Hispanic/Latino: _____
    (4) Asian: _____
    (5) Native American: _____
    (6) Pacific Islander: _____
    (7) Mixed: _____
    (8) Other: _____

35. Status of Mother Figure
    (1) Biological
    (2) Step
    (3) Adoptive
    (4) Female relative (aunt, grandmother)
    (5) Other: _____
    (6) No mother-figure present in home

36. Current Marital Status of Mother/Mother Figure
    (1) Married or Living With Partner
    (2) Unmarried - Single
    (3) Separated
    (4) Divorced
    (5) Widowed
    (6) Other _____

37. How long has child been living with mother figure?
    (1) Less than 6 months
    (2) 6-12 months
    (3) 1-2 years
    (4) 2+ years
    (5) All/most of child's life (all but a few months)
    (6) Child does not live with mother figure

38. Mother's Highest Grade Completed: (1-12=HS; 13-16=College; 16+ Post college)
1   2   3   4   5   6   7   8   9   10   11   12   13   14   15   16   17   18   19   20

39. Mother's Highest Degree Obtained
    (0) None
    (1) HS Diploma/GED
    (2) Vocational Degree/Certificate
    (3) Associates Degree (2-year college degree)
    (4) Bachelor's Degree (4-year college degree)
    (5) Master's Degree
    (6) Doctorate (e.g., PhD, EdD, JD, MD, etc.)
    (7) Other: _____

40. Mother employed?
    (2) Yes; Full-time
    (1) Yes; Part-time
    (0) No

41. Mother location of employment?
    (1) Home
    (2) Out-of-home
    (8) N/A (not employed)

42. Mother's Job Title: _____

43. How many hours worked per week? _____

Father/Father Figure Information

44. Name of Father: _____
                          Last,   Middle,   First

45. Father's Date of Birth: _____   Age: _____

46. Race/ethnic background of father:
    (1) White/Caucasian
    (2) Black/African American
    (3) Hispanic/Latino: _____
    (4) Asian: _____
    (5) Native American: _____
    (6) Pacific Islander: _____
    (7) Mixed: _____
    (8) Other: _____

47. Status of Father Figure
    (1) Biological
    (2) Step
    (3) Adoptive
    (4) Male relative (uncle, grandfather)
    (5) Other: _____
    (6) No father figure present in home

48. Current Marital Status of Father/Father Figure
    (1) Married or Living With Partner
    (2) Unmarried - Single
    (3) Separated
    (4) Divorced
    (5) Widowed
    (6) Other _____

49. How long has child been living with father figure?
    (1) Less than 6 months
    (2) 6-12 months
    (3) 1-2 years
    (4) 2+ years
    (5) All/most of child's life (all but a few months)
    (6) Child does not live with father figure

50. Father's Highest Grade Completed: (1-12=HS; 13-16=College; 16+ Post college)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

51. Father's Highest Degree Obtained
    (0) None
    (1) HS Diploma/GED
    (2) Vocational Degree/Certificate
    (3) Associates Degree (2-year college degree)
    (4) Bachelor's Degree (4-year college degree)

(5) Master's Degree
(6) Doctorate (e.g., PhD, EdD, JD, MD, etc.)

52. Father employed?
    (2) Yes; Full-time
    (1) Yes; Part-time
    (0) No

53. Father location of employment?
    (1) Home
    (2) Out-of-home
    (8) N/A (not employed)

54. Father's Job Title: _____

55. How many hours worked per week? _____

56. Annual total <u>family</u> (combined) income
    (1) $14,999 or less
    (2) $15,000-24,999
    (3) $25,000-34,999
    (4) $35,000-44,999
    (5) $45,000-54,999
    (6) $55,000-64,999
    (7) $65,000-74,999
    (8) $75,000-84,999
    (9) $85,000-99,999
    (10) $100,000-$114,999
    (11) $115,000-$129,999
    (12) $130,000+

57. Does family and/or child qualify for government aid programs?
    (1) Yes
    (0) No
    (2) Don't Know

58. If yes, which government aid programs does the family and/or child receive?
    TANIF Temporary Assistance to Needy Families (i.e., welfare/public assistance)
    (1) Yes
    (0) No

    Supplemental Security Income (SSI)
    (1) Yes
    (0) No
    Social Security
    (1) Yes
    (0) No

    Medicaid (and/or Medicaid Waiver)
    (1) Yes
    (0) No

Caregiver Disability Pension
(1) Yes
(0) No

Women, Infants, and Children (WIC)
(1) Yes
(0) No

Oregon Health Plan (OHP)
(1) Yes
(0) No

Other: _____
(1) Yes
(0) No

59. Total number of adults (age 18+) currently living in the home _____

60. Total number of children currently living in the home_____

Sibling Information

61. Does child have siblings living in the home?
    (1) Yes
    (0) No

62. How many siblings living in the home? _____

    Sibling Name: _____
    Date of Birth: _____Age_____

    Sibling Name: _____
    Date of Birth: _____Age_____

    Sibling Name: _____
    Date of Birth: _____Age_____

63. Do any of the siblings have learning problems?
    (1) Yes _____
    (0) No

64. Do any of the siblings have behavior problems or mental health problems?
    (1) Yes
    (0) No

65. Do parent(s)/caregiver(s) have history of learning problems?
    (1) Yes
    (0) No

66. Do parent(s)/caregiver(s) have history of mental health problems?
    - (1) Yes
    - (0) No

67. Any family history of autism spectrum?
    - (1) Yes _____
    - (0) No

68. If yes, is the family history of autism spectrum in the <u>immediate</u> family (parents or siblings of target child)?
    - (1) Yes
    - (0) No
    - (8) N/A (no family history of ASD)

Family Contact Information

Home address: _____

Phone number (home): _____

Phone number – work (please circle: Mother/Father): _____

Phone number – cell (please circle: Mother/Father): _____

Email address (please circle: Mother/Father): _____

How long have you lived here? _____ How long lived in Oregon? _____

APPENDIX B

VINELAND ADAPTIVE BEHAVIOR SCALES, SECOND EDITION–SURVEY INTERVIEW

FORM

Communication Domain

Response Options: **2** = Usually; **1** = Sometimes or Partially, **0** = Don't Know

Receptive

1	Turns eyes and head toward sound.	2	1	0	DK
2	Looks toward parent or caregiver when hearing parent's or caregiver's voice.	2	1	0	DK
3	Responds to his or her name spoken (for examples, turns toward speaker, smiles, etc.).	2	1	0	DK
4	Demonstrates understanding of the meaning of the word *no*, or word or gesture with the same meaning (for example, stops current activity briefly).	2	1	0	DK
5	Demonstrates understanding of the meaning of the word *yes*, or word or gesture with the same meaning (for example, continues activity, smiles, etc.).	2	1	0	DK
6	Listens to story for at least 5 minutes (that is, remains relatively still and directs attention to the storyteller or reader)	2	1	0	DK
7	Points to at least three major body parts when asked (for example, nose, mouth, hands, feet, etc.).	2	1	0	DK
8	Points to common objects in a book or magazine as they are named (for example, dog, car, cup, key, etc.).	2	1	0	DK
9	Listens to instructions.	2	1	0	DK
10	Follows instructions with one action and one object (for example, "Bring me the book"; "Close the door"; etc.).	2	1	0	DK
11	Points to at least five minor body parts when asked (for example, fingers, elbows, teeth, toes, etc.).	2	1	0	DK
12	Follow instructions with two actions or an action and two objects (for example, "Bring me the crayons and the paper"; "Sit down and eat your lunch"; etc.).	2	1	0	DK
13	Follows instructions in "if-then" form (for example, "If you want to play outside then put your things away"; etc.).	2	1	0	DK
14	Listens to a story for at least 15 minutes.	2	1	0	DK
15	Listens to a story for at least 30 minutes.	2	1	0	DK
16	Follows three-part instructions (for example, "Brush your teeth, get dressed, and make your bed; etc.).	2	1	0	DK
17	Follows instructions or directions heard 5 minutes before.	2	1	0	DK

18	Understands sayings that are not meant to be taken word for word (for example, "Button your lip"; "Hit the road", etc.).	2	1	0	DK
19	Listens to an informational talk for at least 15 minutes.	2	1	0	DK
20	Listens to an informational talk for at least 30 minutes.	2	1	0	DK

Expressive

1	Cries or fusses when hungry or wet.	2	1	0	DK
2	Smiles when you smile at him or her.	2	1	0	DK
3	Makes sounds of pleasure (for example, coos, laughs, etc.).	2	1	0	DK
4	Makes nonword baby sounds (that is, babbles).	2	1	0	DK
5	Makes sounds or gestures (for example, waves arms) to get parent's or caregiver's attention.	2	1	0	DK
6	Makes sounds or gestures (for example, shakes head) if he or she wants an activity to stop or keep going.	2	1	0	DK
7	Waves goodbye when another person waves or parent or caregiver tells him or her to wave.	2	1	0	DK
8	Says "Da-da," "Ma-ma," or another name for parent or caregiver (including parent's or caregiver's first name or nickname).	2	1	0	DK
9	Points to object he or she wants that is out of reach.	2	1	0	DK
10	Points or gestures to indicate preference when offered a choice (for example, "Do you want this one or that one?"; etc.).	2	1	0	DK
11	Repeats or tries to repeat common words immediately upon hearing them.	2	1	0	DK
12	Names at least three objects (e.g., bottle, dog, favorite toy, etc.).	2	1	0	DK
13	Says one-word requests (for example, *up, more, out,* etc.).	2	1	0	DK
14	Uses first names or nicknames of brothers, sisters, or friends, or says their names when asked.	2	1	0	DK
15	Answers or tries to answer with words when asked a question.	2	1	0	DK
16	Names at least 10 objects.	2	1	0	DK
17	States own first name or nickname (for example, Latesha, Little Sister, etc.) when asked.	2	1	0	DK
18	Uses phrases with a noun and a verb (for example, "Katie stay"; "Go home"; etc.).	2	1	0	DK
19	Asks questions by changing inflection of words or simple phrases (for example, "Mine?"; "Me go?"; etc.); grammar is not important.	2	1	0	DK
20	Says at least 50 recognizable words.	2	1	0	DK
21	Uses simple words to describe things (for example, *dirty, pretty, big, loud,* etc.).	2	1	0	DK

22	Asks questions beginning with *what* or *where* (for example, "What's that?"; "Where doggie go?"; etc.).	2	1	0	DK
23	Uses negatives in sentences (for example, "Me no go"; "I won't drink it"; etc.); grammar is not important.	2	1	0	DK
24	Tells about experiences in simple sentences (for example, "Ginger and I play"; "Dan read me a book"; etc.).	2	1	0	DK
25	Says correct age when asked.	2	1	0	DK
26	Says at least 100 recognizable words.	2	1	0	DK
27	Uses *in, on,* or *under* in phrases or sentences (for example, "Ball go under chair"; "Put it on the table"; etc.).	2	1	0	DK
28	Uses *and* in phrases or sentences (for example, "Mom and Dad"; "I want ice cream and cake"; etc.).	2	1	0	DK
29	Says first and last name when asked.	2	1	0	DK
30	Identifies and names most common colors (that is, red, blue, green, yellow, orange, purple, brown, and black).	2	1	0	DK

Scoring tip: Make a "2" if the individual names 6 to 8 colors; make a "1" if the individual names 2 to 5 colors; mark a "0" if the individual names 0 or 1 color.

31	Asks questions beginning with *who* or *why* (for example, "Who's that?"; "Why do I have to go?"; etc.).	2	1	0	DK
32	Uses present tense verbs ending in *ing* (for example, "Is singing"; "Is playing"; etc.).	2	1	0	DK
33	Uses possessives in phrases or sentences (for example, "That's her book"; "This is Carlos's ball"; etc.).	2	1	0	DK
34	Uses pronouns in phrases or sentences; must use correct gender and form of pronoun, but sentences need not be grammatically correct (for example, "He done it"; "They went"; etc.).	2	1	0	DK
35	Asks questions beginning with *when* (for example, "When is dinner?"; "When can we go home?"; etc.).	2	1	0	DK
36	Uses regular past tense verbs (for example, *walked, baked,* etc.); May use irregular past tense verbs ungrammatically (for example, "I runned away"; etc.).	2	1	0	DK
37	Uses *behind* or *in front of* in phrases or sentences (for example, "I walked in front of her"; "Terrell is behind you"; etc.).	2	1	0	DK
38	Pronounces words clearly without sound substitutions (for example, does not say "wabbit" for "rabbit", "Thally" for "Sally", etc.).	2	1	0	DK
39	Tells basic parts of a story, fairy tale, or television show plot; does not need to include great detail or recount in perfect order.	2	1	0	DK
40	Says month and day of birthday when asked.	2	1	0	DK
41	Modulates tone of voice, volume, and rhythm appropriately (for	2	1	0	DK

example, does not consistently speak too loudly, too softly, or in a monotone, etc.).

42	Tells about experiences in detail (for example, tells who was involved, where activity took place, etc.).	2	1	0	DK
43	Gives simple directions (for example, on how to play a game or how to make something).	2	1	0	DK

Scoring tip: Mark a "2" is the directions are clear enough to follow; mark a "1" if the individual articulates directions but they are not clear enough to follow; make a "0" if the individual never attempts to articulate directions.

44	Uses *between* in phrases or sentences (for example, "The ball went between the cars"; etc.).	2	1	0	DK
45	Says own telephone number when asked.	2	1	0	DK
46	Easily moves from one topic to another in conversation.	2	1	0	DK
47	Stays on topic in conversations; does not go off on tangents.	2	1	0	DK
48	Explains ideas in more than one way (for example, "This was a good book. It was exciting and fun to read"; etc.).	2	1	0	DK
49	Has conversations that last 10 minutes (for example, relates experiences, contributes ideas, shares feelings, etc.).	2	1	0	DK
50	Uses irregular plurals correctly (for example, *children*, *geese*, *mice*, *women*, etc.).	2	1	0	DK
51	Says complete home address (that is, street or rural route, apartment number, city, and state), with or without zip code, when asked.	2	1	0	DK
52	Describes a short-term goal and what he or she needs to do to reach it (for example, says, "I want to get an A on my test, so I'm going to study hard"; etc.).	2	1	0	DK
53	Gives complex directions to others (for example, to a distant location, for recipe with many ingredients or steps, etc.).	2	1	0	DK

Scoring tip: Mark a "2" if the directions are clear enough to follow; mark a "1" if the individual articulates directions but they are not clear enough to follow; mark a "0" if the individual never attempts to articulate directions.

54	Describes a realistic long-range goal that can be done in 6 months or more (for example, says, "I want to buy a bike, so I'll babysit and run errands to earn enough money to buy it"; etc.).	2	1	0	DK

Written

1	Identifies one or more alphabet letters as letters and distinguishes them from numbers	2	1	0	DK
2	Recognizes own name in printed form.	2	1	0	DK
3	Identifies at least 10 printed letters of the alphabet.	2	1	0	DK

4	Prints or writes using correct orientation (for example, in English from left to right; in some languages from right to left or top to bottom).	2	1	0	DK
5	Copies own first name.	2	1	0	DK
6	Identifies all printed letters of the alphabet, upper- and lowercase.	2	1	0	DK
7	Prints at least three simple words from example (for example, *cat, see, bee*, etc.).	2	1	0	DK
8	Prints or writes own first and last name from memory.	2	1	0	DK
9	Reads at least 10 words aloud.	2	1	0	DK
10	Prints at least 10 simple words from memory (for example, *hat, ball, the,* etc.).	2	1	0	DK
11	Reads simple stories aloud (that is, stories with sentences of three to five words).	2	1	0	DK
12	Prints simple sentences of three or four words; may make small errors in spelling or sentence structure.	2	1	0	DK
13	Prints more than 20 words from memory; may make small spelling errors	2	1	0	DK
14	Reads and understands material of at least second-grade level.	2	1	0	DK
15	Puts lists of words in alphabetical order	2	1	0	DK
16	Writes simple correspondence at least three sentences long (for example, postcards, thank-you notes, email, etc.).	2	1	0	DK
17	Reads and understands material of at least fourth-grade level.	2	1	0	DK
18	Writes reports, papers, or essays at least one page long; may use computer.	2	1	0	DK
19	Writes complete mailing and return addresses on letters or packages.	2	1	0	DK
20	Reads and understands material of at least sixth-grade level.	2	1	0	DK
21	Edits or corrects own written work before handing it in (for example, checks punctuation, spelling, grammar, etc.).	2	1	0	DK
22	Writes advanced correspondence at least 10 sentences long; may use computer.	2	1	0	DK
23	Reads and understands material or at least ninth-grade level.	2	1	0	DK
24	Reads at lease two newspaper articles weekly (print or electronic version).	2	1	0	DK
25	Writes business letters (for example, requests information, makes complaint, places order, etc.); may use computer.	2	1	0	DK

Daily Living Skills Domain

Response Options: **2** = Usually; **1** = Sometimes or Partially, **0** = Don't Know

Personal

1	Opens mouth when food is offered.	2	1	0	DK
2	Eats solid foods (for example, cooked vegetables, chopped meats, etc.).	2	1	0	DK
3	Sucks or chews on finger foods (for example, crackers, cookies, toast, etc.).	2	1	0	DK
4	Drinks from a cup or glass; may spill.	2	1	0	DK
5	Lets someone know when he or she has wet or soiled diapers or pants (for example, points, vocalizes, pulls at diaper, etc.).	2	1	0	DK
6	Feeds self with spoon; may spill.	2	1	0	DK
7	Sucks from straw.	2	1	0	DK
8	Takes off clothing that opens in the front (for example, a coat or sweater); does not have to unbutton or unzip the clothing.	2	1	0	DK
9	Pulls up clothing with elastic waistbands (for example, underwear or sweatpants).	2	1	0	DK
10	Feeds self with fork; may spill.	2	1	0	DK
11	Drinks from cup or glass without spilling.	2	1	0	DK
12	Feeds self with spoon without spilling.	2	1	0	DK
13	Urinates in toilet or potty chair.	2	1	0	DK
14	Puts on clothing that opens in the front (for example, a coat or sweater); does not have to zip or button the clothing.	2	1	0	DK
15	Asks to use toilet.	2	1	0	DK
16	Defecates in toilet or potty chair.	2	1	0	DK
17	Is toilet-trained during the day.	2	1	0	DK

Scoring tip: Mark a "2" if the individual uses the toilet without help and without accidents; mark a "1" if the individual needs help, such as with wiping, or has some accidents; mark a "0" if the individual always needs help or has frequent accidents.

18	Zips zippers that are fastened at the bottom (for example, in pants, on backpacks, etc.).	2	1	0	DK
19	Wipes or blows nose using tissue or handkerchief.	2	1	0	DK
20	Is toilet-trained during the night.	2	1	0	DK
21	Puts shoes on correct feet; does not need to tie laces.	2	1	0	DK
22	Fastens snaps.	2	1	0	DK
23	Holds spoon, fork, and knife correctly.	2	1	0	DK

24	Washes and dries face using soap and water.	2	1	0	DK	
25	Brushes teeth.	2	1	0	DK	
26	Buttons large buttons in front, in correct buttonholes.	2	1	0	DK	
27	Covers mouth and nose when coughing and sneezing.	2	1	0	DK	
28	Buttons small buttons in front, in correct buttonholes.	2	1	0	DK	
29	Connects and zips zippers that are not fastened at the bottom (for example, in jackets, sweatshirts, etc.).	2	1	0	DK	
30	Turns faucets on and adjusts temperature by adding hot or cold water.	2	1	0	DK	
31	Wears appropriate clothing during wet or cold weather (for example, raincoat, boots, sweater, etc.).	2	1	0	DK	
32	Bathes or showers and dries self.	2	1	0	DK	

Scoring tip: Mark a "2" if the individual bathes or showers without help, including turning the water on and off; mark a "1" if the individual needs help with any part of bathing or drying or with turning the water on and off; mark a "0" if the individual never bathes or showers without help or without reminders.

33	Finds and uses appropriate public restroom for his or her gender.	2	1	0	DK	
34	Washes and dries hair (with towel or hair dryer).	2	1	0	DK	
35	Cares for minor cuts (for example, cleans wound, puts on a bandage, etc.).	2	1	0	DK	
36	Takes medicine as directed (that is, follows directions on label).	2	1	0	DK	
37	Uses thermometer to take another's temperature.	2	1	0	DK	
38	Seeks medical help in an emergency (for example, recognizes symptoms of serious illness or injury, such as shortness of breath, chest pain, uncontrolled bleeding, etc.).	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if the individual has not been in a medical emergency.

| 39 | Follows directions for health care procedures, special diet, or medical treatments. | 2 | 1 | 0 | DK | N/O |

Scoring tip: You may mark "N/O" for No Opportunity if the individual does not have a health concern that requires special procedures, diet, or treatments.

| 40 | Keeps track of medications (nonprescription and prescription) and refills them as needed. | 2 | 1 | 0 | DK | |
| 41 | Makes appointments for regular medical and dental checkups. | 2 | 1 | 0 | DK | |

Domestic

| 1 | Is careful around hot objects (for example, the stove or over, an open fire, etc.). | 2 | 1 | 0 | DK | |

2	Helps with simple household chores (for example, dusts, picks up clothes or toys, feeds pet, etc.).	2	1	0	DK	
3	Clears unbreakable items from own place at table.	2	1	0	DK	
4	Cleans up play or work area at end of an activity (for example, finger painting, model building, etc.).	2	1	0	DK	
5	Puts away personal possessions (for example, toys, books, magazines, etc.).	2	1	0	DK	
6	Is careful when using sharp objects (for example, scissors, knives, etc.).	2	1	0	DK	
7	Clears breakable items from own place at table.	2	1	0	DK	
8	Helps prepare foods that require mixing and cooking (for example, cake or cookie mixes, macaroni and cheese, etc.).	2	1	0	DK	
9	Uses simple appliances (for example, a toaster, can opener, bottle opener, etc.).	2	1	0	DK	
10	*Uses microwave oven for heating, baking, or cooking (that is, sets time and power setting, etc.).*	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there is no microwave in the home.

11	Puts clean clothes away in proper place (for example, in drawers or closet, on hooks, etc.).	2	1	0	DK
12	Uses tools (for example, a hammer to drive nails, a screwdriver to screw and unscrew screws, etc.).	2	1	0	DK
13	Washes dishes by hand, or loads and uses dishwasher.	2	1	0	DK
14	Sweeps, mops, or vacuums floors thoroughly.	2	1	0	DK

Scoring tip: Mark "2" if the individual mops, sweeps, or vacuums so well that the task does not have to be redone; mark a "1" if the individual doesn't consistently complete the task well; mark a "0" if the individual never mops, sweeps, or vacuums, or does the task so poorly that it always needs to be redone.

15	Clears table completely (for example, scrapes and stacks dishes, throws away disposable items, etc.).	2	1	0	DK
16	Uses household products correctly (for example, laundry detergent, furniture polish, glass cleaner, etc.).	2	1	0	DK
17	Prepares basic foods that do not need mixing but require cooking (for example, rice, soup, vegetables, etc.).	2	1	0	DK
18	Cleans one or more rooms other than own bedroom.	2	1	0	DK
19	Uses sharp knife to prepare food.	2	1	0	DK
20	Uses stove or oven for heating, baking, or cooling (that is, turns burners on and off, sets oven temperature, etc.).	2	1	0	DK
21	Prepares food from ingredients that require measuring, mixing,	2	1	0	DK

and cooking.

22	Washes clothing as needed.	2	1	0	DK	
23	Performs maintenance tasks as needed (for example, replaces light bulbs, changes vacuum cleaner bag, etc.).	2	1	0	DK	
24	Plans and prepares main meal of the day.	2	1	0	DK	

Community

1	Demonstrates understanding of function of telephone (for example, pretends to talk on phone, etc.).	2	1	0	DK	
2	Talks to familiar person on telephone.	2	1	0	DK	
3	Uses TV or radio without help (for example, turns equipment on, accesses channel or station, selects program, etc.).	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there is no TV or radio in the home.

4	Counts at least 10 objects, one by one.	2	1	0	DK	
5	Is aware of and demonstrates appropriate behavior while riding in car (for example, keeps seat belt on, refrains from distracting driver, etc.).	2	1	0	DK	
6	Demonstrates understanding of the function of money (for example, says, "Money is what you need to buy things at the store"; etc.).	2	1	0	DK	
7	Uses sidewalk (where available) or shoulder of road when walking or using wheeled equipment (for example, skates, scooter, tricycle, etc.).	2	1	0	DK	
8	Demonstrates understanding of function of clock (for example, says, "Clocks tell time"; "What time can we go?"; etc.).	2	1	0	DK	
9	Follows household rules (for example, no running in the house, no jumping on the furniture, etc.).	2	1	0	DK	
10	Demonstrates computer skills necessary to play games or start programs with computer turned on; does not need to turn computer on by self.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there is no computer in the home.

11	Summons to the telephone the person receiving a call or indicates that the person is not available.	2	1	0	DK	
12	Identifies penny, nickel, dime, and quarter by name when asked; does not need to know the value of coins.	2	1	0	DK	
13	Looks both ways when crossing streets or roads.	2	1	0	DK	
14	Says current day of the week when asked.	2	1	0	DK	
15	Demonstrates understanding of right to personal privacy for self and others (for example, while using restroom or changing	2	1	0	DK	

clothes, etc.).

16	Demonstrates knowledge of what phone number to call in an emergency when asked.	2	1	0	DK	
17	Tells time using a digital clock or watch.	2	1	0	DK	
18	States value of penny (1 cent), nickel (5 cents), dime (10 cents), and quarter (25 cents).	2	1	0	DK	
19	Discriminates between bills of different denominations (for example, refers to $1 bills, $5 bills, etc., in conversation; etc.).	2	1	0	DK	
20	Obeys traffic lights and *Walk* and *Don't Walk* signs.	2	1	0	DK	
21	Points to current or other date on calendar when asked.	2	1	0	DK	
22	Demonstrates understanding that some items cost more than others (for example, says, "I have enough money to buy gum but not a candy bar"; "Which pencil costs less?"; etc.).	2	1	0	DK	
23	Tells time by the half hour on analog clock (for example, 1:30, 2:00, etc.).	2	1	0	DK	
24	Makes telephone calls to others, using standard or cell phone.	2	1	0	DK	
25	Orders a complete meal in a fast-food restaurant.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if individual has not eaten at a fast-food restaurant.

26	Carries or stores money safely (for example, in wallet, purse, money belt, etc.).	2	1	0	DK	
27	Tells time by 5-minute segments on analog clock (for example, 1:05, 1:10, etc.).	2	1	0	DK	
28	Obeys curfew parent or caregiver sets.	2	1	0	DK	
29	Watches or listens to programs for information (for example, weather report, news, educational program, etc.).	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there is no TV or radio in the home.

30	Counts change from a purchase.	2	1	0	DK	
31	Demonstrates computer skills necessary to carry out complex tasks (for example, word processing, accessing the internet, installing software, etc.).	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there is no computer in the home.

32	Evaluates quality and price when selecting items to purchase.	2	1	0	DK	
33	Obeys time limits for breaks (for example, lunch or coffee breaks, etc.).	2	1	0	DK	
34	Travels at least 5 to 10 miles to familiar destination (that is, bikes, uses public transportation, or drives self).	2	1	0	DK	

35	Demonstrates understanding of right to complain or report legitimate problems when dissatisfied with services or situations.	2	1	0	DK
36	Notifies school or supervisor when he or she will be late or absent.	2	1	0	DK
37	Uses savings or checking account responsibly (for example, keeps some money in account, tracks balance carefully, etc.).	2	1	0	DK
38	Travels at least 5 to 10 miles to unfamiliar destination (that is, bikes, uses public transportation, or drives self).	2	1	0	DK
39	Earns money at part-time job (that is, at least 10 hours a week) for 1 year.	2		0	DK

Scoring tip: Do not mark 1.

40	Attempts to improve job performance after receiving constructive criticism from supervisor.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if the individual has not held a job.

41	Manages own money (for example, pays most or all own expenses, uses checks or money orders for purchases as needed, etc.).	2	1	0	DK
42	Has held full-time job for 1 year.	2		0	DK

Scoring tip: Do not mark 1.

43	Budgets for monthly expenses (for example, utilities, rent, etc.).	2	1	0	DK
44	Applies for and uses personal credit card responsibly (for example, does not exceed credit limit, pays on time, etc.).	2	1	0	DK

Socialization Domain

Response Options: **2** = Usually; **1** = Sometimes or Partially, **0** = Don't Know

Interpersonal Relationships

1	Looks at face of parent or caregiver.	2	1	0	DK
2	Watches (that is, follows with eyes) someone moving by crib or bed for 5 seconds or more.	2	1	0	DK
3	Shows two or more emotions (e.g., laughs, cries, screams, etc.).	2	1	0	DK
4	Smiles or makes sounds when approached by a familiar person.	2	1	0	DK
5	Makes or tries to make social contact (for example, smiles, makes noises, etc.).	2	1	0	DK
6	Reaches for familiar person when person holds out arms to him/her.	2	1	0	DK
7	Shows preference for certain people and objects (for example, smiles, reaches for or moves toward person or object, etc.).	2	1	0	DK
8	Shows affection to familiar persons (for example, touches, hugs, kisses, cuddles, etc.).	2	1	0	DK

9	Imitates or tries to imitate parent's or caregiver's facial expressions (for example, smiles, frowns, etc.).	2	1	0	DK
10	Moves about looking for parent or caregiver or other familiar person nearby.	2	1	0	DK
11	Shows interest in children the same age, other than brothers or sisters (for example, watches them, smiles at them, etc.).	2	1	0	DK
12	Imitates simple movements (for example, claps hands, waves goodbye, etc.).	2	1	0	DK
13	Uses actions to show happiness or concern for others (for example, hugs, pats arm, holds hands, etc.).	2	1	0	DK
14	Shows desire to please others (for example, shares a snack or toy, tries to help even if not capable, etc.).	2	1	0	DK
15	Demonstrates friendship-seeking behavior with others the same age (for example, says, "Do you want to play?" or takes another child by the hand, etc.).	2	1	0	DK
16	Imitates relatively complex actions as they are being performed by another person (for example, shaving, putting on makeup, hammering nails, etc.).	2	1	0	DK
17	Answers when familiar adults make small talk (for example, if asked, "How are you?" says "I'm fine"; if told, "You look nice," says, "Thank you"; etc.).	2	1	0	DK
18	Repeats phrases heard spoken before by an adult (for example, "Honey, I'm home"; "No dessert until you clean your plate"; etc.).	2	1	0	DK
19	Uses words to express own emotions (for example, "I'm happy"; "I'm scared"; etc.).	2	1	0	DK
20	Has best friend or shows preference for certain friends (of either sex) over others.	2	1	0	DK
21	Imitates relatively complex actions several hours after watching someone else perform them (for example, shaving, putting on makeup, hammering nails, etc.).	2	1	0	DK
22	Uses words to express happiness or concern for others (for example, Says, "Yeah! You won"; "Are you all right?"; etc.).	2	1	0	DK
23	Acts when another person needs a helping hand (for example, holds door open, picks up dropped items, etc.).	2	1	0	DK
24	Recognizes the likes and dislikes of others (for example, says, "Chow likes soccer"; "Susie doesn't eat pizza"; etc.).	2	1	0	DK
25	Shows same level of emotion as others around him or her (for example, does not downplay or overdramatize a situation, etc.).	2	1	0	DK
26	Keeps comfortable distance between self and others in social situations (for example, does not get too close to another person when talking, etc.).	2	1	0	DK

27	Talks with others about shared interests (for example, sports, TV shows, summer plans, etc.).	2	1	0	DK
28	Starts small talk when meets people he or she knows (for example, says, "How are you?; What's up?"; etc.).	2	1	0	DK
29	Meets with friends regularly.	2	1	0	DK
30	Chooses not to say embarrassing or mean things or ask rude questions in public.	2	1	0	DK
31	Places reasonable demands on friendship (for example, does not expect to be a person's only friend or to have the friend always available, etc.).	2	1	0	DK
32	Understands that others do not know his or her thoughts unless he or she says them.	2	1	0	DK
33	Is careful when talking about personal things.	2	1	0	DK
34	Cooperates with others to plan or be part of an activity (for example, a birthday party, sports event, etc.).	2	1	0	DK
35	Demonstrates understanding of hints or indirect cues in conversation (for example, knows that yawns may mean, ""I'm bored," or a quick change of subject may mean, "I don't want to talk about that"; etc.).	2	1	0	DK
36	Starts conversations by talking about things that interest others (for example, says, "Tyrone tells me you like computers"; etc.).	2	1	0	DK
37	Goes on group dates.	2	1	0	DK
38	Goes on single dates.	2	1	0	DK

Play and Leisure

1	Responds when parent or caregiver is playful (for example, smiles, laughs, claps hands, etc.).	2	1	0	DK
2	Shows interest in where he or she is (for example, looks or moves around, Touches objects or people, etc.).	2	1	0	DK
3	Plays simple interaction games with others (for example, peek-a-boo, patty-cake, etc.).	2	1	0	DK
4	Plays near another child, each doing different things	2	1	0	DK
5	Chooses to play with other children (for example, does not stay on the edge of a group or avoid others).	2	1	0	DK
6	Plays cooperatively with one or more children for up to 5 minutes.	2	1	0	DK
7	Plays cooperatively with more than one child for more than 5 minutes.	2	1	0	DK
8	Continues playing with another child with little fussing when parent or caregiver leaves.	2	1	0	DK
9	Shares toys or possessions when asked.	2	1	0	DK

10	Plays with others with minimal supervision.	2	1	0	DK
11	Uses common household objects or other objects for make-believe activities (e.g., pretends a block is a car, a box is a house, etc.).	2	1	0	DK
12	Protects self by moving away from those who destroy things or cause injury (e.g., those who bite, hit, throw things, pull hair, etc.).	2	1	0	DK
13	Plays simple make-believe activities with others (e.g., plays dress-up, pretends to be superheroes, etc.).	2	1	0	DK
14	Seeks out others for play or companionship (e.g., invites others home, goes to another's home, plays with others on playground, etc.).	2	1	0	DK
15	Takes turns when asked while playing games or sports.	2	1	0	DK
16	Plays informal, outdoor group games (e.g., tag, jump rope, catch, etc.).	2	1	0	DK
17	Shares toys or possessions without being asked.	2	1	0	DK
18	Follows rules in simple games (relay races, spelling bees, electronic games, etc.).	2	1	0	DK
19	Takes turns without being asked.	2	1	0	DK
20	Plays simple card or board games based only on chance (e.g., Go Fish, Crazy Eights, Sorry, etc.).	2	1	0	DK
21	Goes places with friends during the day with adult supervision (for example, to a shopping mall, park, community center, etc.).	2	1	0	DK
22	Asks permission before using objects belonging to or being used by another.	2	1	0	DK
23	Refrains from entering group when nonverbal cues indicate that he or she is not welcome.	2	1	0	DK
24	Plays simple games that require keeping score (for example, kickball, pickup basketball, etc.).	2	1	0	DK
25	Shows good sportsmanship (that is, follows rules, is not overly aggressive, congratulates other team on winning, and does not get mad when losing).	2	1	0	DK
26	Plays more than one board, card, or electronic game requiring skill and decision making (for example, Monopoly, Cribbage, etc.).	2	1	0	DK
27	Goes places with friends in evening with adult supervision (for example, to a concert, lecture, sporting event, movie, etc.).	2	1	0	DK
28	Follows rules in complex games or sports (for example, football, soccer, volleyball, etc.).	2	1	0	DK
29	Goes places with friends during the day without adult supervision (for example, to a shopping mall, park, community center, etc.).	2	1	0	DK

| 30 | Plans fun activities with more than two things to be arranged (for example, a trip to a beach or park that requires planning transportation, food, recreational items, etc.). | 2 | 1 | 0 | DK |
| 31 | Goes places with friends in evening without adult supervision (for example, to a concert, lecture, sporting event, movie, etc.). | 2 | 1 | 0 | DK |

Coping Skills

1	Changes easily from one at-home activity to another.	2	1	0	DK
2	Says "thank you" when given something.	2	1	0	DK
3	Changes behavior depending on how well he or she knows another person (for example, acts differently with family member than with stranger, etc.).	2	1	0	DK
4	Chews with mouth closed.	2	1	0	DK
5	Says "please" when asking for something.	2	1	0	DK
6	Ends conversations appropriately (for example, says, "Good-bye"; "See you later"; etc.).	2	1	0	DK
7	Cleans or wipes face and hands during and/or after meals.	2	1	0	DK
8	Responds appropriately to reasonable changes in routine (for example, Refrains from complaining, etc.).	2	1	0	DK
9	Says that he or she is sorry for unintended mistakes (for example, bumping into someone, etc.).	2	1	0	DK
10	Chooses not to taunt, tease, or bully.	2	1	0	DK
11	Acts appropriately when introduced to strangers (for example, nods, smiles, shakes hands, greets them, etc.).	2	1	0	DK
12	Changes voice level depending on location or situation (for example, in a library, during a movie or play, etc.).	2	1	0	DK
13	Says he or she is sorry after hurting another's feelings.	2	1	0	DK
14	Refrains from talking with food in mouth.	2	1	0	DK
15	Talks with others without interrupting or being rude.	2	1	0	DK
16	Accepts helpful suggestions or solutions from others.	2	1	0	DK
17	Controls anger or hurt feelings when plans change for reason(s) that cannot be helped (for example, bad weather, car trouble, etc.).	2	1	0	DK
18	Keeps secrets or confidences for longer than one day.	2	1	0	DK
19	Says he or she is sorry after making unintentional mistakes or errors in judgment (for example, when unintentionally leaving someone out of a game, etc.).	2	1	0	DK
20	Shows understanding that gentle teasing with family and friends can be a form of humor or affection.	2	1	0	DK
21	Tells parent or caregiver about his or her plans (for example, what time he or she is leaving and returning, where he or she is going,	2	1	0	DK

etc.).

22	Chooses to avoid dangerous or risk activities (for example, what time he or she is leaving and returning, where he or she is going, etc.).	2	1	0	DK
23	Controls anger or hurt feelings when he or she does not get his or her way (for example, when not allowed to watch television or attend a party; when suggestion is rejected by friend or supervisor; etc.).	2	1	0	DK
24	Follows through with arrangements (for example, if promises to meet someone, meets that person; etc.).	2	1	0	DK
25	Stops or stays away from relationships or situations that are hurtful or dangerous (for example, being bullied or made fun of, being taken advantage of sexually or financially, etc.).	2	1	0	DK
26	Controls anger or hurt feelings due to constructive criticism (for example, correction of misbehavior, discussion of test score or grade, performance review, etc.).	2	1	0	DK
27	Keeps secrets or confidences for as long as needed.	2	1	0	DK
28	Thinks about what could happen before making decisions (for example, refrains from acting impulsively, things about important information, etc.).	2	1	0	DK
29	Is aware of potential danger and uses caution when encountering risk social situations (for example, binge drinking parties, Internet chat rooms, personal ads, etc.).	2	1	0	DK
30	Shows respect for co-workers (for example, does not distract or interrupt others who are working, is on time for meetings, etc.).	2	1	0	DK

Motor Skills Domain

Response Options: **2** = Usually; **1** = Sometimes or Partially, **0** = Don't Know

Gross

1	Holds head erect for at least 15 seconds when held upright in parent's or caregiver's arms.	2	1	0	DK
2	Sits supported (for example, in a chair, with pillows, etc.) for at least 1 minute.	2	1	0	DK
3	Sits without support for at least 1 minute.	2	1	0	DK
4	Creeps or moves on stomach across floor.	2	1	0	DK
5	Sits without support for at least 10 minutes.	2	1	0	DK
6	Raises self to sitting position and sits without support for at least 1 minute.	2	1	0	DK
7	Crawls at least 5 feet on hands and knees, without stomach touching floor.	2	1	0	DK
8	Pulls self to standing position.	2	1	0	DK

9	Crawls up stairs.	2	1	0	DK
10	Takes at least two steps.	2	1	0	DK
11	Stands along for 1 to 3 minutes.	2	1	0	DK
12	Rolls ball while sitting.	2	1	0	DK
13	Climbs on and off low objects (for example, chair, step stool, slide, etc.).	2	1	0	DK
14	Crawls down stairs.	2	1	0	DK
15	Stands for at least 5 minutes.	2	1	0	DK
16	Walks across room; may be unsteady and fall occasionally.	2	1	0	DK
17	Throws ball.	2	1	0	DK
18	Walks to get around; does not need to hold on to anything.	2	1	0	DK
19	Climbs on and off adult-sized chair.	2	1	0	DK
20	Runs without falling; may be awkward and uncoordinated.	2	1	0	DK
21	Walks up stairs, putting both feet on each step; may use railing.	2	1	0	DK
22	Kicks ball.	2	1	0	DK
23	Runs smoothly without falling.	2	1	0	DK
24	Walks down stairs, facing forward, putting both feet on each step; may use railing.	2	1	0	DK
25	Jumps with both feet off floor.	2	1	0	DK
26	Throws ball of any size in specific direction.	2	1	0	DK
27	Catches beach-sized ball with both hands from a distance of 2 to 3 feet.	2	1	0	DK
28	Walks up stairs, alternating feet; may use railing.	2	1	0	DK
29	Pedals tricycles or other three-wheeled toy for at least 6 feet.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if the individual does not have a tricycle or three-wheeled toy. However, if the individual has such a vehicle but does not ride in it for any reason, including parent or caregiver does not think he or she is ready, mark "0".

30	Jumps or hops forward at least three times.	2	1	0	DK
31	Hops on one foot at least once without falling; may hold on to something for balance.	2	1	0	DK
32	Climbs on and off high objects (for example, jungle gym, 4-foot slide ladder, etc.).	2	1	0	DK
33	Walks down stairs, alternating feet; may use railing.	2	1	0	DK
34	Runs smoothly, with changes in speed and direction.	2	1	0	DK
35	Rides bicycle with training wheels for at least 10 feet.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if the individual does not have a bicycle. However, if the individual has a bike but does not ride it for any reason, including the parent or caregiver does not think he or she is ready, mark "0".

36	Catches beach-sized ball (from at least 6 feet away) with both hands.	2	1	0	DK	
37	Hops forward on one foot with ease.	2	1	0	DK	
38	Skips at least 5 feet.	2	1	0	DK	
39	Catches tennis or baseball-sized ball (from at least 10 feet away), moving to catch it if necessary.	2	1	0	DK	
40	Rides bicycle with no training wheels without falling.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if the individual does not have a bicycle. However, if the individual has a bike but does not ride it for any reason, including the parent or caregiver does not think he or she is ready, mark "0".

Fine

1	Reaches for toy or object	2	1	0	DK
2	Picks up small objects (no larger than 2 inches on any side); may use both hands.	2	1	0	DK
3	Moves object from one hand to the other.	2	1	0	DK
4	Squeezes squeaky toy or object,	2	1	0	DK
5	Picks up small object with thumb and fingers.	2	1	0	DK
6	Removes object (for example, a block or clothespin) from a container.	2	1	0	DK
7	Puts object (for example, a block or clothespin) into container.	2	1	0	DK
8	Turns pages of board, cloth, or paper book, one at a time.	2	1	0	DK
9	Stacks at least four small blocks or other small objects; stack must not fall.	2	1	0	DK
10	Opens doors by turning doorknobs.	2	1	0	DK
11	Unwraps small objects (for example, gum or candy).	2	1	0	DK
12	Completes simple puzzles of at least two pieces or shapes.	2	1	0	DK
13	Turns book or magazine pages one by one.	2	1	0	DK
14	Uses twisting hand-wrist motion (for example, winds up toy, screws/unscrews lit of jar, etc.).	2	1	0	DK
15	Holds pencil in proper position (not with fist) for writing or drawing.	2	1	0	DK
16	Colors simple shapes; may color outside the lines.	2	1	0	DK
17	Builds three-dimensional structures (for example, a house, bridge, vehicle, etc.) with at least five small blocks.	2	1	0	DK

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18	Opens and closes scissors with one hand.	2	1	0	DK	
19	Glues or pastes two or more pieces together (for example, for art of science projects, etc.).	2	1	0	DK	
20	Uses tape to hold things together (for example, torn page, art project, etc.).	2	1	0	DK	
21	Draws more than one recognizable form (for example, person, house, tree, etc.).	2	1	0	DK	

Scoring tip: Mark a "2" if the individual draws two or more recognizable forms; make a "1" if the individual draws one form; mark a "0" if the individual does not draw any recognizable forms.

22	Makes recognizable letters or numbers.	2	1	0	DK	
23	Draws circle freehand while looking at example.	2	1	0	DK	
24	Uses scissors to cut across paper along a straight line.	2	1	0	DK	
25	Colors simple shapes; colors inside the lines.	2	1	0	DK	
26	Cuts out simple shapes (for example, circles, squares, rectangles, etc.).	2	1	0	DK	
27	Uses eraser without tearing paper.	2	1	0	DK	
28	Draws square freehand while looking at example.	2	1	0	DK	
29	Draws triangle freehand while looking at example.	2	1	0	DK	
30	Ties knot.	2	1	0	DK	
31	Draws straight line using a ruler or straightedge.	2	1	0	DK	
32	Unlocks dead-bolt, key, or combination locks that require twisting.	2	1	0	DK	N/O

Scoring tip: You may mark "N/O" for No Opportunity if there are no dead-bolt, key, or combination locks in the home.

33	Cuts out complex shapes (for example, stars, animals, alphabet letters, etc.).	2	1	0	DK	
34	Uses keyboard, typewriter, or touch screen to type name or short words; may look at keys.	2	1	0	DK	N/O

Scoring tip: you may mark "N/O" for No Opportunity if there is no computer in the home.

35	Ties secure bow.	2	1	0	DK	
36	Uses keyboard to type up to 10 lines; may look at the keys.	2	1	0	DK	N/O

Scoring tip: you may mark "N/O" for No Opportunity if there is no computer in the home.

APPENDIX C

CHILDHOOD AUTISM RATING SCALE, SECOND EDITION–STANDARD VERSION

For each category, use the space provided in the *Observations* section for taking notes concerning the behaviors relevant to that item. After you have finished observing the child, rate the behaviors relevant to each item by circling the number that corresponds to the statement that best describes the child. You may indicate that the child's behavior falls between two descriptions by circling ratings of 1.5, 2.5, or 3.5. Abbreviated rating criteria are presented for each item. See chapter 2 of the Manual for detailed rating criteria.

Item	Score	Description
1		**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 to or initiates contact with the adult. Only the most persistent attempts to get the child's attention have any effect.
2		**Imitation**
	1	*Appropriate imitation.* The child can imitate sounds, words, and movements that are appropriate for his or her skill level.
	1.5	
	2	*Mildly abnormal imitation.* The child imitates simple behaviors such as clapping for 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.

3		**Emotional Response**
	1	*Age-appropriate and situation-appropriate emotional response.* 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 response.* The child occasionally displays a somewhat inappropriate type or degree of emotional reaction. Reactions are sometimes unrelated to the objects or events surrounding him or her.
	2.5	
	3	*Moderately abnormal emotional response.* The child shows definite signs of inappropriate type and/or degree of emotional response. Reactions may be quire inhibited or excessive and unrelated to the situation; child may grimace, laugh, or become rigid even though no apparent emotion-producing objects or events are present.
	3.5	
	4	*Severely abnormal emotional response.* Responses are seldom appropriate to the situation; once the child gets in a certain mood, it is very difficult to chance the mood. Conversely, the child may show wildly different emotions when nothing has changed.

4		**Body Use**
	1	*Age-appropriate body use.* The child moves with the same ease, agility, and coordination as 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.

5		**Object Use**
	1	*Appropriate interest in, or use of, 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 interests in, or use of, toys and other objects.* The child may show atypical interest in a toy or play with it in an inappropriate 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 litter 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 and 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.

6	**Adaptation to Change**

1   *Age-appropriate adaptation to change.* While the child may notice or comment on changes in routine, he or she accepts these changes without undue stress.

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.

7	**Visual Response**

1   *Age-appropriate visual response.* The child's visual behavior is normal and appropriate for his or her 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 are his or her 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 usual 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 focus of other visual peculiarities described above.

8		**Listening Response**
	1	*Age-appropriate listening response.* The child's listening behavior is normal and appropriate for his or her 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.

9		**Taste, Smell, and Touch Response**
	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.
10		**Fear or Nervousness**
	1	*Normal fear or nervousness.* The child's behavior is appropriate both to the situation and for 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.* Fear persists 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 that other children of the same age avoid.
11		**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, or complex noises approximating speech, or may show persistent, bizarre use of some recognizable words or phrases.
12		**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 a typically developing 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 uses only bizarre or peculiar gestures that have no apparent meaning and shows no awareness of the meanings associated with the gestures or facial expressions of others.

13		**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.

14		**Level and Consistency of Intellectual Response**
	1	*Intelligence is normal and reasonable 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	The child has low intelligence (IQ score between 71 and 85) and does not have any unusual intellectual skills or problems.
	2	*Mildly abnormal intellectual functioning.* The child has very low intelligence (IQ score is 70 or lower) and his or her skills appear fairly evenly delayed across all areas.
	2.5	The child has very low intelligence (IQ score is 70 or lower) and skills appear to vary across areas, but none is at or above average.
	3	*Moderately abnormal intellectual functioning.* The child's overall intelligence is in the range from intellectually disabled to average (IQ score less than 115), and there is significant variability in skills. At least one skill

		is in average range.
	3.5	The child's overall intelligence is in the range from intellectual disability to average (IQ score less than 115), and there is significant variability in skills. At least one skill in above average range. Extreme savant skills are not included here but are rated in category 4.
	4	*Severely abnormal intellectual functioning.* A rating of 4 is given when extreme savant skills are present, regardless of overall level of intelligence.
15		**General Impressions**
	1	*No autism spectrum disorder.* The child shows none of the symptoms characteristic of autism.
	1.5	
	2	*Mild autism spectrum disorder.* The child shows only a few symptoms or only a mild degree of autism.
	2.5	
	3	*Moderate autism spectrum disorder.* The child shows a number of symptoms or a moderate degree of autism.
	3.5	
	4	*Severe autism spectrum disorder.* The child shows many symptoms or an extreme degree of autism.

CENTER FOR EPIDEMIOLOGICAL STUDIES DEPRESSION SCALE

You are going to read a list of ways you may have felt. Please circle the number that best indicates how often you have felt this way **during the past week**.

During the past week, that would be from _____ (date) through today:		Rarely or none of the time (less than 1 day)	Some or little of the time (1-2 days)	Occasionally or moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
a.	I was bothered by things that don't usually bother me.	0	1	2	3
b.	I did not feel like eating; my appetite was poor.	0	1	2	3
c.	I felt that I could not shake off the blues even with help from my family or friends.	0	1	2	3
d.	I felt that I was just as good as other people.	0	1	2	3
e.	I had trouble keeping my mind on what I was doing.	0	1	2	3
f.	I felt depressed.	0	1	2	3
g.	I felt that everything I did was an effort.	0	1	2	3
h.	I felt hopeful about the future.	0	1	2	3
i.	I thought my life had been a failure.	0	1	2	3
j.	I felt fearful.	0	1	2	3
k.	My sleep was restless.	0	1	2	3
l.	I was happy.	0	1	2	3
m.	I talked less than usual.	0	1	2	3
n.	I felt lonely.	0	1	2	3
o.	People were unfriendly.	0	1	2	3
p.	I enjoyed life.	0	1	2	3
q.	I had crying spells.	0	1	2	3
r.	I felt sad.	0	1	2	3
s.	I felt that people dislike me.	0	1	2	3
t.	I could not get "going".	0	1	2	3

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